

Article

Gender Diversity and Business Performance Nexus: A Synoptic Panorama Based on Bibliometric Network Analysis

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Abstract: Board gender diversity literature has demonstrated the positive influence of female leaders' traits, such as openness to negotiation and collaboration, greater flexibility in approaching professional tasks, and improved quality of life, on the business development strategy and consequently on the performance of the companies. This study aims to investigate gender diversity's link to business performance through bibliometric network analysis, highlighting the scientific literature dynamics through a scientific mapping of the existing knowledge. The temporal evolution of the gender diversity and business performance nexus in the scientific publications selected from Web of Science was examined for 1996–2021, investigating more than 2000 documents and focusing on author, keyword, paper, journal, and topic analysis. The statistical processing of publications was performed in R using Bibliometrix and Biblioshiny software, revealing the most influential and prolific authors and also the most representative journals. Results of the panoramic synopsis analysis revealed outstanding research trends, topics related to women and business performance including women directors, firm performance, issues of board diversity including size, structure, board gender diversity, and independence of members, and issues connected to leadership and gender with items such as gender equality, diversity management, women on boards, and culture.

Keywords: bibliometric analysis; gender diversity; business performance; board of directors; network analysis; sustainable development



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1. Introduction

Since one of the sustainable development objectives of the UN 2030 Agenda is gender equality and the empowerment of women, many recent studies have focused on the issue of gender diversity and applied scientific investigation in the business environment. In addition, the analysis of the various implications of the presence of women on boards on the performance of companies. As Hofstede et al. [1] pointed out in their analysis of opposable cultural dimensions centered on masculinity versus femininity, in business organizations populated by more women; higher importance is given to good relations with direct superiors. In addition, there is a higher inclination towards cooperation and collaboration between employees and managers. All participants in more feminine business organizations focus on managing current business issues through discussion, consensus, compromise, and negotiation. Therefore, the premise of our study revolves around the hypothesis formulated by Hofstede et al. [1] regarding the essential characteristics of business with a more substantial female presence, the orientation of labor, and business relations towards consensus, as well as flexibility at work. Thus, the emphasis is more on balancing professional and private life, from the perspective of finding the right job, the changing characteristics of the business environment and organizational culture, and optimizing business performance.

The European Union's efforts on gender equality have materialized in the 2012 proposals to increase the number of women on boards [2]. Equal economic independence for

women and men, eliminating pay gaps and other financial incentives between women and men, improving business decision-making by ensuring a gender balance, and combating gender discrimination of any kind are also constant concerns of the Organization for Economic Co-operation and Development [3]. From the perspective of agency conflict, board gender diversity has a significance that requires future examinations both from the perspective of equal opportunities and the perspective of influences on strategies and policies to improve business performance [4–6]. Prior studies proved that having more women on board could diminish agency costs, improve financial performance indicators, and positively impact turnover [5,7–9]. At the same time, gender diversity moderates the relationship between the improving strategies of financial performance, environmental protection, and Corporate Social Responsibility (CSR) actions, as well as the innovation and sustainable development capabilities of companies [10–12]. Furthermore, it can be seen that studies based on bibliometric analysis of the relationship between gender diversity and business performance have been on the rise in recent years due to the growing interest of researchers in examining the various effects of gender stereotypes on companies' performance [4,13,14].

This study aims to investigate gender diversity's link to business performance through bibliometric network analysis, highlighting the scientific literature dynamics through a scientific mapping of the existing knowledge. To critically analyze the development of this research topic over time in terms of publications, we extracted scientific publications from the Web of Science database for the period 1996–2021, investigating over 2000 documents, focusing our analysis on keywords with the highest frequency, the most cited authors, the journals that publish the most investigated issues on the topic, the collaborations between institutions to conduct research in the field, and the analysis of the predominant topics in the reviewed writings. The bibliometric analysis was selected as the method of investigation to outline the main picture of the leading topic and to identify the current currents of analysis in the literature as well as the future paths that are foreseen to have high research potential with added value for both academic and scientific research as well as practical utility for business organizations. For the processing of the selected items and the critical analysis of the results, Bibliometrix and Biblioshiny software were used.

