

## CSR and Environment: a Bibliometric Mapping

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### Abstract

*Corporate social responsibility (CSR) is a concept that ensures that a corporation should act responsibly toward its employees, suppliers, customers, shareholders, and other stakeholders when making daily business choices and developing strategies.*

*The study aims to analyze the evolution of scientific publications in the field of CSR and the environment. We examined the most relevant 2390 publications indexed in the Web of Science Core Collection database from 2010 to 2022 and applied a quantitative research methodology. We conducted a bibliometric analysis related to the topics of CSR and the environment based on co-occurrence keywords that highlight the most important connections between these two concepts using the VOS viewer program.*

*The main findings indicate that the scientific interest in the field of the influence of CSR on the environment has progressively increased in the last five years.*

**Key words:** Bibliometric mapping, CSR research, environment, VOS viewer

**J.E.L. classifications:** M14

### 1. Introduction

This article aims to evaluate the current level of knowledge in relation to the Web of Science (WOS) database's research on CSR and environment. By utilizing relational algorithms in the VOS viewer application, we have found the keywords related to CSR and the environment that are used the most frequently in the scientific publications analyzed (van Eck & Waltman, 2010).

The phrases CSR and environment were identified in 2390 scientific papers after searching the Web of Science Core Collection (WOSCC) and using economic criteria. Then, using relational algorithms in the VOS viewer application, we determined which terms were most frequently associated with CSR and environment.

By examining the WOS and Google Academic databases, we found a research gap related to the topic of our analysis. In the period we studied the evolution of research on the topic of CSR and environment, 2010-2022, no similar publications were founded.

Connected topics, such as CSR reporting (Sikacz, 2017), social and environmental accounting research in the public sector (Fusco and Ricci, 2019), CSR and Sustainability (Sánchez-Teba et al., 2021) were discovered to be linked to bibliometric analyses.

The study is divided into the following sections: the article starts with some theoretical elements of CSR and the environment, then presents the research methodology, the next section describes how to conduct a bibliometric analysis, and the final section of the article focuses on the study findings and conclusions.

### 2. Literature review

As the importance of CSR in business has increased, the subject of CSR is getting more attention in the research literature. CSR is the process through which businesses integrate economic, environmental, and social issues into their values, decision-making, and strategy, to create wealth and improve their performance.

The World Business Council for Sustainable Development describes CSR as representing an organization's contribution to economic development on sustainable criteria, being founded on compliance with regulations and legislation, in other words, "the commitment of business environments to contribute to sustainable economic development by working together with employees, their families, the local community and society as a whole to improve their quality of life" (Hohnen, 2007). The council highlights that CSR is a concept that refers to the contribution that any company must make to the development of modern society. CSR could also be perceived as based on personal social responsibility, on the care and willingness of each individual to build a living in close connection with the environment, in the context of finding in the values promoted by companies (<https://www.wbcsd.org/>).

The European Commission defines CSR as a phenomenon whereby companies voluntarily decide to contribute to a better society and a cleaner environment. According to the definition given by the European Commission, in order to be socially responsible, a company must integrate into its actions and strategies the social and environmental problems related to the interactions in which it engages (Gheraia et al., 2019).

Firstly, CSR is voluntary, involving moral responsibilities assumed by companies, above those imposed by law. Then, CSR involves creating long-term and equally profitable relationships with the market and the social environment, so more than just the act of philanthropy or donation. Although it requires costs, CSR is a profitable management strategy, insofar as it generates credibility and long-term trust, necessary for a company in its relations with those on which it depends, namely shareholders, business partners, and customers ([https://ec.europa.eu/growth/industry/sustainability/corporate-social-responsibility-responsible-business-conduct\\_en](https://ec.europa.eu/growth/industry/sustainability/corporate-social-responsibility-responsible-business-conduct_en)).

According to Zhang et al. (2019), the notion of CSR is associated with the theory of "triple-bottom-line": economic prosperity, respect for the environment, and respect for improvement of social cohesion. The development of the company, therefore, is highlighted by the following objectives: an economic goal (creating wealth for all, based on the ways of production and sustainable consumption), another ecological (conservation, and management of resources), and a third, social (equity and participation of all social groups).

