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Article

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Journal of Open Innovation: Technology, Market, and Complexity

Provided in Cooperation with:

Society of Open Innovation: Technology, Market, and Complexity (SOItmC)

Suggested Citation: Sánchez-Teba, Eva María; Benítez-Márquez, María Dolores; Porrás-Alcalá, Paloma (2021) : Gender diversity in boards of directors: A bibliometric mapping, Journal of Open Innovation: Technology, Market, and Complexity, ISSN 2199-8531, MDPI, Basel, Vol. 7, Iss. 1, pp. 1-16,
<https://doi.org/10.3390/joitmc7010012>

This Version is available at:

<https://hdl.handle.net/10419/241597>

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Review

Gender Diversity in Boards of Directors: A Bibliometric Mapping

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Abstract: The literature on gender diversity in boards of directors has expanded significantly in recent years, due to the fact that women are increasingly holding higher management positions within the company hierarchy, clearly demonstrating that certain characteristics of women have a positive impact on different areas within the company. The objective of this paper is to analyze scientific articles on the presence of women in boards of directors, based on a literature review, in order to learn about the evolution of this concept over time. The search conducted for this paper produced 300 documents from the Web of Science, with a final total result of 168 documents after passing the initial results through various filters. VOSviewer software was used to analyze the information, which enabled the creation of bibliometric citation, co-citation and co-word maps. The results reveal the most relevant authors and studies on this subject and identify the most current studies, the main topic of which deals with sustainability and corporate social responsibility, in addition to highlighting the characteristics of women that are of vital importance to boards of directors within the current context: empathy, open innovation, concern for the needs of interest groups and a heightened perception of risks.

Keywords: women; board of directors; gender diversity; open innovation; business performance; bibliometric analysis



Citation: Sánchez-Teba, E.M.; Benítez-Márquez, M.D.; Porrás-Alcalá, P. Gender Diversity in Boards of Directors: A Bibliometric Mapping. *J. Open Innov. Technol. Mark. Complex.* **2021**, *7*, 12. <https://doi.org/10.3390/joitmc7010012>

Received: 8 December 2020

Accepted: 26 December 2020

Published: 31 December 2020

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1. Introduction

Gender balance in company boards of directors has slightly improved in recent years; however, there is still a long way to go. This fact is reflected in the data: in 2017, only 25% of the executives at major publicly traded companies in the European Union were women [1]. This considerable gap is a result of various obstacles facing women, primarily in the working world, including: gender stereotypes assumed by a large part of society [2], personality traits associated with the feminine gender [3], leadership style [4], and reconciliation of work and family life [5].

The aforementioned series of obstacles, which serve as discriminatory mechanisms, is formally known as the “glass ceiling” [6]. The glass ceiling generally consists of natural intangible barriers, and is described as a barrier that is so imperceptible that it can be transparent, but is nonetheless so solid that it impedes women from ascending within their company hierarchy [7]. According to [8], there are three types of obstacles that women face: individual barriers, which are the expectations between men and women in terms of motivation and personality traits; cultural barriers, which originate based on the ideology or culture of each country; and institutional or structural barriers, which refer to the hierarchy or structure of a labor organization.

The current literature on this subject not only refers to the glass ceiling to explain gender inequality in companies; the concept has also recently given way to new terms.

For example, the term “glass cliff” is used to describe the phenomenon of women being more likely to be appointed to boards of directors that are contemporaneously experiencing periods of underperformance or other turmoil [9]. Consequently, the career prospects of these women tend to be riskier and are more likely to result in early failure. Furthermore, if the performance of these companies decreases during the tenure of female executive directors—in most cases due to the fact that when a woman is appointed to a position of responsibility it is because there is some sort of problem or setback—they will likely be fired and replaced by men [10].

Another innovative concept is the “sticky floor,” a metaphor used to point out a discriminatory employment pattern in which women are kept in the lower ranks of the job scale, with low mobility [1]. This is a widely studied issue, and supranational organizations have tried to find solutions, such as the European Union’s 2012 proposed directive to increase the presence of women in boards of directors [11]. The Organization for Economic Co-operation and Development (OECD) is also involved in these kinds of initiatives, offering recommendations such as progressively eliminating the gender pay gap and increasing the number of women in decision-making positions, as presented at the OECD Council Meeting in Paris in 2013 [12].

The presence of women on company boards is not only important to reach gender balance as a symbolic act within these organizations, but also because this diversity can have numerous beneficial impacts for companies. This can be explained both from the perspective of the agency theory and the upper echelon theory. Agency theory defines the agency’s costs as well as the costs associated with conflicting objectives between directors and partners [13]. Companies with a gender-diversified board of directors have a lower level of agency costs [14]. On the other hand, the upper echelon theory maintains that the characteristics of senior management or the upper echelon of a company can influence the decisions made and practices adopted by said company [15]. In this case, the presence and participation of women in the board of directors can improve the company’s financial performance and have a positive impact on the company’s sales [16], and gender diversity positively moderates the relationship between the ability to combine knowledge and innovation performance [17].

The objective of this paper is to systematically analyze the features of the studies conducted on the presence of women in company boards using the Web of Science online database and two keywords: women and board of directors. A bibliometric analysis was applied accordingly in order to understand the general panorama of the subject in question and to identify emerging lines of research. VOSviewer software was used to achieve the proposed objectives. This tool enables the creation of bibliometric citation, co-citation and co-word maps, which allows us to visualize the current state of affairs regarding this issue and observe new lines of research [18].

This paper is organized according to the following sections: the first section is a literature review that classifies the selected articles chronologically in various different periods; the following section describes the methodology used for the literature review, including the data collection and sample method; the third section includes a study and analysis of the resulting bibliometric maps; and the final section offers a discussion of the results and conclusions.

2. Literature Review

Gender diversity in the upper echelon of a company hierarchy is a topic of great interest, which has been studied by academics and political actors in order to develop laws that regulate this issue [19]. After a quick search of the academic literature, the results demonstrate that the publication of scientific articles on gender balance has increased considerably over the years. By searching the Web of Science with the keywords diversity, board and gender, the results show that only 11 articles were published in 2009 on the general subject of gender diversity, while there were more than 280 publications recorded in 2019. In general, the issue addressed in most of the scientific articles that deal with this

subject is whether the presence of women in boards of directors is associated with improved company performance [20], which is measured by financial results [21], the company's level of debt [22] and corporate social responsibility [23]. Other authors have studied the subject from different perspectives, including: the gender pay gap [24], work–life balance [25] and gender quotas [26]. In order to understand the main subject of study and pinpoint noteworthy articles from the selected literature, three time periods have been identified: the first period spans from 1994 to 2005, the second period from 2006 to 2012, and the third period from 2013 to 2020. The documents included in this section were selected from the Web of Science online database after passing through an initial filter using the following keywords: women and board of directors, resulting in a total of 168 articles (Figure 1). The first article published dates back to 1994, showing that the presence of women in boards of directors began to be a topic of study only 25 years ago.