To achieve our main goal, we looked for answers to the following research questions: RQ1. Who are the best-ranked and most influential researchers and the best-ranked journals, universities, and countries exploring gender diversity and business performance? RQ2. Is there a geographical aggregation of the writings, and how can the interconnection between the conducted studies be described? RQ3. Can the main keywords be identified, and which research clusters stand out? RQ4. How can the evolution of gender diversity research and its implications for business performance be characterized?

Results of the Three Plots field and trend topic examination, cluster analysis, and multiple correspondence analysis (MCA) on mapping the research themes revealed three significant trends of interest: the first connects women directors and companies' performance; the second focuses on the size, composition, diversity of the board, and the independence of directors; and the last one links company leadership to gender equality issues and organizational behavior.

To organize the above scientific approach and to reveal the results, highlighting the most influential papers, journals, authors, and dominant currents of research, this paper was structured as follows: first an overview of several relevant studies grouped in three categories is presented; this is followed by a description of data and methodology; next a descriptive analysis and a discussion of results on different levels after the performed analysis; with a final section summarizing the main conclusions, limitations, and future research avenues.

2. Literature Review

Bibliometric analysis is a statistical evaluation of scientific papers published in journals, books, book chapters, or even other scientific works communicated at various conferences

and published in the volumes of events, etc., and is an effective way to measure the influence of essential publications, authors, journals, or institutions in the scientific community [15]. The central object of the bibliometric analysis is the number of works published in journals, the group of authors or authors cited, the identification of the terminology used in literature, and therefore the terms with the highest frequency, and its main feature is that the results must be quantifiable [15,16]. Therefore, a method of quantitative investigation [17–21] contains many qualitative elements and can contribute to developing new research trends through hybrid approaches. The bibliometric analysis is based on an integrated and comprehensive knowledge system that transversally examines the bearers of knowledge through mathematical and statistical methods, emphasizing quantification from different perspectives. Nevertheless, what makes this kind of analysis and research methodology even more attractive and extremely useful is the visual graphic representation of the results obtained from the process of cross-processing various knowledge in the investigated fields. Thus, several web applications and software have been created in recent years to facilitate the interpretation of the results obtained from a bibliometric analysis, which is more spectacular, showing once again the usefulness of technologies in scientific research. As this paper aims to explore the connection between gender diversity and business performance through bibliometric analysis in designing the scientific construct, the investigation started with an overview of the existing works. During this process, a comprehensive examination of the literature [22] on the topic outlined three categories of research: studies oriented on the bibliometric analysis of board gender diversity, those investigating the link between gender diversity and organizations' performance, and studies focused on gender diversity in correlation with sustainability indicators and other moderating or mediating variables.

Issues concerning gender discrimination and women's independence represent one of the 17 objectives of sustainable development; therefore, company board gender diversity and its implications for businesses have become a topic of great interest both for researchers and other actors of the social community interested in the implementation of Sustainable Development Goal 5, Gender Equality (SDG 5) [23].

Regarding the first category of analyzed studies, we noticed that unlike the works of the past decades that focused on the structured analysis of the investigated literature and the critical analysis of content, the most recent studies focus rather on examining and exploring the research topic by resorting to bibliometric analysis. Thus, the classical or traditional studies that can be placed in the period before 2016 and that examine the topic of gender diversity mainly in relation to board structure have resorted to content analysis, combined or not with a structured analysis of the literature [24–31].