Researchers have investigated the effect of CSR in integrating environmental indicators into company survival strategies.

Wang et al. (2016) think that CSR can lead to the reduction of environmental effects, while Abbas (2020), Shahzad et al. (2019), and Suganthi (2019) contributed to determining the impact of CSR policies targeted at the development of environmental sustainability.

From an environmental point of view, CSR can consist of:

- limit the company's greenhouse gas emissions;
- save resources such as paper and water;
- to limit energy consumption, whether electricity, heating, or fuel;
- to favor "sustainable" premises;
- to take care to organize the sorting and recycling of waste.

Nowadays, only the largest companies are legally required to communicate about their CSR actions. However, it must be understood that CSR is an ethical approach that aims to reposition the company at the heart of society. Its implementation will therefore be much more effective if it is accompanied by communication actions.

### **3. Research methodology**

The aim of this research is to carry out a bibliometric mapping of the evolution of research in published scientific papers on CSR and environment by using data extracted from the WOS platform. Also, the main purpose of this methodology involves identifying, organizing, and analyzing the interrelation between CSR and environment by searching the most frequently used terms in this specific research field.

We chose a bibliometric analysis because is a set of methods used to study or measure information, especially in big datasets like WOS, and it is a quantitative research assessment of academic output. A bibliometric analysis contains two main procedures: a performance analysis and a science mapping (Cobo et al. 2011).

In the first part of our analysis, we carry out a performance analysis that evaluates groups of scientific actors and the impact of their activity (according to WOS criteria: types of publications, research areas, languages, countries, number of publications - [www-webofscience-com.am.e-information.ro](http://www-webofscience-com.am.e-information.ro)).

In the second part of our research, the science mapping carried out displays the structural and dynamic aspects of science by representing the cognitive structure of research. Regarding the science mapping, our research examined the architecture of connections but also various components of research, clustering for the analyzed fields, the relevance of the key issues revealed, and their relationships in various settings (clusters).

According to Cobo, the most important steps in conducting a bibliometric analysis are the following: "data retrieval, preprocessing, network extraction, normalization, mapping, analysis, and visualization" (Cobo et al., 2011).

Figure no. 1 Diagram of the methodology used



Source: (Cobo et al., 2011)

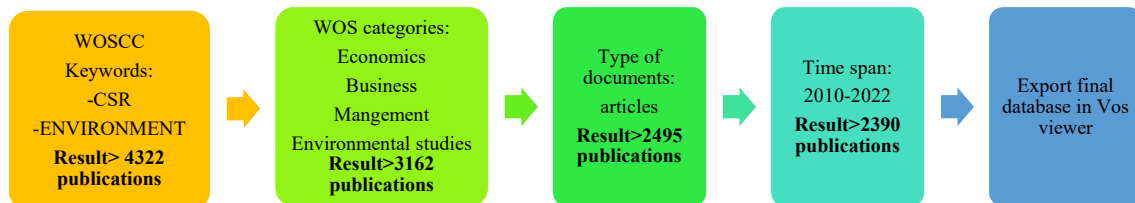
In order to carry out the bibliometric analysis of CSR and environment, we used the Web of Science Core Collection database and ran an advanced search on the keywords: CSR Or "corporate social responsibility" in Title AND environment\* in Topic. The search in WOS was performed on 11 April 2022 with no time limit.

We used the VOS viewer application to generate science mapping by visualizing the networks between CSR and environment in order to build a quantitative analysis of the relevance of CSR and environment in the existing research.