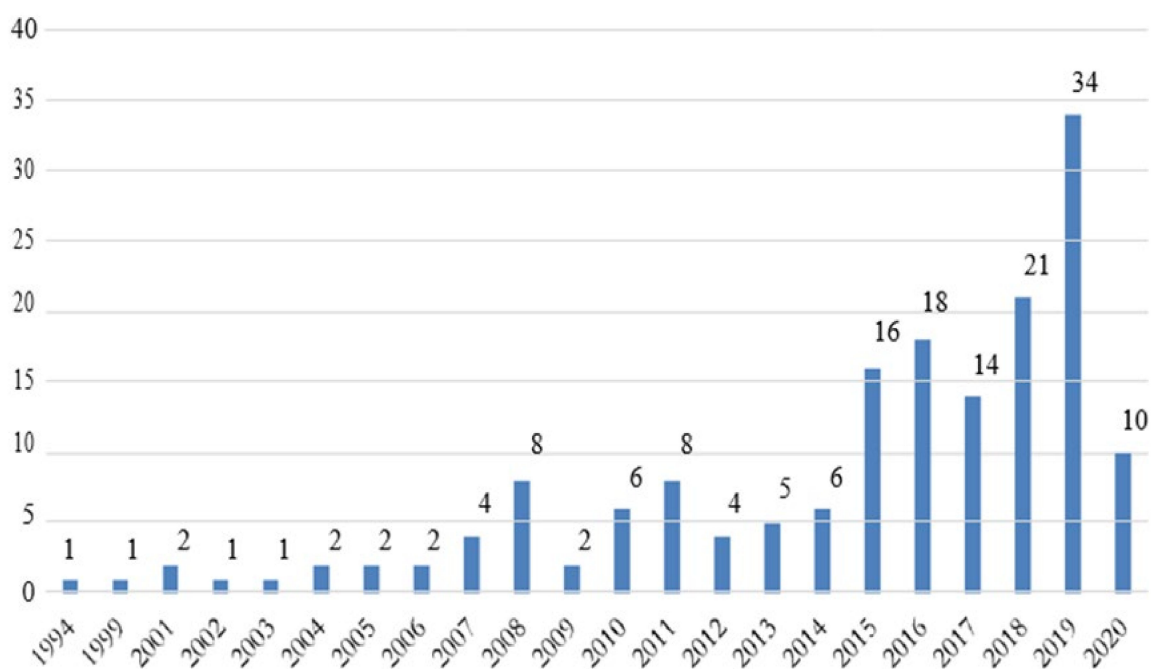


Figure 1. Articles concerning the presence of women on boards of directors published each year. Source: Web of Science.

2.1. First Period (1994–2005)

The fewest number of articles were published during the first period. Most of the papers from this period deal with trying to establish whether or not there really is a gender bias, or if female executives simply lack certain characteristics based on the experience required to perform such high level positions. They focus primarily on the number of women that hold senior level positions, without going into much detail regarding the impact this could have on the companies where they work [27]. Furthermore, Sheridan et al. suggest that in order for a woman to gain access to a position of responsibility, she has to make a greater effort than a man, since a woman's competence has to be widely recognized in the public sphere or through family connections to the board [28]. Various articles that analyze gender balance in companies during this period focus on prior time periods. What can primarily be deduced from these articles is that women's presence in boards of directors was only minimal at this time, although it was increasing [29].

2.2. Second Period (2006–2012)

During the second period, academics were still concerned with the low number of women in top levels of management at companies. This concern not only worried

academics, but also governments—so much so, that a law was passed in Spain in an attempt to achieve equality between men and women (Spain, Constitutional Law 3/2007). Consequently, authors such as [30] analyze the impact the aforementioned law could have on companies. Their research results are clear: the stock market would react positively to the announcement of women being appointed to boards of directors, as it was believed that they would provide added value, reaffirming that the approved legislation made sense and contributed to the main objective. Other articles analyze the differences between men and women in order to try to explain why the results may be different when the person directing a company is either male or female [19,24,28]. Along these lines, academics such as [2] demonstrate in their studies that women are less prone to taking risks, have different priorities and are less concerned with power. Another series of articles studies whether the increase in women in senior level positions is due to their abilities and attitude, or whether it is simply symbolic or obligatory, as numerous governments start implementing gender quotas [31] with the goal of increasing the proportion of women in boards of directors. Beyond merely respecting the law and thereby complying with required quotas, a study by [31] reaffirms that female executives have a very positive influence on companies, contributing to decisions made by the board of directors; moreover, as the ratio of women increases, the social barriers they must face decrease. It also shows that the contribution that women can make in open innovation activities is considered fundamental to achieve competitive advantages in the markets and in the satisfaction of social needs by the company [32].

2.3. Third Period (2013–2020)

The articles written during this period clearly focus on the impact of female executives on company performance and, specifically, corporate social responsibility [33–36]. Corporate social responsibility has become a strategic issue for all companies, which must be handled by upper management [23]. Most of the academics have concluded that female talent can play a strategic role in enabling companies to properly manage their social responsibility and sustainable practices [35]. Along these lines, environmental sustainability is also positively influenced by the existence of gender diversity in a company's board of directors [37]. Similarly, other topics that have been widely studied by academics during this period include the gender pay gap, company financial performance and the amount of debt based on the presence of women in the board of directors and the relationship between company size and gender diversity [38–40]. Generally speaking, it is thought that the presence of women in senior level positions leads to companies showing better performance, as they are believed to make higher-quality decisions [41]. Although it is difficult to measure the impact of decisions made, it is true that the Return On Equity ratio (ROE) is higher in companies that have women in management positions [42]. Lastly, if we consider the relationship between company size and gender diversity, it may seem as if there is no relationship [39]; however, academics that have studied this subject have concluded that there are more women in the board of directors in small and medium-sized enterprises (SMEs) than in larger companies [41]. This may be due to the fact that SMEs have a greater degree of flexibility as they are often family companies, which makes it somewhat easier to balance work and family life [40,43].

3. Materials and Methods

A bibliometric approach was used for this study in order to analyze research documents on the presence of women in company boards, using metadata extracted from the Web of Science. This database is one of the most important of its kind, since it includes the most influential academic publications used in bibliometric and scientometric studies [44] and indexes a large number of articles published in the primary academic journals from all over the world [45]. The main collection of the Web of Science contains over 76 million records and over 1600 million cited references [46].

Data Collection and Sample

Various steps were followed to select the documents that would eventually be included in the study (Figure 2). The entire document search and selection process took place in March 2020. Firstly, a search was conducted of the Web of Science’s main collection using the following keywords: women and board of directors. These words are found in the subject (title, summary or keywords) of each selected article. This search was not restricted to any specific dates; neither start nor end dates. Considering that these two keywords are relatively general terms, a wide variety of articles was found, with a total of 1024 results. The second step consisted of refining the obtained results in order to filter out documents that were not relevant to the subject of study. Accordingly, the documents pertaining to the Web of Science Management category were selected. The results were refined based on this category since the paper focuses exclusively on the business sector, as it studies the presence of women in boards of directors. The results were also refined by document type, so that only articles would appear in the final sample. After refining the documents according to the abovementioned criteria, the resulting number of documents was 301. The third step involved selecting the articles, one-by-one, that were most relevant to the subject of study, eliminating all of the documents that had titles and abstracts on other subjects. The final resulting sample contains 168 articles. The oldest article dates back to 1994, while the most recent articles were published in 2020. Finally, bibliometric metadata were extracted from each selected document in order to continue the study. The specific selected data include: the number of times the article, author, source, country, and references are cited, in addition to the title, summary or abstract and keywords of all of the articles included in the final sample. This information is very useful for the creation and analysis of different types of bibliometric maps, which can be used to study the subject further in-depth.