The main structure of board diversity research can be found in conducting a bibliometric study [32], which, combined with a social network analysis, enables tracking the main themes of the research field and, after their analytical investigation, allows shaping future research trends [33,34]. An examination of gender variety in business governance through bibliometric and content analysis is done by Mumu et al. [35]. Four strains of research have emerged as a result of the combined exploratory intellectual analysis that underpins the literature on business governance and gender variety: women's participation in companies' boards and their features; women directors and their functions on boards in various countries; gender plurality in committees and corporate social responsibility; financial performance; business risks; and market share prices [35]. They also observed that the realms of board gender variety and corporate social responsibility are not sufficiently explored, leaving room for future directions of investigation. Performing a thorough bibliometric analysis, Khatib et al. [36] showed that researchers focus on board gender plurality while ignoring cognitive diversity and other demographic variety aspects, such as education, ethnicity, religion, age, nationality, experience, etc., emphasizing the need for further future research considering other attributes of diversity and the interaction between them. Drago and Aliberti [37] believe that the increased interest in interconnected gender issues in boards and management of entities is fueled by recent European regulations and is supported by the results of their bibliometric analysis, which show that it

is significant to study board management composition networks by gender, type of role in boards, and board committees' duality as they influence business performance. The bibliometric analysis of studies examining how boards influence corporate sustainability by Zheng and Kouwenberg [38] revealed the need for more future research on this topic, and the analysis of keyword co-occurrence leads to the conclusion that gender variety, CSR, and methods of innovation indicate possible further plausible directions for investigation. Co-occurrence analysis of keywords in Trinarningsih et al.'s [14] study disclosed the following novel research fields in board diversity research: board architecture and content, ownership structure, business value, and organization performance. Most articles published on the explored topic frequently analyzed the organization's performance, which becomes the ultimate goal of reorganizing, restructuring, and reshaping the business board. Sánchez-Teba et al. [4] analyzed the scientific papers related to the subject of women on boards published in the Web of Science (WoS) database, based on a literature review and bibliometric exploration. They grouped the amount of knowledge found in publications over three time periods: the first span covering the years from 1994 to 2005, the second period from 2006 to 2012, and the third period from 2013–2020. The results identify, in addition to the most productive authors, significant works conducted on the topic and a central theme that focuses on CSR and sustainability, but also highlights women's traits, such as empathy, conciliation, negotiation, open innovation, high-risk perception, and caring for the needs of social groups and the community in general, that are essential features in the administration of today's business.

Baker et al. [13] conducted a study that combined a systematic review of scientific papers on board gender variety with a bibliometric analysis. They propose five ways of performing future research: the development of conceptual studies; studies conducted in several countries and comparative analysis between countries; studies targeting a particular sector of activity or industry; studies conducted on other categories of cultural diversity variables; social, political, or religious studies; and studies aiming to analyze cognitive diversity. The significant contribution of the bibliometric analysis performed by Baker et al. [13] is the identification of publication patterns and the intellectual structure within them.

The studies analyzed and included in the second category of works whose central objective is research on gender variety in correlation with the companies' performance were mainly recent publications from 2000–2021. Many recent studies have examined the relationship between the boards' gender plurality and the performance of organizations, but the results are difficult to interpret because they are quite contradictory. As Adams and Ferreira [39] outlined, at the level of first-performed investigations, gender variety turns out to have a positive effect on operational performance, but this is no longer the case if reasonable approaches and reverse causality issues are applied. The results indicated that on average companies perform worse when there is greater gender variety on the board of directors. On the other hand, Arora [40] pointed out that increasing the number of women on committees positively affects performance and explains that including women on boards increases the cognitive diversity of the board, improves strategic thinking, introduces new skill sets, values, and more open beliefs about solving problems. From the perspective of Arora [40], women's inclusion on committees may be associated with higher board efficiency and integrated business problem-solving skills. However, the evidence needed to be proven on women's board inclusion and the company's dividend payment policies. Authors who are inclined to accept the hypothesis that women on committees are positively associated with business financial performance [8,9,41–50] and use various models of performance measurement in their studies can be considered supporters of gender plurality and promoting women in business management structures. However, there are many works [39,51–56] that support the hypothesis of a negative or no relationship between gender variety and business performance, while Ryan and Haslam [57] support the glass cliff phenomenon, considering that the company's poor performance is related to the appointment of women as board directors. The arguments of the glass cliff are

also supported by those found by Hurley and Choudhary [58], who found that women Chief Financial Officers (CFOs) run relatively smaller companies with poorer financial performance compared to companies run by male CFOs. The heterogeneous influence of women financial directors on the business's financial risk depends on the risk measures taken. In contrast, the growth of women on committees reduces this risk, as shown by panel data analysis.