## 4. Findings

### 4.1. The performance analysis

Figure no. 2 Diagram of the performance analysis

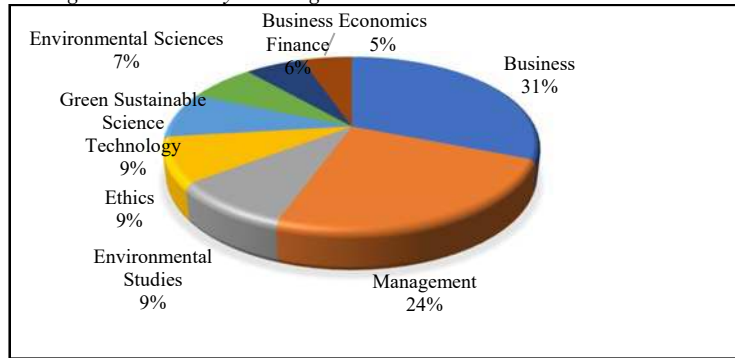


Source: Authors' own conception

The WOSCC scanned the published studies regarding CSR and environmental. A database query revealed 4322 publications on the subject of the inquiry. After the initial results, the records were filtered by the criteria of the research field (economics, management, business, business-finance, environmental studies), and 3162 results of the most relevant studies were returned.

The scientific literature about CSR and environment research was scanned in the WOSCC. After querying the database, 4322 studies on the topic searched were identified. These publications were filtered again by the research area criteria (economics, management, business, business-finance, environmental studies), so the next result was 3162 records of the most important publications (fig. no.3).

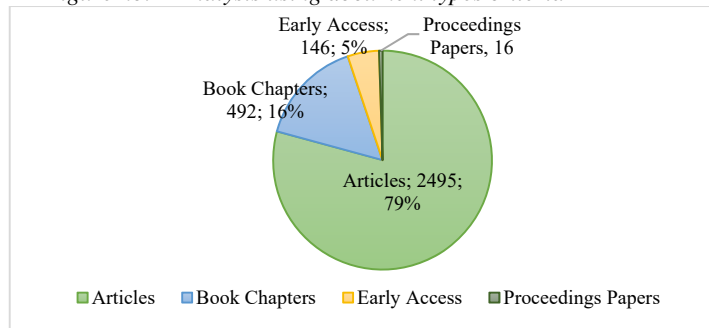
Figure no. 3 Analysis using research areas criteria



Source: Authors' own conception using data from WOS database

From the 3162 records, we filtered the publications by document types, and we analyzed only the 2495 articles, excluding the other forms of publications (proceedings papers, early access, book chapters, review articles, editorial materials, etc. (fig. no.4).

Figure no. 4 Analysis using document types criteria

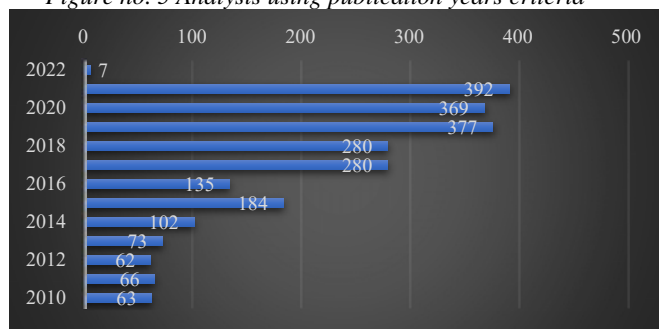


Source: Authors' own conception using data from WOS database

Among these 2495 records, we decided to carry out the bibliometric analysis only with the publications between 2010 and 2022.

The years with the most published articles are 2021 -392, 2019 – 377, 2020 – 3,69, and booth 20217-2018 with 280 publications (fig. no. 5). We can notice that there is a rise in the scientific interest in the field of CSR and the environment, as evidenced by the increasing number of published studies over the previous five years.

Figure no. 5 Analysis using publication years criteria



Source: Authors' own conception using data from WOS database

After we analyzed the country criteria, we remark that the authors writing in the field of CSR mostly belong to the USA (455), England (278) and China (274) (table no. 1). The United States is also the country with the highest number of citations (13.004), the average number of citations per article (28,58) and the highest H-index (60).

