

Research Article

Bibliometric analysis of environmental, social and corporate governance (ESG) articles published in the Scopus database

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ABSTRACT

The aim of this study is to examine the literature on environmental, social and governance (ESG) studies using bibliometric analysis methods, to analyze authors, documents, sources and country performance, and to reveal the conceptual structure of the field. For this purpose, 2,055 articles published in the Scopus database between 2007 and 2024 were analyzed. As a result of the study, it was revealed that Khaled Hussainey is the most productive and influential author in the field. The article, entitled "Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance", published by S. Gillan et al. in 2021, is the most influential document, the journal with the highest number of publications is Sustainability (Switzerland), and the country where the most recent studies are conducted is China. In addition, the study found that the articles published in this field were grouped into 6 clusters and the most recent keywords were "green innovation" and digital transformation.

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INTRODUCTION

Human society will continue to search for progress as long as there is life. Today, with the advancement of economy, technology and society, the world faces a variety of opportunities and challenges. In 2020, there have been many "black swan" events, the global spread of COVID-19, the US stock market crash four times in two weeks, the locust epidemic in Africa, the delisting of Luckin Coffee due to fraud, environmental (E), social (S) and governance (G) issues have raised global concerns. As a result, the issue of "sustainable and inclusive development" has become a global agenda. International organizations and countries around the world have proposed sustainable development action plans, such as ESG, to establish a framework for sustainable and inclusive development

in response to the growing challenges of sustainable development in the environment, society and the financial market [1]. Over the past two decades, there has been a significant increase in interest in socially responsible investing (SRI), also known as ethical investing or sustainable investing, around the world as awareness of the importance of sustainable activities has grown. SRI is defined as the integration of non-financial issues such as environmental, social and corporate governance (ESG) into the investment decision-making process [2].

As a result of pressure from regulators, NGOs and stakeholders, and in the wake of financial scandals, more and more companies are seeking to incorporate environmental, social and other local regulations into their strategies. Companies aim to give stakeholders a clear picture of their corporate re-

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sponsibility practices and efforts. As a result, corporate disclosure of ESG issues has been developing in various dimensions for more than two decades, and an increasing number of companies have started to engage in ESG disclosure activities [3]. These activities have led to the emergence of ESG rating agencies. ESG rating agencies screen companies using proprietary research methodologies, assess companies' sustainability performance and provide ESG ratings. Thomson Reuters' ASSET4, the Ethical Investment Research Service (EIRIS), MSCI's Kinder Lydenberg Domini & Co. (KLD) and the Sustainable Asset Management Group (SAM) are among the most prominent ESG rating agencies. Other rating agencies, such as Bloomberg Sustainability, also calculate and publish ESG disclosure scores [2]. Socially responsible managers and investors take ESG ratings into account in their decision-making, and they have become an important resource for conscientious consumers [4].

The rapid development of ESG ratings in the recent period has led the academic world to address the issue. According to proponents of ESG ratings, these ratings objectively and effectively measure a company's ESG efforts while correcting information asymmetries for stakeholders [5], providing access to resources, improving corporate competitiveness, social reputation and performance [6]. In contrast, some scholars argue that ESG ratings are not effective. They believe that ESG ratings symbolically force companies to comply with external requirements in order to gain various benefits, which does not contribute meaningfully to corporate sustainability behavior [7] but rather represents corporate decline and may mislead stakeholders [8]. As a result of these divergent views, numerous studies have been conducted on the effectiveness of environmental, social and governance (ESG) ratings [9]. ESG ratings and corporate financial performance or capital market reactions have generally been the focus of these studies [10], [11].

This study analyses studies in the field of ESG using a bibliometric analysis method. The aim of the study is to identify the leading authors, articles, sources and countries in the field by analyzing the literature and to reveal the conceptual structure of the field. It is expected that the study will inform researchers wishing to work in the field about the structure of the field and the issues can focus on, provide guidance by highlighting the gaps in the field, and thus contribute to

sustainability in ESG dimensions. In the following sections of the study, the literature on bibliometric studies in the field of ESG will be mentioned. The methodology of the study will then be explained and the findings and results will be presented. Finally, the limitations of the study are mentioned and suggestions for future studies are provided.

LITERATURE REVIEW

In recent years, the number of ESG studies has increased in parallel with the importance and awareness of ESG activities. Some of the studies in this field have focused on the financial implications of ESG performance. For example, [12] find that companies with high CSR performance face lower capital constraints, which is supported by stakeholder engagement and transparency. [13] reveal that there is a generally positive relationship between ESG and firm financial performance and that this effect is stable over time. In addition, [14] find a moderate positive relationship between ESG disclosure and corporate efficiency, with the strongest effect coming from governance information. In this field, there are also studies that examine the relationship between ESG performance and firms' strategic decisions. [15] stated that companies respond positively to the issuance of green bonds, which increases the liquidity of their shares. [16] conducted a study for multinational logistics companies and found that "greenhouse gas emissions" is the most important criterion and "eco-efficiency" is the best environmental competitive strategy. These results show that ESG performance is closely linked not only to financial results but also to strategic decisions. Some studies have also examined how ESG activities are perceived under political and economic conditions. [17] reported that investors pay a premium for environmental and social investments during periods of high political uncertainty. This shows that social and environmental investments have a significant impact on investors' decisions. In addition, [18] show that companies increase their ESG activities during periods of high economic policy uncertainty, and that these activities are perceived as risk-reducing and value-enhancing.

There are also studies in the literature that have been analyzed using bibliometric methods. These are summarized in Table 1.