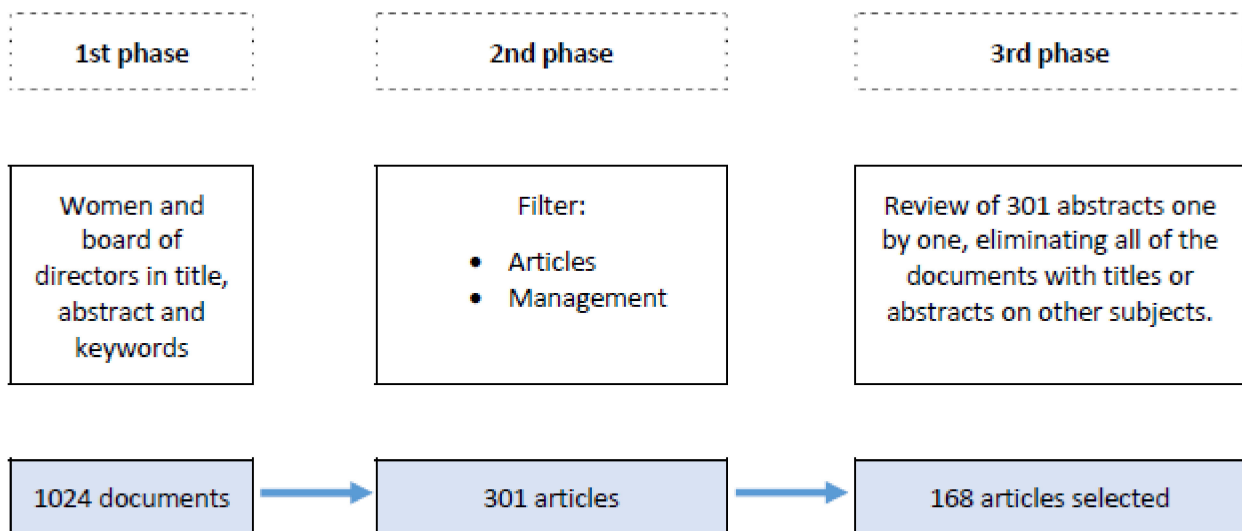


Figure 2. Selection process in the Web of Science of the final sample of documents. Source: Own elaboration.

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation as well as the experimental conclusions that can be drawn.

4. Analysis

Version 1.6.14 of VOSviewer software was used for this study, which enables the creation and visualization of bibliometric maps based on online data [47]. This tool was used to examine and view the existing relationships between authors and terms in the final sample of selected articles, which is very useful for analyzing the dynamism and structure of any scientific field [48].

In order to understand a bibliometric map, it is necessary to define a series of concepts: the size of the node represents the importance of the item, the color of the node indicates which cluster it belongs to, the thickness of the lines connecting the nodes represents the strength of the relationship between them, and the distance between nodes depicts the existing relationship between them. The following sections describe three different types of analysis: citation, co-citation and keywords.

4.1. Citation Analysis

A citation analysis identifies the most important documents within a specific field of study, which have a greater influence than other documents that are cited less often [49]. Table 1 shows the 10 most-cited articles in absolute terms; in addition to the total number of times the article has been cited, it also includes the average number of citations per year during the period from 1900 to 2020.

Table 1. The 10th most cited articles.

Authors	Title	Journal	Year Public.	Total Cites	Average per Year
Erhardt, Werbeland and Shrader [50]	Board of director diversity and firm financial performance	Corporate Governance: An International Review	2003	503	27.94
Carter, D'Souza, Simkins and Simpson [51]	The Gender and Ethnic Diversity of US Boards and Board Committees and Firm Financial Performance	Corporate Governance: An International Review	2010	370	33.64
Hillman, Shropshire and Cannella [52]	Organizational predictors of women on corporate boards	Academy of Management Journal	2007	304	21.71
Nielsen and Huse [53]	The Contribution of Women on Boards of Directors: Going beyond the Surface	Corporate Governance: An International Review	2010	269	24.45
Post and Byron [41]	Women on boards and firm financial performance: A meta-analysis	Academy of Management Journal	2015	264	44
Hillman, Cannella and Harris [54]	Women and racial minorities in the boardroom: How do directors differ?	Journal of Management	2002	259	13.63
Smith, Smith and Verner [55]	Do women in top management affect firm performance? A panel study of 2500 Danish firms	International Journal of Productivity and Performance Management	2006	250	16.67
Konrad, Kramer and Erkut [56]	Critical mass: The impact of three or more women on corporate boards	Organizational Dynamics	2008	2012	16.31
Adams and Funk [2]	Beyond the Glass Ceiling: Does Gender Matter?	Management Science	2012	207	23
Daily, Certo and Dalton [29]	A decade of corporate women: Some progress in the boardroom, none in the executive suite	Strategic Management Journal	1999	172	7.82

Source: Own elaboration. Note: Public. (Publication).

In the most-cited article, ref. [50] analyze the relationship between gender diversity in boards of directors and company financial performance, using data that spans from 1993 to 1998. The result is that the presence of women in management positions has a positive influence on financial performance indicators. The importance of this article lies in the fact that it proves the positive effects of women in boards of directors during a time when they were still not very well-represented in said boards, offering encouraging results for this trend to change. On the other hand, other highly cited authors are not only interested in the absence of women in senior level positions at companies, but also in the ethnic diversity of senior management, since ethnicity can also be a factor of discrimination. Regardless, the conclusion is that diversity in a board of directors, whether based on gender or ethnicity, should not have a negative impact on company financial performance [51,54]. Generally speaking, the most-cited articles deal with trying to determine the impact of women on companies' financial performance in order to respond to why there is such a low representation of women in boards of directors [41,50,55]. They also present other highly debated concepts over the years, such as the glass ceiling [2]. A bibliometric citation map was created in order to analyze the relationship between all of the cited articles in a more visual format (Figure 3).

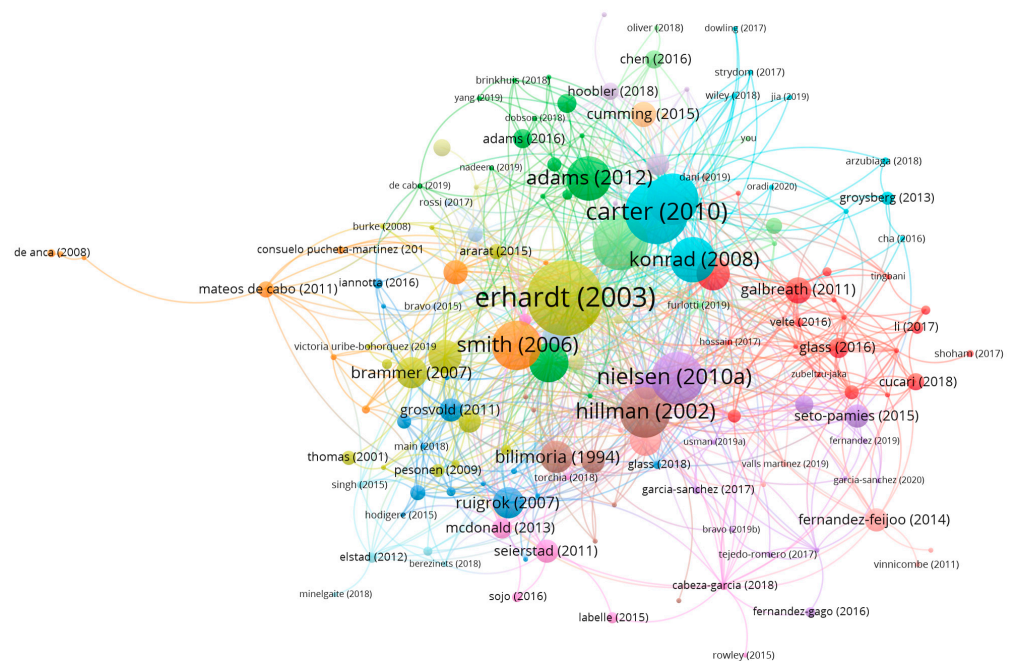


Figure 3. VOSviewer network visualization of the bibliometric citation map.