An examination of studies in the third category shows that these were mainly performed and concentrated in the last five years, have as their main concern the connection of gender diversity to environmental, social and governance (ESG) sustainability variables, or are concerned with the effects of mediation or their moderating attribution in board gender plurality and financial performance nexus. Thus, Bristy et al. [59] examined whether gender influences the nexus CSR-FP and found that the CSR actions taken by the analyzed American companies lead to an increase in profit; nevertheless, the CSR return on investment diminishes as the number of women directors grows. However, the authors emphasize the relevance of taking gender into account when improving knowledge of how firms approach CSR-CFP relationships. Examining the moderating role of CSR through the results obtained, Jiang et al. [10] showed that higher participation of women on boards is positively associated with the financial performance of companies, and CSR has a significant positive effect when moderating the relationship between board gender variety and financial performance. Moreover, the board size, committee members' average age, and the Big4 variables all positively affected the company's performance. The mediation effect of ESG for the board gender variety and financial performance connection was analyzed by Ouni et al. [60], showing that the effect of gender plurality on turnover has an impact on the financial performance of companies and revealing the mediation mechanism by the ESG orientations of companies', which explain almost 4% of the total effect of diversity on performance. The influence of committee plurality on financial performance is analyzed by Ozdemir [61], who demonstrated that board diversity has a large impact for tourism companies when institutional ownership is poor on ownership structure. Saeed et al. [62] and Tyrowicz et al. [63] argued that institutional variables act as emancipatory forces that empower women, and their outcomes for moderation variables emphasize the function of institutional attributes in encouraging women's initiatives. Gender diversity on committees significantly and positively affects CSR reporting, as demonstrated by Wang et al. [12], but no effect of non-executive directors on CSR reporting was found. The authors argue that in the case of Chinese companies, non-executive directors' inclusion on the board is irrelevant mainly because they do not significantly influence business decision-making. At the same time, Wang et al. [12] showed that committee size, board meeting frequency, and leverage significantly influence CSR reporting. DeBoskey et al. [64] were concerned about the link between women's board inclusion and transparency policies of corporate governance and found that more women executives are associated with more transparent disclosures of corporate governance policies. Most studies in this category examine how gender diversity on boards is linked to financial performance and CSR variables. However, some studies investigate the representation of women in corporations in response to stakeholders' requests for increased climate change risk reporting [11,65]. The classification of the reviewed studies helped clarify aspects of the data collected for the bibliometric analysis and elaborate the stages of the research process.

3. Materials and Methods

3.1. Data and Methodology

Gender diversity nexus to business organizations in the present research was investigated through a bibliometric analysis. We looked for the intersections between gender variety and business performance using a comprehensive range of terms as keywords devoted to gender diversity such as 'gender diversity', 'women', 'board diversity', 'executive diversity', 'board structure', 'female', 'executive disclosure', as well as 'business performance', 'financial performance', 'non-financial disclosure', 'business reporting', 'corporate

performance', 'sensitive analysis', 'mediating effect' for companies' performance. Records for each publication identified during the search were converted and concatenated as plain text files and imported into Bibliometrix and Biblioshiny. The examined period covered the years 1996–2021.

The Web of Science (WoS) database was used for search analysis, and the language used was English. The filter used to select the journals was the field of science applied to obtain robust outcomes. Thus, accounting journals, corporate finance, business administration, economics, and management were selected. The published materials were found in eight different categories of publications. They were grouped as follows (Table 1): scientific articles (1621), book chapter papers (45), early access articles (159), books (4), editorial materials (13), proceedings papers (137), and reviews (70). Bibliometrix and Biblioshiny software were run in the R linguistic field for the statistical processing of publications. Bibliometrix performs a global analysis of scientific literature and data processing, while Biblioshiny captures the core code of Bibliometrix and builds an online data analysis platform based on it [66]. Biblioshiny is one of the many web applications that allow users to perform relevant bibliometric and visual analyzes.