Table 1. Studies conducted using the bibliometric analysis method in the field of ESG

No	Author(s)	Title	Publication year	Period covered	Database covered	Number of analysed publication	Aim of the study
1	T. S. Legendre A. Ding Ki-Joon Back [19]	A bibliometric analysis of the hospitality and tourism environmental, social, and governance (ESG) literature	2024	1978 -2021	WoS	704	To carry out a bibliometric analysis of the studies carried out in the field of ESG
2	M.S. Khamisu A.R. Paluri [20]	What's past is prologue: reminiscing research on environment social governance (ESG) disclosures	2024	2006-2022	Scopus WoS	794	To analyse the literature on ESG disclosure
3	X. Zhao D. Nan C. Chen S. Zhang S. Che J.H.Kim [21]	Bibliometric study on environmental, social, and governance research using CiteSpace	2023	2007–2021	WoS	849	To provide an overview of the state of the art of ESG research and the emerging trends
4	J. Karishma P.S. Tripathi [22]	Mapping the environmental, social and governance literature: a bibliometric and content analysis	2023	2018-2023	Scopus WoS	190	To quantify and map the academic literature on ESG from a bibliometric perspective and provide a
5	G. Wan A.Y.Dawod S. Chanaim S.S.Ramasamy [23]	Hotspots and trends of environmental, social and governance (ESG) research: a bibliometric analysis	2023	2004-2021	WoS	755	To analyse the literature on ESG-related topics
6	G. Wan A. Y. Dawod C. Nopasit [24]	A bibliometric and visual analysis in the field of environment, social and governance (ESG) between 2004 and 2021	2023	2004-2021	WoS	1735	To examine the performance and structure of the ESG literature and identify future areas of research
7	S.Senadheera R.Gregory J.Rinklebe M.Farrukh J.Rhee Y.Tamam [25]	The development of research on environmental, social, and governance (ESG): a bibliometric analysis	2022	2001 - 2021	Scopus	981	To explore current and future research directions in ESG

8	S.Galletta S. Mazzù V. Naciti[26]	A bibliometric analysis of ESG performance in the banking industry: from the current status to future directions	2022	1986–2021	Wos	271	To assess the development of the literature on ESG in the banking sector, the characteristics of authors and articles, and to examine research trends.
9	N.O.D. Ellili [27]	Bibliometric analysis and systematic review of environmental, social, and governance disclosure papers: current topics and recommendations for future research	2022	2010-2021	Scopus	161	To provide an analysis of the literature on ESG disclosure
10	H.-j. Siao S.-H. Gau J.-H. Kuo M.-G. Li C.-J. Sun[28]	Bibliometric analysis of environmental, social, and governance management	2022	2002-2021	WoS	3599	To examine the trend and evolution of published research from 2002 to 2021
11	S. Gao F. Meng Z. Gu Z. Liu M.Farrukh [29]	Mapping and clustering analysis on environmental, social and governance field a bibliometric analysis using Scopus	2021	1990- 2020	Scopus	690	To conduct a bibliometric and visualisation study of the ESG literature.

As can be seen in Table 1, there are bibliometric analysis studies in the literature that have been conducted to examine studies in the field of ESG based on specific sectors [19], [26]. There are also studies that focus on specific areas related to ESG, such as ESG disclosure [20], [27]. In some bibliometric analysis studies, all studies in the field of ESG have been reviewed. Some of these studies cover both the WoS and Scopus databases [22], some only the WoS database [21], [23], [23] and some only the Scopus database [25], [29]. As can be seen in Table 1, the data of bibliometric studies based on Scopus are older than those based on other databases. Documents published in 2023 and 2024 are not included in bibliometric studies based on Scopus. However, as mentioned in the publication trends section of this study, a significant number of documents in this field were published in 2023 and 2024. In addition, when examining studies conducted using the Scopus database, it is noted that [29] focused on studies in the “Business, Management and Accounting” and “Economics, Econometrics and Finance” categories, and [25] included terms such as index, rating and score along with ESG in their search terms to avoid including publications unrelated to business, such as those in medicine and

engineering, and manually excluded irrelevant publications from the dataset. The authors noted that manual cleaning was a limitation of their study.

The importance of ESG is increasingly recognized and is the subject of more and more academic studies. The aim of this study is to conduct a bibliometric analysis of ESG studies in the “Business, Management and Accounting” category of the Scopus database. It covers all sectors, including the most recent studies up to 27 May 2024. Therefore, in contrast to the literature, this study also includes studies from 2023 and 2024 in the analysis. In addition, the data included in the study belong in a different way to the studies in the category “Business, management and accounting” than other studies in the literature. The study was conducted on 2,055 documents published in the Scopus database in the field of ESG between 2006 and 2024 and aims to identify the main themes in the field, recent focuses, leading authors, documents, sources and countries.

METHOD

In this study, the literature on ESG studies was analyzed us-

ing bibliometric analysis method. Bibliometric analysis is a quantitative technique used to assess and monitor the current state of research in a particular area of scientific interest [30]. Unravelling and mapping the evolutionary nuances of scientific fields and cumulative scientific knowledge can be done using the bibliometric analysis method, which allows the analysis of large amounts of unstructured data [31] and involves the use of quantitative techniques [32].

Performance analysis and science mapping are two types of bibliometric analysis techniques that consider the contributions of research components. Performance analysis assesses the performance of the components of the field (e.g. authors, documents, sources, countries), while science mapping focuses on the relationships between research components. Performance analysis is carried out using different metrics. One of the issues to be taken into account when analyzing performance is that articles with an earlier publication date tend to receive more citations. This creates a problem when comparing the effectiveness of recently published articles with the effectiveness of earlier published articles in the field. In order to reduce this negative effect, the study used the average normalized (norm.) citation count metric [33]. Citation analysis, co-citation analysis, bibliographic matching, co-occurrence of keywords as part of the performance analysis, the h-indexes of the authors working in the field and of the sources published in the field were also analyzed. The h-index is a metric that measures the scientific output of a research component in terms of both productivity and quality [34]. The main theme of the field is usually revealed by the co-occurrence of keywords [35]. In this study, the co-occurrence of keywords analysis, one of the scientific mapping methods, was used to determine the conceptual structure of the field.