The map in Figure 3 demonstrates the relative importance of the 10 most-cited articles shown in Table 1, which are the articles represented by larger nodes.

4.2. Keyword Analysis

The keyword analysis shows the distribution and relationship between the most frequently used keywords in the studies included in the final sample. This analysis was conducted using the co-occurrence of keywords. In order for the map to be representative, the minimum threshold of the number of times a keyword must appear in order for it to be included in the map was set at five times. Therefore, 66 of the total 700 keywords meet this requirement. These conditions were used to obtain the map shown in Figure 4.

As shown in this map, depending on the size of the nodes, the most frequently used words are “women,” “corporate governance,” “gender,” “firm performance,” and “directors,” among others. Table 2 presents the ranking of the 15 keywords most frequently used by academics.

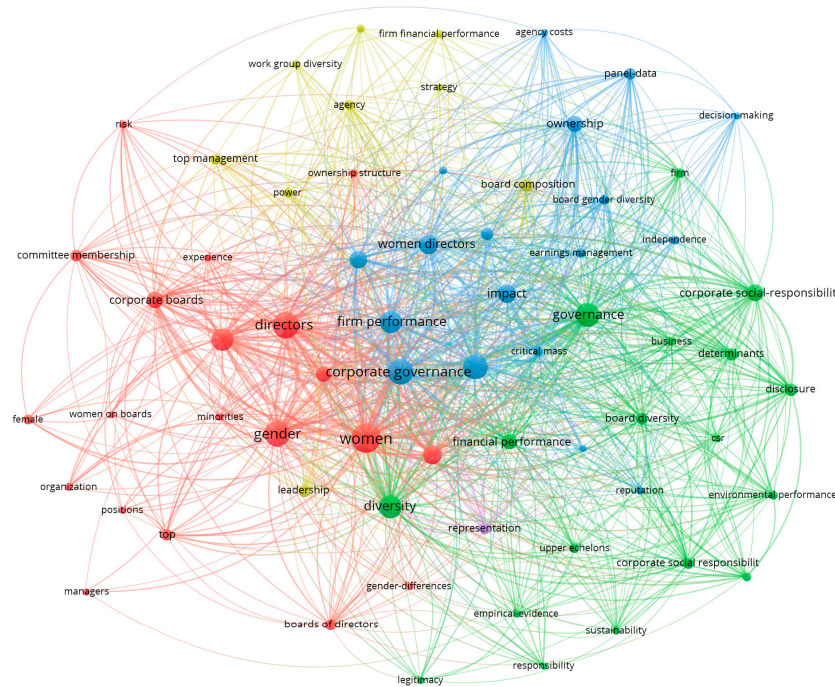


Figure 4. VOSviewer network visualization of the bibliometric keywords map.

Table 2. Ranking of the most cited keywords by the authors.

Rank	Keyword	Number of Times Used by Academics	Rank	Keyword	Number of Times Used by Academics
1	Women	60	9	Impact	26
2	Directors	58	10	Women directors	24
3	Gender diversity	48	11	Corporate Social Responsibility	21
4	Governance	44	12	Board of directors	20
5	Gender	42	13	Financial performance	17
6	Performance	38	14	Determinants	14
7	Firm performance	34	15	Top	12
8	Management	28	-	-	-

Source: Own elaboration using software VOSviewer.

In terms of clusters, the normalization method of the strength of word association used by VOSviewer [47] indicates that there are four in total, which can be distinguished by their colors. The first cluster consists of 20 keywords and is represented in red. This group includes keywords that primarily refer to the highest level of a company hierarchy. The most important word in this cluster is “board of directors”. Due to the size of the nodes and the large number of connections with other groups of words, this is considered to be the main cluster, which makes sense since this cluster contains basic terms from the scientific articles that address the presence of women in boards of directors.

The second cluster, represented in blue, is characterized by how highly connected it is to the main cluster, as we can see a large number of short, thick lines connecting these two groups. This cluster has words that are primarily related to company performance, where “firm performance” is one of the most influential words in this group.

The third cluster, represented in green, contains words that complement the two previous clusters, since it deals with diversity, sustainability and corporate social responsibility. In this case, the connections are weaker since it addresses a more specific topic and, depending on the angle of each article, these words may or may not be included as keywords. The fourth and last cluster is the smallest and weakest of all the clusters,

represented in yellow. The most noteworthy words are strategy, power and leadership, which are essential elements in management positions.

Figure 5 shows a visualization of the same map, which is of great interest as it shows the evolution of keywords over the years. Thus, initially, the main objective of the researchers was to discover the impact of women’s participation in boards of directors on business performance. On the other hand, emerging lines of research focus on very current topics, such as sustainability and corporate social responsibility.

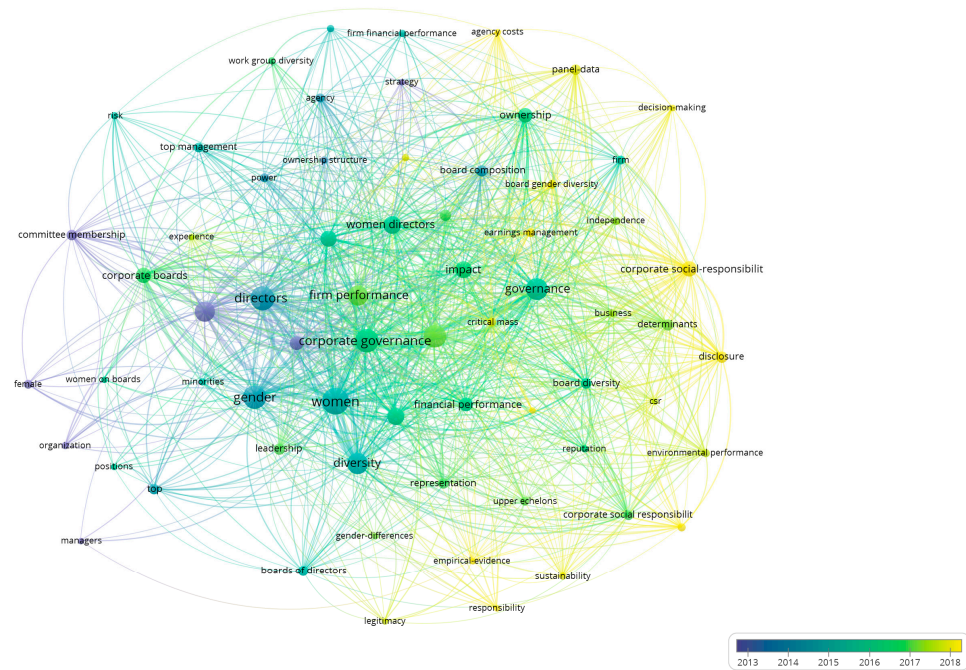


Figure 5. Evolution over the years 2013 to 2018 of the bibliometric keyword map.

4.3. Co-Citation Analysis

A co-citation analysis defines the frequency with which pairs of scientific documents are cited together in source articles. As explained by [57,58], the most cited articles contain key concepts, methods or experiments in a specific field. This analysis informs us as to which documents define the intellectual structure of the main issues related to the presence of women in boards of directors. Of the sample of 168 scientific documents, 7352 references have been cited. In this case, a minimum number of 10 citations of a cited reference was established in order to build the bibliographic map; consequently, there are 131 resulting items in the map that meet this requirement. Table 3 shows the 10 articles that have been cited the greatest number of times along with other scientific documents.