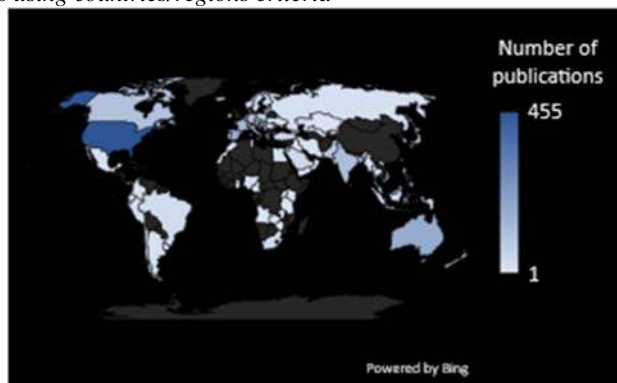
Table no. 1 Ranking 10 countries with the biggest number of publications

No.	Country	Number of publications	Number of citations	Average no. of citations per article	H - index
1	USA	455	13.004	28,58	60
2	ENGLAND	278	5.508	19.81	37
3	PEOPLES R CHINA	274	4.226	15.42	33
4	SPAIN	183	3.197	17.47	33
5	AUSTRALIA	178	3.444	19.35	29
6	FRANCE	138	2.207	15.99	28
7	SOUTH KOREA	128	2.826	22.08	26
8	INDIA	119	1.098	9.23	18
9	ITALY	111	1.785	16.08	21
10	CANADA	106	2.636	24.87	30

Source: Authors' own conception using data from WOS database

Also, 99% of the publications (2368 records,) were written in English, followed by 10 Spanish and 7 French.

Figure no. 6 Analysis using countries/regions criteria



Source: Authors' own conception using data from WOS database

Next, we showed the most productive authors. Thus, table no. 2 displays the main 5 most productive researchers in the areas of knowledge about CSR and environment during the period between 2000 and 2022.

Table no. 2 5 ranking authors

Author	No of publications	No of citations	Average no. of citations per article	First article	Last article	H - index	Country	University
Perez Andrea	18	536	29.78	2012	2020	9	Spain	Universidad de Cantabria
Garcia-Sanchez Isabel Maria	16	536	33.5	2014	2020	12	Spain	University of Salamanca
Kim Jung Sun	16	173	10.81	2017	2021	7	US	University of Nevada Las Vegas
Jamali Dima	14	930	66.43	2010	2019	10	Lebanon	American University of Beirut

Kim Sora	14	298	21.29	2012	2022	7	Peoples R China	Chinese University of Hong Kong Shatin
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Source: Authors' own conception using data from WOS database

The most productive author is Perez Andrea, with a total of 18 articles published during the period analyzed, followed by both García-Sánchez and Kim with 16 publications. Even though the first author has the biggest number of articles, the most cited author is Jamali Dima with 930 citations and a 66 average number of citations per article. Analyzing the data, we can see that Perez Andrea, García-Sánchez, and Jamali Dima have not published research articles in the research area in 2021. Also, the most quality indication in the area of research (H-index 12) was Garcia-Sanchez.

Then, we analyzed the journals with the highest number of published studies on CSR and the environment (table no. 3).

Table no. 3 5 Ranking journals

No.	Journals	Number of publications	Number of citations	Average no. of citations per article	Scimago Journal Rank quartile	H index	Journal Impact Factor	Country
1	Journal of Business Ethics	204	11.621	56,97	Q2	63	6,43	Netherlands
2	Sustainability	196	1.627	8,3	Q2	20	3,25	Switzerland
3	Corporate Social Responsibility and Environmental Management	78	2.478	31,77	Q1	29	8.74	US
4	Journal of Business Research	48	1.932	40,25	Q1	22	7,55	UK
5	Public Relations Review	44	907	20,61	Q3	15	3,38	Germany

Source: Authors' own conception using data from WOS database

Regarding the number of articles published, the Journal of Business Ethics has been the most productive (204), followed by Sustainability (196) and Corporate Social Responsibility and Environmental Management (78). It is observed that the highest journal rank is the one presented by Corporate Social Responsibility and Environmental Management and Journal of Business Research (Q1), followed by both Journal of Business Ethics and Sustainability with Q2.

On the other hand, the biggest journal impact factor has Corporate Social Responsibility and Environmental Management (8,74), followed by the Journal of Business Research (7,55). Similarly, the first journal with the highest H-index in the research area is the Journal of Business Ethics (63), followed by Corporate Social Responsibility and Environmental Management (29).

Also, the Journal of Business Ethics is the scientific journal with the highest average number of citations per article (56,97) and the highest number of citations (11.621).