Bibliometric analysis has gained popularity in recent years, thanks to software such as Gephi, Leximancer and VOSviewer, and the increasing availability and accessibility of scientific databases such as Scopus and Web of Science [36]. In this study, VosViewer version 1.6.20 was used to perform performance analysis and scientific mapping. This program is particularly useful for visualizing bibliometric analyses involving large amounts of data using distance-based maps. The purpose of visualizing data using VOSviewer is to facilitate the understanding and interpretation of complex data [37]. Visual maps consist of nodes and links. Nodes can represent elements such as countries, institutions and keywords. The size of nodes is a measure of the quantity or frequency of publications; as node size increases, so does the quantity or frequency of publications [38]. Co-operation, co-occurrence or co-citation relationships are represented by the links between nodes [39]. Different clusters or years can be represented by the color of the nodes and lines [38].

Data and Analysis

The most commonly used databases for bibliometric analysis are Scopus and WoS. Both databases contain high quality publications and allow data to be exported without manu-

al processes. However, the Scopus database contains more documents in the fields of economics, finance and management than WoS [25]. In other words, the Scopus database is the largest research repository containing publications of acceptable quality [27]. The purpose of this study is to analyze studies related to ESG in the category "Business, management and accounting". One of the reasons for focusing on documents in the Scopus database in this study is that it contains a higher number of publications in the "business, management and accounting" category. Another reason for focusing on the Scopus database, as mentioned in the literature section, is that no bibliometric analysis study has been found that examines documents on ESG published in this database in 2023-2024.

The data analyzed in the study were obtained from the Scopus database on 27/05/2024. In the Scopus database, the words "ESG" and "Environmental, Social and Governance" were searched using the Boolean operator "or" between "article title, abstract, keywords" and it was found that 11,249 documents were available. 2,874 of these documents were written in the field of business, management and accounting. 2,055 of the documents written in the field of business, management and accounting are articles. The analysis of the study was carried out by considering 2,055 articles. The process of determining which documents to include in the analysis is illustrated in the PRISMA flowchart in Figure 1.

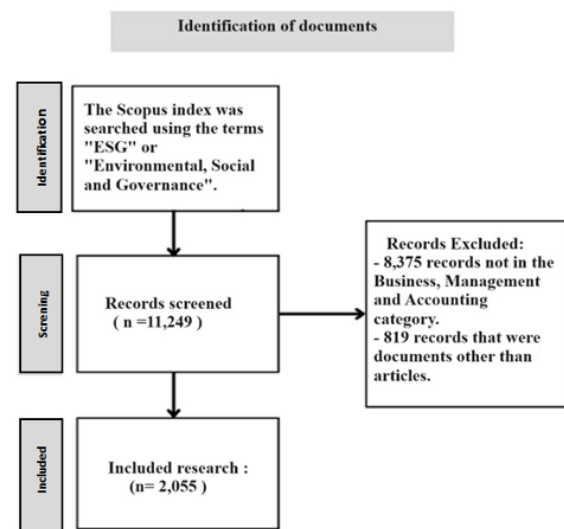


Figure 1. Prisma flow diagram demonstrating the identification of documents

FINDINGS

Publication Trend

This study analyses 2,055 articles written in the field of ESG and published in the Scopus database. The distribution of these articles by year is shown in Figure 2.

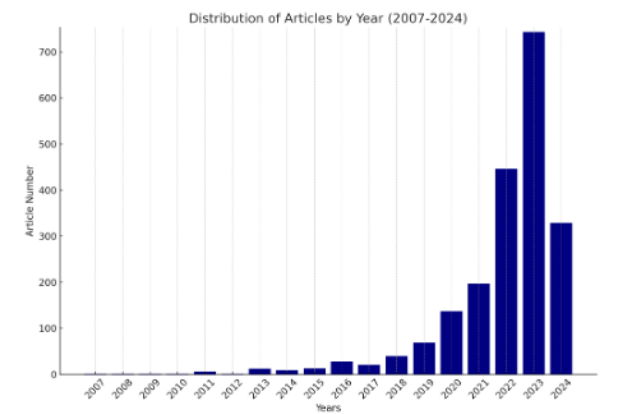


Figure 2. Distribution of publications by years

The first article (published between 2007 and 2024) in this field was written by M.J. Kiernan in 2007, entitled “Universal owners and ESG: Leaving money on the table?” The article emphasized the need for universal owners to recognize their power and responsibility to shape their investment strategies to improve the ESG practices of the companies in which they invest. In 2007, 2008, 2009 and 2010, 1 article was published in this field.

Looking at the change in the number of articles per year, we

can see that the number of articles has been increasing since 2018, and that the increase has gained momentum since 2020. The data of the study were determined on 27/05/2024. Therefore, in the evaluation of the number of articles in 2024 (n=329), it should be taken into account that 5 months of the year are still behind and the number of publications will probably increase in the following months of 2024.

PERFORMANCE ANALYSIS

Performance of Authors

The performance of authors is measured by their productivity and impact. The number of publications by authors is an indicator of their productivity, and the average number of citations is an indicator of their impact.

However, publications with earlier publication dates are likely to receive more citations. When the number of citations is examined by removing the effect of time, the average normalized number of citations becomes a parameter of impact.

The articles analyzed in the study were written by a total of 4,978 authors. Table 2 provides quantitative information on the 10 authors with the highest number of publications.