Table 3. Ranking of co-citations.

Ranking	Author/s (Year)	Number of Cites	Total Connection Force
1	Adams and Ferreira (2009) [20]	74	1421
2	Carter et al. (2003) [59]	72	1424
3	Terjesen et al. (2009) [60]	61	1129
4	Erhardt et al. (2003) [50]	49	1008
5	Campbell and Mínguez-Vera (2008) [61]	47	982
6	Hillman et al. (2002) [54]	47	971
7	Farrell Hersch (2005) [62]	44	812
8	Daily et al. (1999) [29]	40	710
9	Jensen (1976) [63]	38	727
10	Pfeffer (1978) [64]	37	718

Source: Own elaboration using software VOSviewer.

In regard to the bibliometric map of cited references (Figure 6), each of the nodes represents one reference, and the size of each node represents the number of citations per document. The connections between the different nodes, represented by lines, indicate that there is a co-citation. There are three clusters in this bibliographic map. The red cluster represents the most relevant articles from the first decade of the 21st century, which is the most important group, consisting of 50 items. The grand majority of these articles deal with the impact of diversity in a company’s upper management, where the following articles stand out as the most relevant [20,60,61]. The green cluster consists of 48 articles, which include the least recent articles, with publication years spanning from 1978 up to the beginning of the 21st century. This group has the article with the strongest connections, with a score of 1424 [59]. Lastly, the blue cluster is the smallest and has the weakest connections, with a total of 33 items, and the article with the strongest connections in this group has a score of 727 [65]. This group includes articles from the most recent scientific literature, where the main topic of discussion is the relationship between corporate social responsibility and the presence of women in boards of directors. The publication years of these papers span from 2000 to 2015.

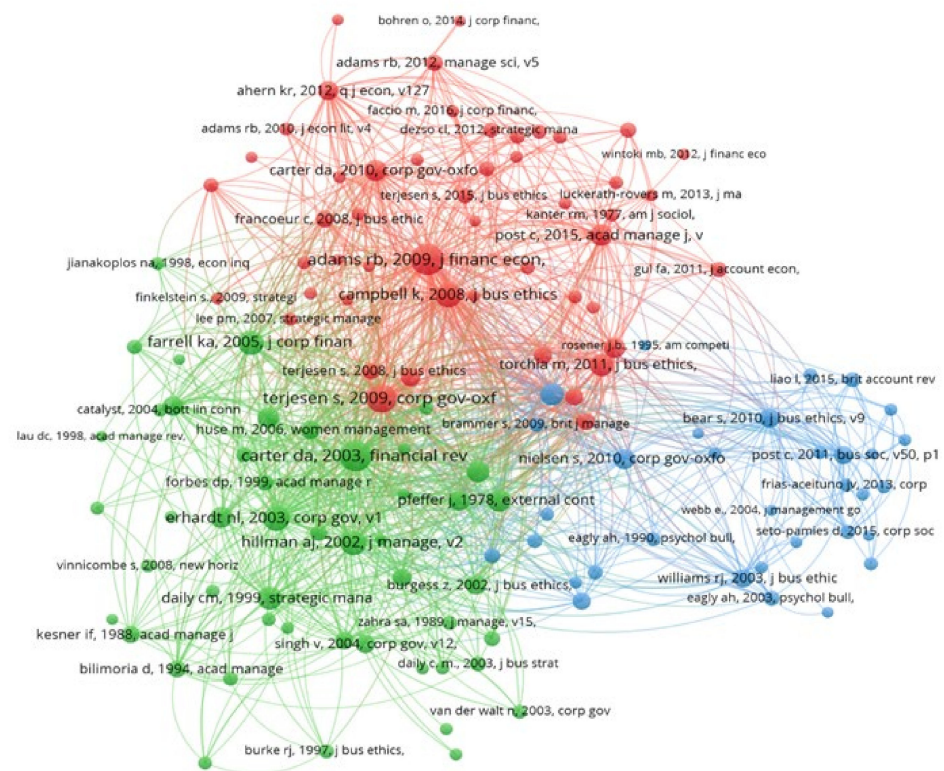


Figure 6. The bibliometric map of cited references.

5. Discussion

The citation analysis shows the most relevant articles in the subject of study. The number of citations reflects the increasing importance of women in boards of directors. The most-cited scientific article [50] has a total of 503 citations on the Web of Science, followed by two other articles that have over 300 citations each, although they were only published 10 and 13 years ago, respectively [51,52].

The co-citation network of documents shows that the most important scientific articles, based on the strength of their connections, include [20,51,60], among others. Three distinct clusters have been identified in the bibliographic map created from this analysis (Figure 6). The blue cluster is the most relevant since it contains the scientific articles with the most innovative lines of research, such as sustainability and corporate social responsibility, which is also reflected in the keyword analysis. Likewise, the red cluster also represents a

significant part of the literature as it contains articles studying the impact of the presence of women in boards of directors on financial performance, which has also been corroborated by crosschecking the co-citation and keyword maps.

As mentioned earlier, the bibliometric map of keywords (Figure 4) has four clusters, which perfectly reflect the most widely studied subtopics within the area of gender balance in high-level company positions (business performance, corporate social responsibility, etc.), which can be further divided into other topics (the most relevant being financial performance, risk level, decision-making, and environmental performance). Based on the impact of the keywords, 23.81% deal with business performance, while 13.4% are related to corporate social responsibility, which are always related to the presence of women in board of directors. The difference between these two figures can be explained thanks to the timeline visualization in the bibliometric map of keywords (Figure 5). A clear trend can be observed throughout the total period of time in which these studies were conducted. The yellow nodes identify the most recent studies, which primarily deal with issues of sustainability and corporate social responsibility. This explains why the percentage of articles that deal with this subject is lower than the percentage of articles that deal with topics such as business and financial performance.

Likewise, the close relationship between the co-citation and keyword maps can be corroborated. They show that emerging lines of research primarily focus on topics such as the impact of women in boards of directors on companies' corporate social responsibility, sustainability policies and levels of pollution, among other topics. Throughout the last few decades, the concept of corporate social responsibility has gained relevance and meaning, making it a widely addressed issue in today's scientific articles, books and conferences [66]. Carrying out and publicizing corporate social responsibility activities can reap great benefits for a company's reputation and legitimacy [67,68]. This is one of the areas of a company where women are of vital importance, since a larger number of women in boards of directors has a positive impact on a company's corporate social responsibility results [23]. This is due to the fact that women usually have a higher perception of risks and are more empathetic, which leads to being more concerned with the needs of others, which are very positive characteristics in the area of corporate social responsibility [69]. It is therefore primordial to consider the number of women required for this effect to materialize, which is why the keyword "critical mass" appears in numerous articles in the selected sample. It is not enough to symbolically include a certain number of senior level positions or fulfill the gender quotes that are required in some countries; rather, it is necessary to take into account not only the presence of women, but also the number as well as their participation in decision-making processes [70,71]. This is not an issue of mere symbolism, but of the real impact on a company's corporate social responsibility results, where the different characteristics and attributes of the women selected for high level positions take precedence, as they lead to improved business performance [31].

The impact of women executives on business performance is a widely studied issue, as it appears very frequently even in less recent literature. In this case, there is also a connection between the co-citation and keyword maps, since both the red cluster in the co-citation map and the blue cluster in the keyword bibliometric map deal with business performance, which is always related to the presence of women in companies' senior management. The items in these clusters generally have numerous strong connections, leading to the deduction that it has been a recurring issue throughout the various different periods of the subject of study. This connection can be clearly seen in Table 4, which shows the relationships between the different keywords that appear in the keyword map of the scientific articles referenced in the co-citation map.