Table 1. The information described in the selected publications.

Content Description	Outcomes
Timespan	1996–2021
Sources (journals, books, etc)	560
Papers	2049
Average years from publication	3.92
Average citations per paper	25.86
Average citations per year per doc	4.236
References	72,604
Article	1621
Article, book chapter	45
Article, early access	159
Book	4
Editorial material	13
Proceedings paper	137
Review	70
Keywords plus (ID)	2366
Author's keywords (DE)	3791
Authors	4332
Author appearances	5708
Authors of single-authored papers	218
Authors of multi-authored documents	4114
Single-authored papers	242
Documents per author	0.473
Authors per paper	2.11
Co-authors per papers	2.79
Collaboration Index	2.28

Source: Authors' processing based on the examination of WoS published materials.

Bibliometric analysis techniques are expressed in two forms: (1) performance analysis, which counts the contributions of research items, and (2) scientific mapping, which concentrates on the link examination between the research items [67]. Bibliometric analysis tools (performance analysis, science mapping, and network analysis) described by Donthu et al. [67] were used for centralizing and synthesizing bibliometric data, highlighting the main research trends on the link between gender diversity and business performance. The technical design of the research consists of five major stages carried out successively [68]: study architecture, information gathering, data analysis, data visualization, and interpretation.

The study's design involves the delimitation of the research topic and the choice of bibliometric methodologies that lead to the formulation of answers to research questions. Accordingly, the following objectives have been determined: (i) identifying the scientific

knowledge and the conceptual framework or the study field of gender diversity, (ii) investigating the conceptual framework of gender diversity's nexus to business organizations, and (iii) developing a social network structure for a specific scientific group concerned with gender diversity and business performance.

Data collection was performed in three work phases. First, the information was gathered. In this regard, the online bibliographic database Clarivate Analytics Web of Science (WoS), which stores metadata about scientific papers and can be used to find bibliographic information [69]. The data has been refined by applying filtering criteria such as document type, language, timespan, and subject category. To identify citations, bibliographic coupling and co-citation links between elements cited were downloaded. The next step is to upload and convert bibliographic information, which involves converting the data into a format compatible with the bibliometric tools used by Biblioshiny. Plaintext format was used, and the full record and cited references options were selected for data items. The last step is data cleaning, which consists of eliminating errors, duplicate works, and homogenizing presentation formats. The quality of the data significantly influences the quality of the results.

3.2. Data Analysis

The data analysis process consisted of an analytical-descriptive bibliometric examination of the research topic, the most prolific sources, the most cited papers, the most productive countries, the author's impact, the keyword-author-journal connections, and the investigative trends of the subjects. Subsequently, the study used network and cluster analysis to investigate the main features of the research field structure on gender diversity linked to business performance. Thus, we determined the main research topics using network analysis based on keyword co-occurrence and multiple correspondence analysis (MCA). Consequently, the results of the co-citation network (authors, papers, and journals) were investigated. The study also revealed the collaboration network between authors, institutions, and countries. To perform the cluster analysis of the data, we proceeded to group by coupling the word clouds obtained for abstracts, authors, and publications. Citations can be analyzed through descriptive and network data. The classical methodologies used in citation analysis are bibliographic coupling, co-citation, and co-formulation. If at least two registration data cite the same publication, according to Kessler [70], we identify the bibliographic link. However, co-citation evaluates the most cited works [71]. Co-word analysis [72] maps the cognitive structure of the network over time based on the co-occurrence of terms in the abstract, title, or keywords in publications. Co-word citation generates the temporal increase within a scientific subject by facilitating the constitution of conceptual frameworks through the descriptive narrative text. The study uses the bibliometric coupling analysis together with the descriptive analysis to evaluate the organization of the publication topic. According to Kessler [70], papers citing the same third source create a bibliographic pair that analyzes connected topics [73].