Table 2. Quantitative information on the authors with the 10 highest number of publications

No	Author(s)	Document number	Citation number	Average citation	Norm. citation	Average norm. citation	Average publication year	H- index
1	K.Hussainey	9	265	29.44	38.83	4.31	2023.11	45
2	A. Buallay	8	589	73.62	12.18	1.52	2020.62	21
3	H.A.Amosh	8	118	14.75	28.11	3.51	2023.12	13
4	I.Makarenko	8	40	5.00	1.81	0.23	2021.38	39
5	F. Paolone	7	105	15	8.80	1.26	2022.86	15
6	R. Rajesh	6	301	50.17	11.35	1.89	2021.67	24
7	K. Singh	6	7	1.17	2.37	0.39	2023.33	5
8	R. Lueg	6	114	19	3.43	0.57	2020.83	17
9	V. Barros	6	95	15.83	6.67	1.11	2022.50	11
10	E.E Olmedo	5	479	95.80	8.99	1.80	2021.67	10

¹ There are a total of 21 authors with 5 publications. The author with 5 publications in Table 2 is the author with the highest number of citations among the authors with 5 publications.

² The average number of citations is calculated by dividing the number of citations by the number of publications.

Table 3 provides quantitative information on the 10 authors whose publications are most cited. As can be seen in Table 3, George Serafeim (n=1,821) is the most cited author in this field and he has 3 articles. The average year of publication of his articles is 2019.67.

Among the most cited authors, Stuart L. Gillan and Andrew Koch have the highest average number of normalised citations (n=17.86). The authors co-authored a paper entitled 'Firms and social responsibility: A review of ESG and CSR research in corporate finance', published in 2021, in which they examine environmental, social and governance (ESG) and corporate social responsibility (CSR) research from a corporate finance perspective (Gillan, Koch & Starks, 2021). The norma. average number of citations was calculated by dividing the norm. number of citations by the number of publications.

As can be seen in Table 2, “Khaled Hussainey” has the highest number of publications and normalized citations. This indicates that this author is the most productive and influential author in the field of ESG. In addition, Khaled Hussainey has the highest h-index. The author is the most influential author when all his publications are taken into account. Also, the average publication year (2023.11) of this author is the most recent among his publications. When analyzing the authors in terms of average citation, Elena Escrig- Olmedo, who has 5 publications, is the author with the highest average number of citations ($n=95.80$). The average publication year of Elena Escrig- Olmedo is 2021.67. The average norm. citation of the author (1.80) is not very high. This is an indication that the author’s publications are cited more because they are older,

rather than because they are more influential.

On the other hand, Table 3 presents quantitative information about the 10 authors whose publications are cited the most. As seen in Table 3, George Serafeim ($n=1.821$), the most cited author in this field and he has 3 articles. The average publication year of the author’s articles is 2019.67. Among the most cited authors, Stuart L. Gillan and Andrew Koch have the highest average number of norm. citations ($n=17.86$). The authors have a co-authored paper in this field titled “Firms and social responsibility: A review of ESG and CSR research in corporate finance,” published in 2021, in which they examine ESG and corporate social responsibility research from a corporate finance perspective [40].

Table 3. Quantitative information on the 10 most cited authors

No	Author(s)	Document number	Citation number	Average citation	Norm. citation	Average norm. citation	Average publication year	H-indeks
1	G. Serafeim	3	1,821	607.00	19.37	6.46	2019.67	29
2	B. Cheng	1	1,736	1736.00	7.30	7.30	2014.00	1
3	I. Ioannou	1	1,736	1736.00	7.30	7.30	2014.00	13
4	T. Busch	2	1,316	658.00	11.76	5.88	2015.50	26
5	G. Friede	2	1,156	576.00	9.73	4.87	2017.00	3
6	A. Bassen	2	1,125	562.50	9.17	4.59	2015.50	11
7	L.T.Starks	2	626	313.00	20.17	10.58	2022.50	37
8	S.L.Gillan	1	624	624.00	17.86	17.86	2021.00	15
9	A. Koch	1	624	624.00	17.86	17.86	2021.00	7
10	A. Bually	8	589	73.62	12.18	1.52	2020.62	21

Source: Data obtained from citation analysis in Vosviewer

Among the most cited authors in this field, Laura T. Starks has the highest h-index of 37. Laura Starks has the second highest average norm. citation. This indicates that the author is the most influential in the ESG field and she is the most influential author among the authors in Table 3 considering all publications (in all fields) of authors. The top three authors with the most recent ESG research are Laura T. Starks, Stuart L. Gillan and Andrew Koch in terms of average publication years.

Performance of Documents

A total of 2,055 articles were analyzed in the study. As a result of the document citation analysis conducted to determine the performance of the articles, information on the quantitative characteristics of the articles identified as the 10 most cited articles is presented in Table 4.

Table 4. Findings of the most cited articles

No	Author	Article title	Journal title	Citation number	Norm. citation	Publication year
1	G.Serafeim I. Ioannou B.Cheng[12]	Corporate Social Responsibility and Access to Finance	Strategic Management Journal,35,1-23	1736	7.30	2014
2	G. Friede T.Busch A.Bassen[13]	ESG and Financial Performance: Aggregated Evidence from more than 2000 Empirical Studies	Journal of Sustainable Finance and Investment,5, 210-233	1114	9.02	2015
3	S.Gillan A.Koch T.Starks[40]	Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance	Journal of Corporate Finance,66	624	17.86	2021
4	J.Xie W.Nozawa M.Yagi H.Fujii S.Managi[14]	Do Environmental, Social and Governance Activities Improve Corporate Financial Performance?	Business Strategy and The Environment,28,286-300	375	7.00	2018
5	D.Y.Tang Y.Zhang[15]	Do Shareholders Benefit from Green Bonds?	Journal of Corporate Finance,61	367	8.07	2020
6	S. Drempetic C.Klein B.Zwergel[41]	The Influence of Firm Size on The ESG Score:Corporate Sustainability Ratings Under Review	Journal of Business Ethics,167,333-360	365	8.03	2020
7	L.H.Pedersen S.Fitzgibbons L.Pomorski[42]	Responsible Investing: The ESG-Efficient Frontier	Journal of Financial Economics,142,572-597	364	10.42	2021
8	L. Pastor R.F. Stambaugh L.A.Taylor[43]	Sustainable Investing in Equilibrium	Journal of Financial Economics,142,550-571	344	9.85	2021
9	A.S Garcia W.Silva da Mendes R. Orsato[44]	Sensitive Industries Produce Better ESG Performance: Evidence from Emerging Markets	Journal of Cleaner Production,150,135-147	340	2.95	2017
10	N.Cucari S. Esposito de Falco B.Orlando[45]	Diversity of Board of Directors and Environmental Social Governance:Evidence from Italian listed Companies	Corporate Social Responsibility and Environmental Management, 25,250-266	340	3.97	2018