Authors should discuss the results and how they can be interpreted in perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

Table 4. Connection between co-citation map and keyword map.

Co-citation Map (Red Cluster)	Keyword Map (Green Cluster)
“Corporate governance, board diversity, and firm value” Carter et al., 2003 [59] “Women in the boardroom and their impact on governance and performance” Adams and Ferreira, 2009 [20] “Does female board representation influence firm performance? The Danish evidence” Rose, 2007 [72]	Firm Performance
“Gender diversity in corporate governance and top management” Francoeur et al., 2008 [73]	Corporate Governance
“Women in the boardroom and their impact on governance and performance” Adams and Ferreira, 2009 [20] “The changing of the boards: The impact on firm valuation of mandated female board” Ahern and Dittmar, 2012 [74]	Impact
“Board of director diversity and firm financial performance” Erhardt et al., 2003 [50]	Board Gender Diversity
“Women directors’ contribution to board decision-making and strategic involvement: The role of equality perception” Nielsen and Huse, 2010 [75]	Decision Making
“Board of director diversity and firm financial performance” Erhardt et al., 2003 [50] “Gender diversity in the Boardroom and firm financial performance” Campbell and Mínguez-Vera, 2008 [61] “Women on boards and firm financial Performance: A meta-analysis” Post et al., 2015 [41]	Financial Performance

Source: Own source.

Various authors defend the position that when women are included in a company’s board of directors, its business performance improves: financial performance, [50], corporate social responsibility [71], decision-making [76], and even company reputation [77], among others.

Gender Diversity and Open Innovation

Management capabilities have a greater influence on both product and open innovation process when the management team is more balanced in the number of men and women [78]. The reduced representation of women in boards of directors may seem incoherent, considering the major positive impact they have on numerous areas within a company [79]. However, one must not ignore the various barriers and obstacles women have to deal with in order to reach upper level positions in a company, such as social stereotypes, work–life balance and different leadership styles. Along these lines, it is important to highlight an innovative term, which is the primary or secondary topic in some of the articles analyzed in this study: the glass cliff. Ultimately, the metaphor of the glass ceiling, which defines the challenges women have to face in order to move up in a company, has paved the way for the metaphor of the glass cliff; although this issue has slowly improved over the years and more women are reaching higher positions, they are forced to deal with various difficult situations and problems that push them to the edge of this invisible cliff [80]. This additional barrier, along with the study of corporate social responsibility and sustainability, are the most innovative lines of research, as they are the most highly addressed topics in recent articles [36,81,82].

Another limitation is gender stereotypes about the inability of women belonging to marginalized communities/groups to innovate and develop relevant business performance in cases such as American black women, disabled woman, and the stereotypes connection with place attachment, among other limitations [83,84].

6. Conclusions

The results obtained from this study are extremely useful from both an academic and business perspective, since this bibliometric study clearly shows the different stages of this field of study, as well as emerging lines of research, which can be studied further in-depth in order to enhance our knowledge of such an important issue, making the most

of women's abilities in company boards of directors. Furthermore, the bibliographic review brings to light women's attributes and characteristics that can have a beneficial impact on companies and society in general when they are appointed to positions of responsibility. Despite the great value of the results obtained in this study, the main limitations must also be mentioned. The primary limitation of this study is that it was conducted using only one database (Web of Science) to obtain the document sample, while a greater variety of articles and topics could be obtained using additional databases. This also limits the interpretation of the results to a certain degree. Future lines of research should focus on studying the consolidation of the emerging lines of research highlighted in this study and continuing to analyze the evolution of the presence of woman in companies' upper management.

Author Contributions: Conceptualization, E.M.S.-T.; methodology, E.M.S.-T., P.P.-A.; software, E.M.S.-T., P.P.-A.; validation, E.M.S.-T., P.P.-A.; formal analysis, E.M.S.-T., P.P.-A.; investigation, E.M.S.-T., P.P.-A., M.D.B.-M.; data curation, E.M.S.-T., P.P.-A.; writing—original draft preparation, E.M.S.-T., M.D.B.-M.; writing—review and editing, E.M.S.-T., M.D.B.-M.; visualization, M.D.B.-M.; supervision, E.M.S.-T.; M.D.B.-M. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. European Institute for Gender Equality (EIGE). *Gender Equality Index 2019 Work-Life Balance*; European Union, Publications Office of the European Union: Luxembourg, 2019.
2. Adams, R.B.; Funk, P. Beyond the glass ceiling: Does gender matter? *Manage. Sci.* **2012**, *58*, 219–235. [CrossRef]
3. Chizema, A.; Kamuriwo, D.S.; Shinozawa, Y. Women on corporate boards around the world: Triggers and barriers. *Leadersh. Q.* **2015**, *26*, 1051–1065. [CrossRef]
4. Ayuso, V.M.; Robledo, I.S. Barreras que apuntalan el techo de cristal: Barreras que apuntalan el techo de cristal: Una revisión de sus causas en los consejos de administración de las empresas del IBEX 35. *Inf. Comer. Española ICE Rev. Econ.* **2016**, *892*, 123–135.
5. Akpinar-Sposito, C. Career barriers for women executives and the glass ceiling syndrome: The case study comparison between french and turkish women executives. *Procedia Soc. Behav. Sci.* **2013**. [CrossRef]
6. Heredia, E.B.; Ramos, A.; Sarrió, M.; Candela, C. Más allá del “techo de cristal”. Diversidad de género. *Rev. Minist. Trab. Asun. Soc.* **2002**, *40*, 55–68.
7. Broadbridge, A.; Mavin, S. Editorial (Beyond the glass ceiling and metaphors). *Gend. Manag.* **2016**, *31*, 502–513. [CrossRef]
8. Quezada, R.G. Acceso de las mujeres a los cargos directivos: Universidades con techos de cristal. *CS* **2018**, *24*, 67–90. [CrossRef]
9. Smith, G.I.; Main, B. Symbolic management and the glass cliff: Evidence from the boardroom careers of female and male directors. *Br. J. Manag.* **2018**, *29*, 136–155.
10. Cook, A.; Glass, C. Above the glass ceiling: When are women and racial/ethnic minorities promoted to CEO? *Strateg. Manag. J.* **2014**, *35*, 1080–1089. [CrossRef]
11. European Union. Proposal for a Directive of the European Parliament and of the Council on Improving the Gender Balance among Non-Executive Directors of Companies Listed on Stock Exchanges and Related Measures. 2012. Available online: <https://ec.europa.eu/info/policies/justice-and-fundamental-rights/gender-equality> (accessed on 24 December 2020).
12. OECD. *Recommendation of the Council on Gender Equality in Education; Employment and Entrepreneurship*; Paris, French, 2013.
13. Poletti-Hughes, J.; Briano-Turrent, G.C. Gender diversity on the board of directors and corporate risk: A behavioural agency theory perspective. *Int. Rev. Financ. Anal.* **2019**, *62*, 80–90. [CrossRef]
14. Jurkus, A.F.; Park, J.C.; Woodard, L.S. Women in top management and agency costs. *J. Bus. Res.* **2011**, *64*, 180–186. [CrossRef]
15. Nishii, L.H.; Gotte, A.; Raver, J.L. *Upper Echelon Theory Revisited: The Relationship between Upper Echelon Diversity, the Adoption of Diversity Practices, and Organizational Performance (CAHRS Working Paper #07-04)*; Cornell University, School of Industrial and Labor Relations, Center for Advanced Human Resource Studies: Ithaca, NY, USA, 2007.
16. Rodríguez-Fernández, M.; Gaspar-González, A.I.; Sánchez-Teba, E.M. Does diversity in top management teams contribute to organizational performance? The response of the IBEX 35 companies. *Soc. Sci.* **2020**, *9*, 36. [CrossRef]
17. Ruiz-Jiménez, J.M.; Fuentes-Fuentes, M.M.; Ruiz-Arroyo, M. Combination capability and innovation: The effects of gender diversity on top management teams in technology-based firms. *J. Bus. Ethics* **2016**, *135*, 503–515. [CrossRef]