Finally, it should be highlighted that 86% of the most 5 productive scientific journals belong to European countries, while the remaining 16% are in the US.

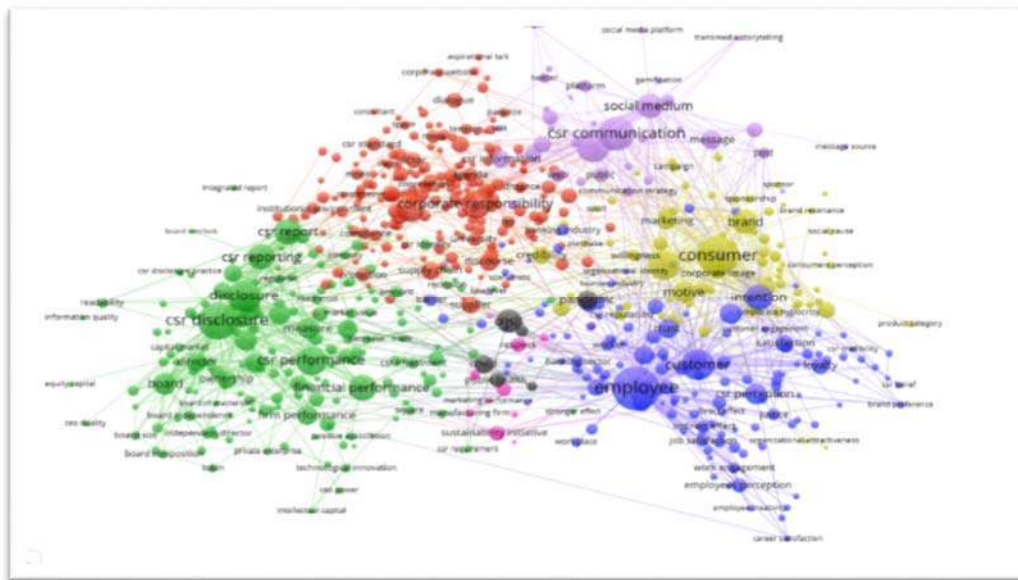
## 4.2. Science mapping

Then, in order to generate a science mapping, the 2390 publications on the concepts of CSR and environment were exported into a plain text format (txt) including full record and cited references, in the VOS viewer software for further analysis, to identify the existing correlations.

From the 2390 publications, the algorithm retrieved 1026 keywords with at least 10 occurrences. From the list of 1026 terms, the program only chose the 60% of terms (615) that were highly relevant to our research and included them in the final analysis. Many other terms were dropped from the list because they were common words, including article, author, data, model, paper, study, theory, value, and year or synonyms (using Thesaurus function).

Colored circles served as labels for the 615 keywords. The number of times a term appears in the titles and abstracts is associated with the size of the letters and circles. The letters and circles get bigger the more frequently a keyword appears (van Eck & Waltman, 2013).

Figure no. 7 VOSviewer network visualization map – association strength of CSR and environment on WOS platform



Source: Authors' own conception using data from WOS database

The co-occurrence network is grouped into 7 clusters (fig. no. 7) by their relevance, every cluster might be thought of as a topic: CSR, CSR disclosure, CSR communication, employee, consumer, community involvement, and pandemic situation.

Table no. 4 Summary of the co-occurrence network of the most important 5 terms in VOSviewer

Colour of cluster	Keyword	Colour of cluster	Keyword
red cluster	csr	yellow cluster	consumer perception
red cluster	csr standard	yellow cluster	consumer skepticism
red cluster	csr theory	yellow cluster	csr image
red cluster	csr goal	violet cluster	communication strategy
red cluster	csr impact	violet cluster	csr communication
green cluster	csr disclosure	violet cluster	csr information
green cluster	csr behaviour	violet cluster	csr message
green cluster	csr reporting	violet cluster	internet
green cluster	financial performance	pink cluster	community involvement
green cluster	information quality	pink cluster	interaction effect
blue cluster	employee	pink cluster	philanthropic activity
blue cluster	customer	pink cluster	sustainability initiative
blue cluster	employees perception	pink cluster	respect