Source: Data obtained from citation analysis in Vosviewer

As seen in Table 4, the most cited article (n=1,736) is “Corporate Social Responsibility and Access to Finance” written by “G.Serafeim, I Ioannou; B.Cheng” in 2014. The article, which examines the impact of corporate social responsibility practices on companies’ access to finance, shows that companies with high corporate social responsibility performance have easier access to finance due to increased stakeholder engagement and reduced information asymmetry [12]. The second most cited article (n=1,114) is “ESG and Financial Performance: Aggregated Evidence from more than 2000 Empirical Studies”, written by G. Friede et al. in 2015. The article examines the results of academic studies in the field of ESG and financial performance and finds that 90% of the studies show a positive or neutral relationship between ESG and financial performance. It emphasizes that incorporating ESG criteria into investments brings environmental, social

and financial benefits to companies [13].

When the norm. citation numbers of the articles are examined, it is seen that the articles titled “Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance” published by “S.Gillan et al.” in 2021 and “Responsible Investing: The ESG-Efficient Frontier” by “Pedersen et al.” in 2021 are the articles with the highest normalized citation numbers.

Performance of Journals

A total of 2,055 articles analyzed in this study were published in 469 different journals. Journal citation analysis was used to determine the performance of the journals. Information on the quantitative characteristics of the 10 most cited journals is shown in Table 5.

Table 5. Findings of the most cited sources

No	Journal name	Number of publications	Number of citations	Average citation	Number of norm. citation	Average norm. citation	Average publication Year	H- index
1	Sustainability (Switzerland)	308	4886	15.86	210.59	0.68	2022.55	169
2	Business Strategy and Environment	89	3921	44.06	207.09	2.33	2021.78	147
3	Journal of Business Ethics	29	2769	95.48	75.41	2.60	2019.31	253
4	Journal of Sustainable Finance and	74	2245	30.34	104.41	1.41	2020.22	35
5	Corporate Social Responsibility and Environmental Management	104	2114	20.33	132.40	1.27	2022.55	113
6	Journal of Cleaner Production	60	1624	27.07	79.82	1.33	2022.33	309
7	Journal of Corporate Finance	13	1482	114	39.04	3.00	2021.69	131
8	Journal of Business Research	14	779	55.64	44.92	3.21	2021.86	265
9	Research in International Business and Finance	44	702	15.95	65.46	1.49	2023.07	73
10	Journal of Asset Management	23	687	29.87	11.65	0.51	2020.52	23

As can be seen in Table 5, the journal with the highest number of publications in this field is “Sustainability (Switzerland)”, which shows that this journal is the most productive journal in this field. When journals are ranked according to the average number of citations to publications in this field, Journal of Business Ethics has the highest average number of citations. However, the average publication year of “Journal of Business Ethics” is 2019.31 and the average normalized citation (2.60) is the third highest. The fact that this is the journal with the highest average number of citations, but not the journal with the highest average normalized citation, is explained by the fact that the publications are relatively old and therefore high cited. The journal with the highest normalized citation count (3.21) is the “Journal of Business Ethics”. This is the most influential journal in the field. If the journals are compared by h-index, the “Journal of Cleaner

Production” comes first. This journal does not stand out in terms of productivity or effectiveness in the field of ESG. However, it is the most influential of the journals in Table 4, taking into account all the articles published in the journal. The top three journals with the most recent ESG studies are “Research in International Business and Finance”, “Corporate Social Responsibility and Environmental Management” and “Sustainability (Switzerland)”.

Performance of Countries

The articles analyzed in this study were written by academics from 100 different countries. A country citation analysis was carried out to determine the productivity and impact of the countries from which ESG studies originate. Table 6 provides information on the 10 countries with the highest number of publications.

Table 6. Quantitative data of the countries with the highest number of publications

No	Country	Publication number	Citation number	Average citation number	Norm. citation	Average norm. citation	Average publication year
1	China	360	3387	9.41	427.69	1.19	2022.84
2	U.S.A.	259	7643	29.51	344.60	1.33	2021.98
3	United Kingdom	213	7494	35.18	325	1.53	2021.94
4	Italy	211	5047	23.92	255.86	1.21	2022.13
5	India	142	1446	10.18	118.67	0.84	2022.35
6	Australia	111	2664	24	127.70	1.15	2021.49
7	Spain	103	2523	24.50	108.53	1.05	2021.23
8	South Korea	102	1161	11.38	66.71	0.65	2022.13
9	Germany	93	4482	48.19	117.06	1.26	2021.05
10	Malaysia	459	1361	15.12	86.07	0.96	2021.77

Source: Data obtained from citation analysis in Vosviewer

As seen in Table 6, the country with the highest number of publications in this field is China (n=360). However, when the countries are ranked according to the impact of the publications in this field, China, with an average norm. citation of 1.19, ranks 5th among the countries with the highest number of publications. The country with the highest impact of publications in this field is the United Kingdom with 213 publications and 1.53 average norm. citations. The top three countries with the most up-to-date studies in the field of ESG are China, Italy and the USA, respectively.