18. Van Eck, N.J.; Waltman, L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics* **2010**, *84*, 523–538. [[CrossRef](#)] [[PubMed](#)]
19. Moreno-Gómez, J.; Lafuente, E.; Vaillant, Y. Gender diversity in the board, women's leadership and business performance. *Gend. Manag.* **2018**, *33*, 104–122. [[CrossRef](#)]
20. Adams, R.B.; Ferreira, D. Women in the boardroom and their impact on governance and performance. *J. Financ. Econ.* **2009**, *94*, 291–309. [[CrossRef](#)]
21. Berezinets, I.V.; Garanina, T.A.; Ilina, Y.B. Social capital of women directors and financial performance of a company: Empirical study. *Russ. Manag. J.* **2018**, *16*, 337–370. [[CrossRef](#)]
22. Usman, M.; Farooq, M.U.; Zhang, J.; Makki, M.A.M.; Khan, M.K. Female directors and the cost of debt: Does gender diversity in the boardroom matter to lenders? *Manag. Audit. J.* **2019**, *34*, 374–392. [[CrossRef](#)]
23. Setó-Pamies, D. The relationship between women directors and corporate social responsibility. *Corp. Soc. Responsib. Environ. Manag.* **2015**, *22*, 334–345. [[CrossRef](#)]
24. Cook, A.; Ingersoll, A.R.; Glass, C. Gender gaps at the top: Does board composition affect executive compensation? *Hum. Relat.* **2019**, *72*, 1292–1314. [[CrossRef](#)]
25. Seierstad, C.; Kirton, G. Having it all? Women in high commitment careers and work-life balance in Norway. *Gend. Work. Organ.* **2015**, *22*, 390–404. [[CrossRef](#)]
26. De Cabo, R.; Terjesen, S.; Escot, L.; Gimeno, R. Do 'soft law' board gender quotas work? Evidence from a natural experiment. *Eur. Manag. J.* **2019**, *37*, 611–624. [[CrossRef](#)]
27. Bilimoria, D.; Piderit, S. Board committee membership, effects of sex-based bias. *Acad. Manag. J.* **1994**, *37*, 1453–1477. [[CrossRef](#)]
28. Sheridan, A.; Milgate, G. Accessing board positions: A comparison of female and male board members' views. *Corp. Gov.* **2005**, *13*, 847–855. [[CrossRef](#)]
29. Daily, C.M.; Certo, S.T.; Dalton, D.R. A decade of corporate women: Some progress in the boardroom, none in the executive suite. *Strateg. Manag. J.* **1999**, *20*, 93–100. [[CrossRef](#)]
30. Campbell, K.; Minguez-Vera, A. Female board appointments and firm valuation: Short and long-term effects. *J. Manag. Gov.* **2010**, *14*, 37–59. [[CrossRef](#)]
31. Elstad, B.; Ladegard, G. Women on corporate boards: Key influencers or tokens? *J. Manag. Gov.* **2012**, *16*, 595–615. [[CrossRef](#)]
32. Wynarczyk, P. *An Investigation into the Participation of Women in Industrial Research and Development (R&D) in the North East of England*; Emerald group: Bingley, UK, 2010.
33. Erynne, L.; Bernardi, R.; Bosco, S. Recognition for sustained corporate social responsibility: Female directors make a difference. *Corp. Soc. Responsib. Environ. Manag.* **2016**, *23*, 27–36. [[CrossRef](#)]
34. Gago, R.F.; García, L.C.; Nieto, M. Corporate social responsibility, board of directors, and firm performance: An analysis of their relationships. *Rev. Mang. Sci.* **2016**, *10*, 85–104. [[CrossRef](#)]
35. Orazalin, N.; Baydauletov, M. Corporate social responsibility strategy and corporate environmental and social performance: The moderating role of board gender diversity. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 1664–1676. [[CrossRef](#)]
36. Colakoglu, N.; Eryilmaz, M.; Ferrero, J.M. Is board diversity an antecedent of corporate social responsibility performance in firms? A research on the 500 biggest Turkish companies. *Soc. Responsib. J.* **2020**. [[CrossRef](#)]
37. Kassinis, G.; Panayiotou, A.; Dimou, A.; Katsifaraki, G. Gender and environmental sustainability: A longitudinal analysis. *Corp. Soc. Responsib. Environ. Manag.* **2016**, *23*, 399–412. [[CrossRef](#)]
38. Hernández-Nicolás, C.M.; Martín-Ugedo, J.F.; Mínguez-Vera, A. The influence of gender on financial decisions: Evidence from small start-up firms in Spain. *Ekon. Manag.* **2015**, *18*, 93–107. [[CrossRef](#)]
39. Dang, A.R.; Houanti, L.; Ammari, A.; Lê, N.T. Is there a 'business case' for board gender diversity within French listed SMEs. *Appl. Econ. Lett.* **2018**, *25*, 980–983. [[CrossRef](#)]
40. Arzubiaga, U.; Iturralde, T.; Maseda, A.; Kotlar, J. Entrepreneurial orientation and firm performance in family SMEs: The moderating effects of family, women, and strategic involvement in the board of directors. *Int. Entrep. Manag. J.* **2018**, *14*, 217–244. [[CrossRef](#)]
41. Post, C.; Byron, K. Women on boards and firm financial performance: A meta-analysis. *Acad. Manag. J.* **2015**, *58*, 1546–1571. [[CrossRef](#)]
42. Lückerath-Rovers, M. Women on boards and firm performance. *J. Manag. Gov.* **2013**, *17*, 491–509. [[CrossRef](#)]
43. Stumbitz, B.; Lewis, S.; Rouse, J. Maternity management in SMEs: A transdisciplinary review and research agenda. *Int. J. Manag. Rev.* **2018**, *20*, 500–522. [[CrossRef](#)]
44. Mongeon, P.; Paul-Hus, A. The journal coverage of Web of Science and Scopus: A comparative analysis. *Scientometrics* **2016**, *106*, 213–228. [[CrossRef](#)]
45. Cortés, J. Web of Science: Termómetro de la producción internacional de conocimiento: Ventajas y limitaciones. *Cult. Científica Tecnológica* **2015**, *5*, 5–15.
46. Clarivate Analytics. Available online: <http://clarivate.libguides.com/webofscienceplatform/coverage> (accessed on 20 April 2020).
47. Waltman, L.; Van Eck, N.; Noyons, E.C.M. A unified approach to mapping and clustering of bibliometric networks. *J. Informetr.* **2010**, *4*, 629–635. [[CrossRef](#)]