Any bibliometric network can be displayed or represented graphically. In this sense, the analysis methods allow the extraction of useful knowledge from data and its presentation in intuitive views or maps. Thus, in this stage of data visualization, we can use network analysis to perform statistical analysis on the contoured maps to suggest different dimensions of the global network or measurements of the relationship or overlap of the identified distinctive clusters. In the last stage of the work, that of interpretation, the findings are described and presented.

4. Results

The sample of documents examined in this study comprises a total of 2049 publications exploring the connection of "gender diversity" to "business performance" (Table 1). The investigated period was between 1996 and 2021. The authors who published in 560 sources and used 3791 different keywords used a total of 72,604 references. As shown in

Table 1, there is a strong sense of collaboration between the authors; 4114 authors shared their publications.

4.1. Dynamics of Publications

Analyzing the set of documents from the perspective of publication dynamics, the number of materials related to gender diversity and business performance began to grow in 2015, from an average of 100 publications to 300 publications in 2019. The annual growth rate is 21.87%. As Merigó et al. [74] observed, the expansion of the WoS database in 2015 and the increase in the number of international researchers have positively influenced the number of publications (Figure 1).

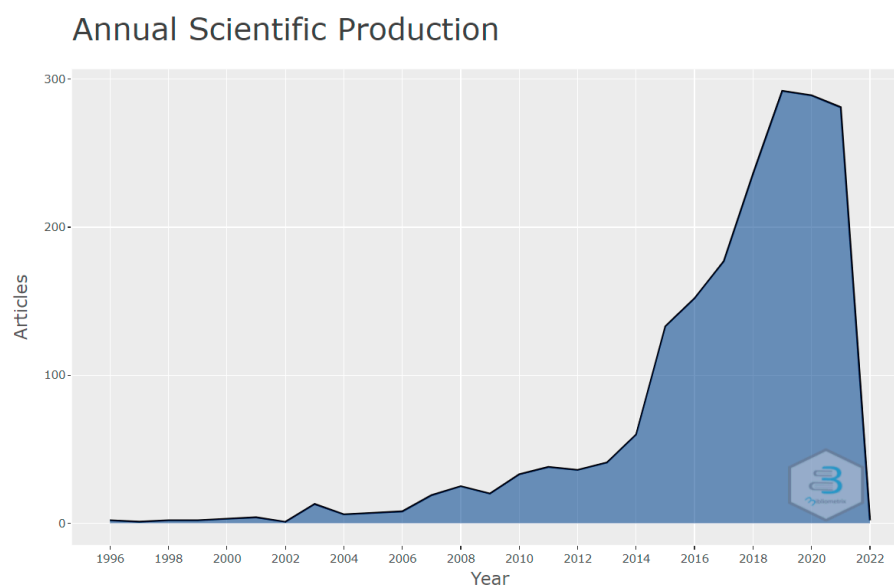


Figure 1. Annual scientific production of WoS published materials.

Citations on gender variety and their connection to financial performance have registered an upward trend since 1999, in average citations of papers per year, with 24 citations at the top of the entire citation spectrum in the dataset (Figure 2).