Moreover, this table 6 is very useful for comparing the scientific publication performance and impact of different countries. Metrics such as number of publications, number of citations, normalized citations and average publication year can be used to understand the scientific impact and relevance of each country. The United Kingdom and the United States, in particular, stand out with their high citation counts and normalized citation values, while China and India stand out with their more recent publications. These data provide important clues for evaluating and improving scientific research and publication strategies.

Keyword Analysis

A keyword analysis was carried out in order to identify the main themes that ESG publications focus on, in other words, to identify the conceptual structure of the field. There are 4,886 keywords in the articles analyzed in the study. Keywords are words that indicate the main points on which the

articles focus. The keyword analysis was carried out to determine the conceptual structure of the literature in the field of ESG and to find the most emphasized themes, concepts and keywords. Table 7 shows the 10 keywords with the highest frequency and information about these keywords.

Table 7. Quantitative data on the most frequent keywords

No	Keywords	Occurrence	Average publication year
1	ESG	906	2022.20
2	Sustainability	239	2022.16
3	Esg Performance	187	2022.20
4	Corporate Social Responsibility	152	2021.30
5	Environmental	130	2021.23
6	Sustainable Development	128	2021.80
7	Esg Disclosure	115	2021.95
8	Corporate Governance	114	2021.39
9	Financial Performance	98	2021.80

As shown in Table 7, the most frequently used keywords in the literature are “ESG” (n=906), “Sustainability” (n=239) and “ESG Performance” (n=187). When analyzing the average year of publication of the most frequent keywords, “ESG”, “ESG Performance” and “Sustainability” are the words with the latest average year of publication.

The network visualization of the keyword analysis, which was carried out by considering 53 keywords with a frequency of at least 20 in order to determine the areas on which the

studies in this field focus, is shown in Figure 1.

As a result of the keyword co-occurrence analysis, the keywords were grouped into 6 clusters as shown in Figure 3. This indicates that studies in the field of ESG focus on 6 main topics. Each cluster in Figure 3 is shown in a different color. The size of the circles in the figure corresponds to the frequency of occurrence of the keywords. In Table 8, quantitative information about the 3 most common keywords in each cluster is given.

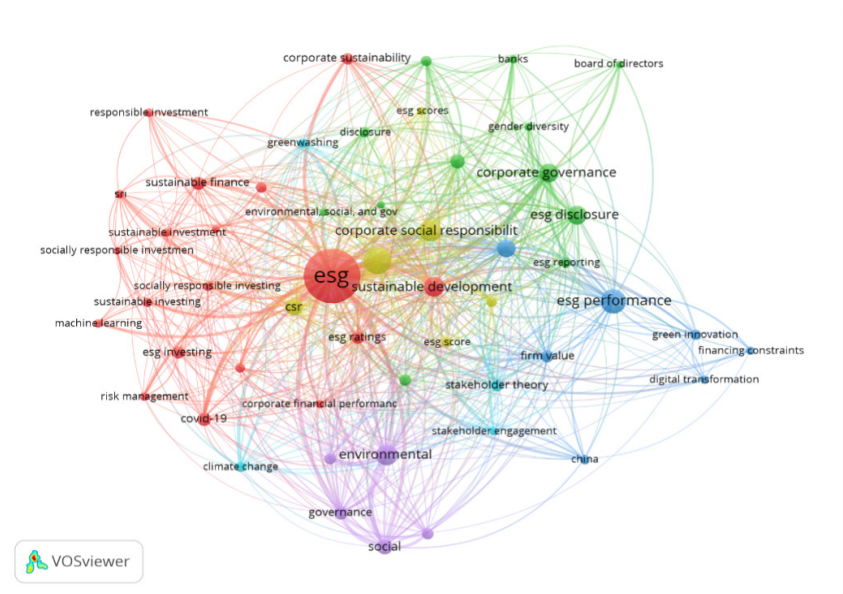


Figure 3. Network visualization for keyword analysis based on occurrence

Table 8. Quantitative data on the 3 most frequent keywords of the clusters

No	Cluster color	Most viewed 3 keywords	Frequency	Average number of citations	Average normalized number of citations	Average year of publication
1	Red	ESG	906	14.98	1	2022.20
		Sustainable Development	128	30.95	1.31	2021.80
		Sustainable Finance	57	9.68	0.80	2022.32
		Corporate Governance	114	33.18	1.24	2021.39
2	Green	ESG Disclosure	115	31.32	1.40	2021.95
		Sustainability Reporting	62	31.45	1.24	2021.37
3	Blue	ESG Performance	187	20.96	1.12	2022.20
		Financial Performance	98	37.12	1.42	2021.80
		Firm Value	52	30.79	1.08	2021.69
		Sustainability	239	22.06	0.94	2022.16
4	Yellow	Corporate Social Responsibility	152	50.82	1.40	2021.30
		Firm Performance	38	22.13	1.30	2021.89
		Environmental	130	31.55	1.08	2021.23
5	Purple	Social	73	38.77	1.32	2021.21
		Governance	57	39.26	1.34	2021.79
		Stakeholder Theory	45	24.40	0.82	2021.42
6	Light Blue	Climate Change	38	13.37	1.10	2022.42
		Green Washing	28	25.57	1.63	2022.54

The keywords in Cluster 1 are shown in red in Figure 3. As can be seen in Table 8, the most repeated keywords in this cluster are "ESG", "sustainable development" and "sustainable finance". The articles in Cluster 1 emphasize the importance of taking ESG factors into account when making investment decisions in the financial sector. The integration of ESG criteria is seen as a fundamental component of sustainable finance [46]. The literature also explores the intersection of ESG (environmental, social and governance) criteria, sustainable finance and sustainable development [47], [48].