48. Sánchez, M.V.G.; Cancino, J.L.T. Los mapas bibliométricos o mapas de la ciencia: Una herramienta útil para desarrollar estudios métricos de información. *Bibl. Univ.* **2013**, *16*, 95–108. [[CrossRef](#)]
49. Fabregat-Aibar, L.; Barberà-Mariné, M.; Terceño, A.; Pié, L. A bibliometric and visualization analysis of Socially responsible funds. *Sustainability* **2019**, *11*, 2526. [[CrossRef](#)]
50. Erhardt, N.; Werbel, J.; Shrader, C. Board of director diversity and firm financial performance. *Corp. Gov.* **2003**, *11*, 102–111. [[CrossRef](#)]
51. Carter, D.; D'Souza, F.; Simkins, B.; Simpson, G. The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corp. Gov.* **2010**, *18*, 396–414. [[CrossRef](#)]
52. Hillman, A.J.; Shropshire, C.; Cannella, A.A., Jr. Organizational predictors of women on corporate boards. *Acad. Manag. J.* **2007**, *50*, 941–952. [[CrossRef](#)]
53. Nielsen, S.; Huse, M. The contribution of women on boards of directors: Going beyond the surface. *Corp. Gov.* **2010**, *18*, 136–148. [[CrossRef](#)]
54. Hillman, A.J.; Cannella, A.A.; Harris, I.C. Women and racial minorities in the boardroom: How do directors differ? *J. Manag.* **2002**, *28*, 747–763. [[CrossRef](#)]
55. Smith, N.; Smith, V.; Verner, M. Do women in top management affect firm performance? A panel study of 2500 Danish firms. *Int. J. Product. Perform. Manag.* **2006**, *55*, 569–593. [[CrossRef](#)]
56. Konrad, A.M.; Kramer, V.; Erkut, S. The impact of three or more women on corporate boards. *Organ. Dyn.* **2008**, *37*, 145–164. [[CrossRef](#)]
57. Small, H. Co-Citation in the scientific literature: A new measure of the relationship between two documents. *J. Am. Soc. Inform. Sci.* **1973**, *24*, 265–269. [[CrossRef](#)]
58. Small, H. Co-Citation in the scientific literature: A new measure of the relationship between two documents. *Infor. Sci.* **1974**, *2*, 28–31. [[CrossRef](#)]
59. Carter, D.; Simkins, B.; Simpsons, G. Corporate governance, board diversity, and firm value. *Financ. Rev.* **2003**, *38*, 33–53. [[CrossRef](#)]
60. Terjesen, S.; Sealy, R.; Singh, V. Women directors on corporate boards: A review and research agenda. *Corp. Gov.* **2009**, *17*, 320–337. [[CrossRef](#)]
61. Campbell, K.; Mínguez-Vera, A. Gender diversity in the boardroom and firm financial performance. *J. Bus. Ethics* **2008**, *83*, 435–451. [[CrossRef](#)]
62. Farrell, K.A.; Hersch, P.L. Additions to corporate boards: The effect of gender. *J. Corp. Financ.* **2005**, *11*, 85–106. [[CrossRef](#)]
63. Jensen, M.; Meckling, W.H. Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* **1976**, *19*, 305–360. [[CrossRef](#)]
64. Pfeffer, J. *Organizational Design*; AHM Publishing Corporation: Arlington Heights, IL, USA, 1978.
65. Ellili, N. Ownership structure, financial policy and performance of the firm: US evidence. *Int. J. Bus. Manag.* **2011**, *6*, 80–93. [[CrossRef](#)]
66. Carroll, A.; Shabana, K.M. The business case for corporate social responsibility: A review of concepts, research and practice. *Int. J. Manag. Rev.* **2010**, *12*, 85–105. [[CrossRef](#)]
67. Brammer, S.; Pavelin, S. Voluntary environmental disclosures by large UK companies. *J. Bus. Financ. Account.* **2006**, *33*, 1168–1188. [[CrossRef](#)]
68. Kurucz, E.C.; Colbert, B.A.; Wheeler, D. The business case for corporate social responsibility. In *The Oxford Handbook of Corporate Social Responsibility*; Crane, A., McWilliams, A., Matten, D., Moon, J., Eds.; Oxford University Press: Oxford, UK, 2008; pp. 3–112.
69. Ciocirlan, C.; Pettersson, C. Does workforce diversity matter in the fight against climate change? An analysis of fortune 500 companies. *Corp. Soc. Responsib. Environ. Manag.* **2012**, *19*, 47–62. [[CrossRef](#)]
70. Cabeza-García, L.; Fernández-Gago, R.; Nieto, M. Do board gender diversity and director typology impact CSR reporting? *Eur. Manag. Rev.* **2018**, *15*, 559–575. [[CrossRef](#)]
71. Fernandez-Feijoo, B.; Romero, S.; Ruiz-Blanco, S. Women on boards: Do they affect sustainability reporting? *Corp. Soc. Responsib. Environ. Manag.* **2014**, *21*, 351–364. [[CrossRef](#)]
72. Rose, C. Does female board representation influence firm performance? The Danish evidence. *Corp. Gov.* **2007**, *15*, 404–413. [[CrossRef](#)]
73. Francoeur, C.; Labelle, R.; Sinclair-Desgagné, B. Gender diversity in corporate governance and top management. *J. Bus. Ethics* **2008**, *81*, 83–95. [[CrossRef](#)]
74. Ahern, K.R.; Dittmar, A.K. The changing of the boards: The impact on firm valuation of mandated female board representation. *Q. J. Econ.* **2012**, *127*, 137–197. [[CrossRef](#)]
75. Nielsen, S.; Huse, M. Women directors' contribution to board decision-making and strategic involvement: The role of equality perception. *Eur. Manag. Rev.* **2010**, *7*, 16–29. [[CrossRef](#)]
76. Rossi, F.; Hu, C.; Foley, M. Women in the boardroom and corporate decisions of Italian listed companies Does the “critical mass” matter? *Manag. Decis.* **2017**, *55*, 1578–1595. [[CrossRef](#)]
77. Brammer, S.; Millington, A.; Pavelin, S. Corporate reputation and women on the board. *Br. J. Manag.* **2009**, *20*, 17–29. [[CrossRef](#)]
78. Ruiz-Jiménez, J.M.; Fuentes-Fuentes, M. Management capabilities, innovation, and gender diversity in the top management team: An empirical analysis in technology-based SMEs. *BRQ* **2016**, *19*, 107–121. [[CrossRef](#)]

79. Mirza, N.I.; Malik, Q.A.; Mahmood, C.K. The value of board diversity in the relationship of corporate governance and investment decisions of pakistani firms. *J. Open Innov. Technol. Mark. Complex* **2020**, *6*, 146. [[CrossRef](#)]
80. Sabharwal, M. From glass ceiling to glass cliff: Women in senior executive service. *J. Public Adm. Res. Theory* **2015**, *25*, 399–426. [[CrossRef](#)]
81. Hurley, D.; Choudhary, A. Role of gender and corporate risk taking. *Int. J. Bus. Soc.* **2020**, *20*, 383–399. [[CrossRef](#)]
82. Tingbani, I.; Chithambo, L.; Tauringana, V.; Papanikolaou, N. Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. *Bus. Strategy Environ.* 2020. [[CrossRef](#)]
83. Malovics, G.; Cretan, R.; Mereine-Berki, B.; Toth, J. Socio-Environmental justice, participatory development, and empowerment of segregated urban Roma: Lessons from Szeged, Hungary. *Cities* **2019**, *91*, 137–145. [[CrossRef](#)]
84. Berki, B.M.; Málovics, G.; Toth, J.; Crețan, R. The role of social capital and interpersonal relations in the alleviation of extreme poverty and spatial segregation of Romani people in Szeged. *J. Urban Reg. Anal.* **2017**, *9*, 33–50.