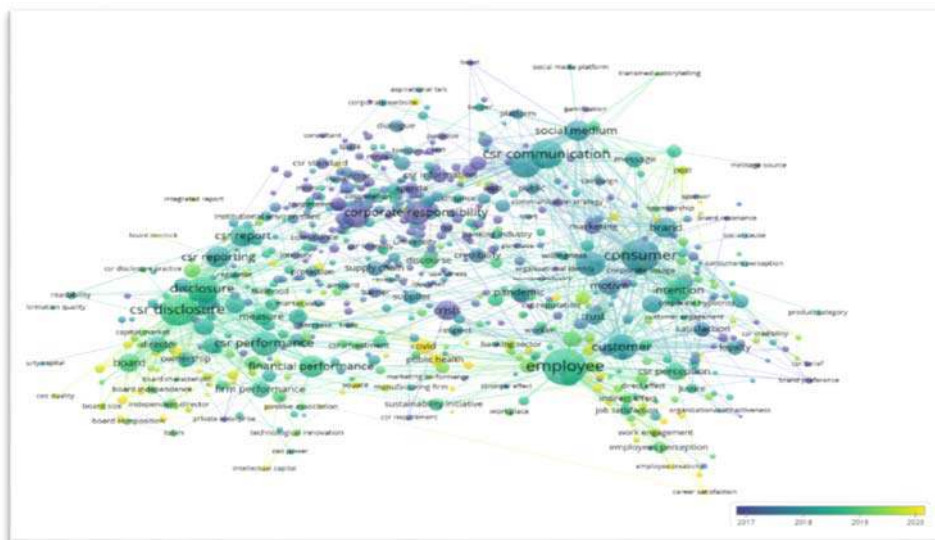


blue cluster	work engagement	grey cluster	covid
blue cluster	csr reputation	grey cluster	financial crisis
yellow cluster	consumer attitude	grey cluster	health
yellow cluster	consumer evaluation	grey cluster	pandemic
		grey cluster	public health

*Source:* Authors' own conception using data from WOS database

Finally, the next figure (fig. no. 8) identifies the major fields of research for the long-term future by illustrating the main trends in recent years.

Figure no. 8 Evolution of keyword clusters based on co-occurrence.



*Source:* Authors' own conception using data from WOS database

## 5. Conclusions

The goal of this article was to analyze the evolution of research articles on CSR and environment on a worldwide scale. The study analyzed 2390 publications from 99 countries, published between 2010 and 2022, which contains the keywords: CSR and environment.

Overall, the research's analysis reveals an exponential rise in the scientific community's interest in CSR and environment, as seen by the consistent growth of publications, authors, and citations. We can also emphasize the increase, in the last five years, in the number of motivated scientific journals, countries, and institutions.

The years with the most published articles are 2021 -392, 2019 – 377, 2020 – 369, and 2017-2018 with 280 publications.

The analysis of the country criteria highlighted that the authors writing about CSR and environment belong to the USA (455), England (278) and China (274). The United States is also the country with the highest number of citations (13.004), the average number of citations per article (28,58), and the highest H-index (60). Also, 99% of the studies (2368 records,) were written in English, followed by 10 Spanish and 7 French.

In what concern the authors, the most productive author is Perez Andrea, with a total of 18 articles published during the period analyzed, followed by both García-Sánchez and Kim with 16 publications. Even though the first author has the biggest number of articles, the most cited author is Jamali Dima with 930 citations and a 66 average number of citations per article. Also, the most quality indication in the area of research (H-index 12) was Garcia-Sanchez.

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Also, the Journal of Business Ethics is the scientific journal with the highest average number of citations per article (56,97) and the highest number of citations (11.621).

Finally, it should be noted that 86% of the most 5 productive scientific journals belong to member countries of the European continent, while the remaining 16% are in the US.

This study was only linked to a selected bibliography from the WOS platform, additional databases, such as Scopus or Google Academic, were not included. This last point represents a limitation of the research. Similarly, the analysis has only considered the publishing of scientific papers between 2010 and 2020, disregarding other factors such as proceedings papers, early access, book chapters, review articles, and editorial materials.

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