In Figure 3, the keywords in Cluster 2 are shown in green. As can be seen in Table 8, the most repeated keywords in this cluster are "corporate governance", "ESG disclosures" and "sustainability reporting". The articles using the keywords in cluster 2 focus on the relationship between corporate dynamics, ESG disclosures and sustainability reporting [49], [50], [51] and the current state and shortcomings of ESG disclosures and sustainability reporting in different sectors [52].

The keywords in Cluster 3 are shown in blue in Figure 3. As shown in Table 8, the most recurring keywords in this cluster

are "ESG performance", "financial performance" and "firm value". The articles using the keywords in this cluster generally focus on the impact of ESG performance on company value and financial performance; [53]; [54]; [55]; [56] and the impact of ESG on company financial performance [57].

The keyword group in Cluster 4 is shown in yellow in Figure 3. As can be seen in Table 8, the most repeated keywords in this cluster are "sustainability", "corporate social responsibility" and "firm performance". The articles in this cluster focus on the relationship between corporate social responsibility and firm performance [58], [59], [60] and the relationship between firm dynamics and corporate social responsibility [61].

In Figure 3, the keywords in Cluster 5 are coloured purple. As can be seen in Table 8, the most recurring keywords in this cluster are "environmental", "governance" and "social". Articles in this cluster generally examine whether ESG metrics are similar at the country level and the factors that cause ESG metrics to differ across countries [62], [63].

In Figure 3, the keywords in cluster 6 shown in light blue.

The most occurring keywords of cluster 6 are “stakeholder theory”, “climate change” and “green washing”. The articles in this cluster examine the link between stakeholder theory, climate change, and green washing and how companies shape their sustainability strategies [64], how investors react to the COP26 news [65] and how companies can take climate-friendly steps, encourage stakeholder participation and collaboration, and avoid green washing [66].

Looking at the keywords in Table 8 in terms of their average publication time, the keywords with the most recent average publication year are “green washing” (2022.54) and “climate change” (2022.42), which are in Cluster 6. Other keywords with an average publication date within 2022 are “sustainable finance” (2022.32) and “ESG” (2022.20) in Cluster 1 and “ESG performance” in Cluster 2. The overlay visualizations created by considering the average publication years of all keywords included in the keyword analysis can be seen in Figure 4. The keywords in the circles shown in purple in the figure are the keywords with the oldest average publication date. The keywords with an average publication date closer to 2024 are shown in green and the keywords closest to 2024 are shown in yellow.

As seen in Figure 4, “climate change”, “green washing”, “sustainable finance”, “ESG”, “ESG performance”, “ESG rating”, “sustainability performance”, “funding constraints”, “machine learning”, “covid 19”, “digital transformation”, and “green innovation” are the keywords used recently. We mentioned above the average publication years and clusters of “climate change”, “green washing”, “sustainable finance”, “ESG” and “ESG performance”. As shown in Figures 3 and 4, the keywords with the most recent average publication years include machine learning (2022.77), Covid-19 (2022.49), and ESG rating (2022.29) in cluster 1; sustainabil-

ity performance (2022.45) in cluster 2; and green innovation (2023.17), digital transformation (2023.13), and financing constraints (2022.82) in cluster 3.

CONCLUSION

In this study, 2,055 articles published in Scopus in the field of Business, Management and Accounting on the concepts of “ESG” and “Environmental Social and Governance” were examined and the publication trend by years; the performance of authors, articles, journals, countries and the conceptual structure of the literature were investigated.

As a result of the research, it was observed that studies on ESG have increased over the years and this increase has gained momentum since 2018. According to the 2017 US Global Change Research Program Climate Science 4th Special Report, the global warming observed in recent years and the impact of the human factor on this warming are increasing [67]. The increase in global warming and society’s growing awareness of its role in this increase can explain the increase in the number of studies written in the field of ESG. As noted in the work of [68], another important reason for the increase in the number of publications is the Covid-19 pandemic. The pandemic has highlighted the importance of ESG and led investors to focus more on non-financial factors that can affect the sustainability of companies.

According to the results of the analysis, the most productive and influential author in the field of ESG is Khaled Hussainey. The author also has the highest H-index. [24], in their study analyzing ESG documents published in the WoS database between 2004-2021, also found that Khaled Hussainey is one of the authors with the highest H-index. When analyzing the performance based on the citations received

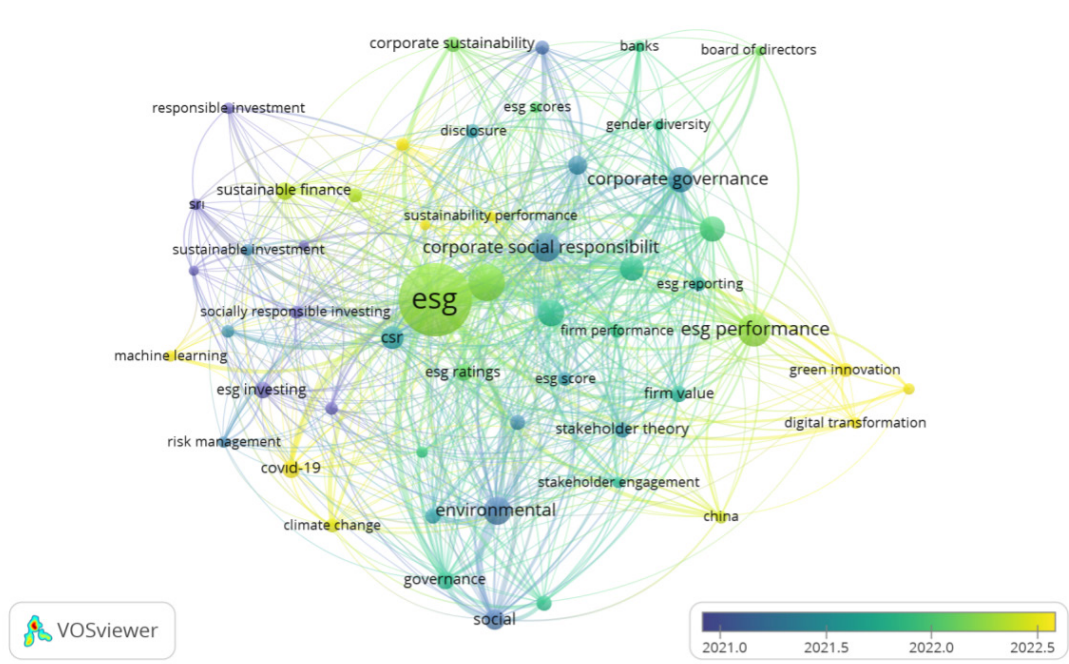


Figure 4. Overlay visualization of keyword analysis based on occurrence

for publications in this area, the most cited author is found to be George Serafeim, who has published 3 articles in this field. Among the most cited authors, the authors with the highest average normalized number of citations are Stuart L. Gillan and Andrew Koch. Laura Starks is a high-impact author, ranking 1st in h-index. Examining the publications of these authors would be beneficial to researchers conducting research in this field.

As a result of the document performance analysis, it is found that the most cited article in this field is "Corporate Social Responsibility and Access to Finance" written by "G. Serafeim, I. Ioannou; B. Cheng" in 2014. Looking at the norm. citation numbers of the articles, it can be seen that the articles titled "Firms and Social Responsibility: A Review of ESG and CSR Research in Corporate Finance" published by "S. Gillan et al." in 2021 and "Responsible Investing: The ESG-Efficient Frontier" by "Pedersen et al." in 2021 have the highest number of citations. It would be beneficial to read these articles as a priority when conducting research in this field.

When analyzing the performance of journals publishing in this field, the most productive journal (the one with the highest number of articles published in this field) is "Sustainability (Switzerland)". The journal with the highest average number of citations is the "Journal of Business Ethics". The most influential journal in this field (the one with the highest normalized number of citations) is "Journal of Business Research". "Journal of Business Research" is the most influential journal in this field. If we look at the h-index of the journals, we see that "the Journal of Business Ethics" is in first place. These journals can be the main targets for researchers in this field to publish their studies.

The country performance analysis shows that four of the countries with the highest number of ESG publications are G10 countries [68]. Looking at the number of publications, these countries are the US, the UK, Italy and Germany, and looking at the countries in terms of the average citations received by publications and normalized citations, the G10 countries are at the top. In other words, these countries are highly productive and effective in terms of publications in this field. China is the country with the highest number of publications in this field and, as we know, it does not belong to the G10. Although China ranks first in terms of productivity, its average number of citations is not very high, but it is the country with the highest number of normalized citations, as the average publication year of its publications is more recent than that of other countries. It can therefore be said that publications from China are just beginning to appear in the literature, but are influential in the field. [20], [22] found similar results in their bibliometric study of ESG documents published in WoS and Scopus. They emphasized that most ESG research is conducted in developed countries and that there is great potential for future research in developing countries.

As a result of the keyword analysis carried out to determine the conceptual structure of the field, it was found that the publications in this field are grouped into six clusters, i.e. six main themes. The focus of the articles using the keywords in

these clusters can be summarized as follows:

Cluster 1: The importance of considering ESG factors when making investment decisions in the financial sector and the integration of ESG criteria as a fundamental component of sustainable finance.

Cluster 2: The relationship between corporate dynamics, ESG disclosure and sustainability reporting.

Cluster 3: The impact of ESG performance on shareholder value and financial performance.

Cluster 4: The relationship between corporate social responsibility, corporate dynamics and corporate performance.

Cluster 5: The study of ESG metrics at the country level.

Cluster 6: The link between stakeholder theory, climate change and green washing and the impact of these concepts on corporate sustainability strategies.

When examining the keywords in terms of their average publication years, the keywords with the most recent average publication years are "Sustainable finance" and "ESG" in Cluster 1, "Machine learning", "Covid-19" and "ESG rating", "ESG performance" and "Sustainability performance" in Cluster 2, "Green innovation", "Digital transformation" and "Financing constraints" in Cluster 3, "Green washing" and "Climate change" in Cluster 6. Clusters 4 and 5 have no keywords with a recent average publication year. In future studies, prioritizing topics related to the above keywords and clusters will enable the current literature to be captured and contribute to the accumulation of scientific knowledge. In addition, this study, which conducted a bibliometric analysis of articles published on ESG in the Scopus database, found that studies related to "ESG assurance" are still underrepresented in the literature. In today's world, where the importance of ESG factors for stakeholders continues to grow, providing assurance on ESG reports will reduce information asymmetry between stakeholders and companies and prevent green washing practices [69]. Future research in this area will be a contribution to the development of the literature.

It is hoped that this study will contribute to the enrichment of ESG theory and the discovery of new research areas related to ESG. As with any bibliometric study, this study has some limitations. This study has several limitations. The most critical limitation is that the analysis is carried out through the Scopus database and other databases, especially other sources that are not circulated online, are not included in the study. Another limitation of the study is the use of "titles, abstracts or keywords" as search parameters. The results of similar analyses using different search parameters may differ. Another limitation of the study is that it only includes articles. Different results may be obtained in studies using different types of documents such as books, book chapters, conference proceedings. It would be useful to extend this study to include other databases and document types in subsequent periods. In addition, future studies that examine the thematic development of the field and the structure of collaboration in the field can contribute to the literature.

DATA AVAILABILITY STATEMENT

The author confirm that the data that supports the findings of this study are available within the article. Raw data that support the finding of this study are available from the corresponding author, upon reasonable request.

CONFLICT OF INTEREST

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

USE OF AI FOR WRITING ASSISTANCE

Not declared.

ETHICS

There are no ethical issues with the publication of this manuscript.

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