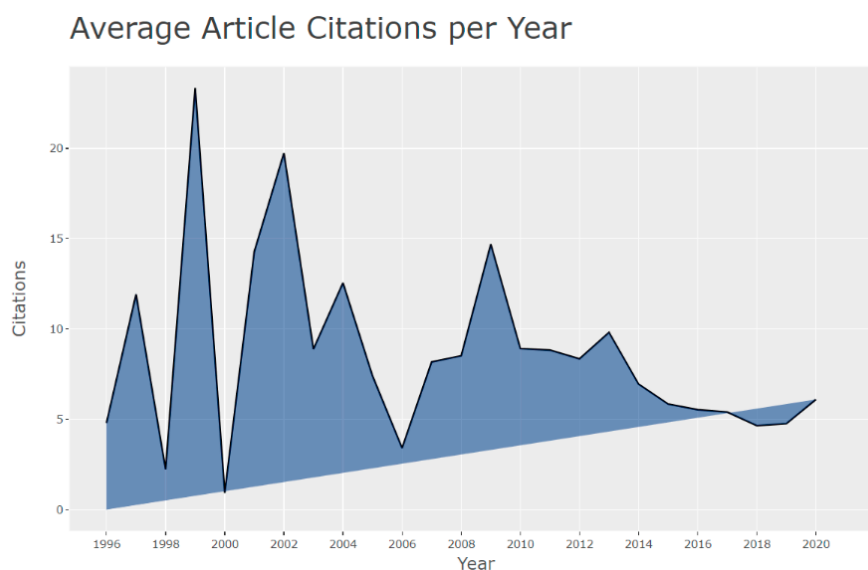


Figure 2. Average article citations per year.

4.2. The Most Efficient Sources

The most relevant scientific journals that publish papers on the border between the two topics were analyzed. The ranking of the twenty most abundant sources in the area of informality indexed in the essential collection of the WoS database, presented in Figure 3, highlights the fact that the “Journal of Business Ethics” ranks first. Moreover, analysis of the most efficient sources revealed that works on gender variety and business performance were mostly published in “Corporate Governance—The International Journal of Business in Society”, “Corporate Governance—An International Review”, “Corporate Social Responsibility and Environmental Management”, and “Business Strategy and the Environment”.

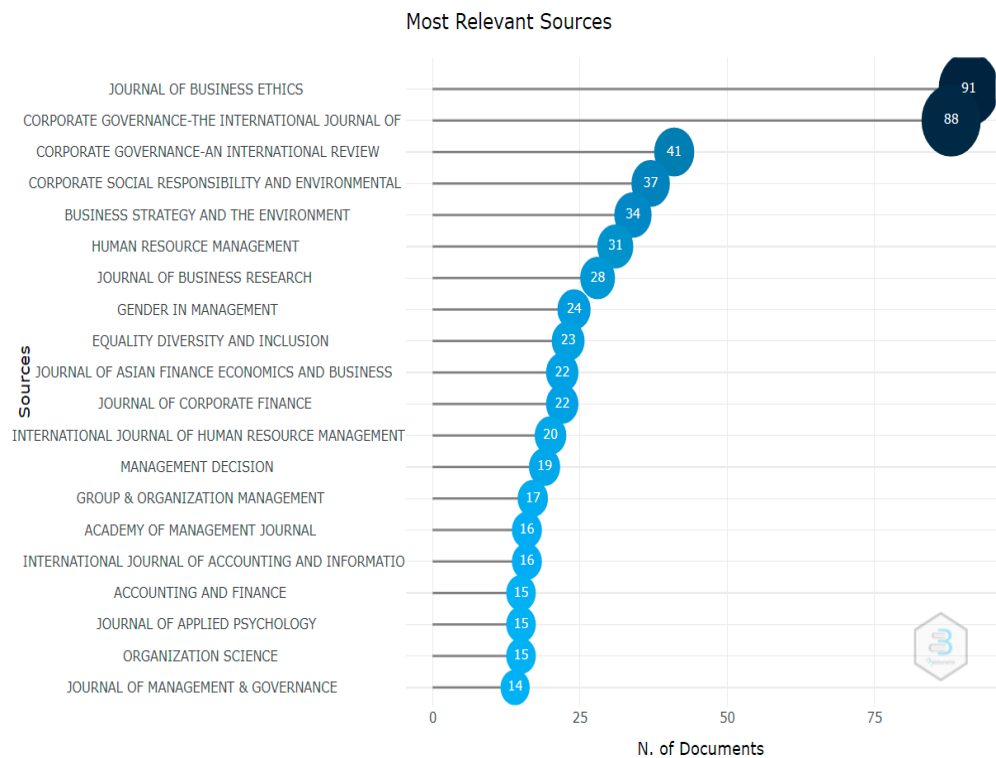


Figure 3. The ranking of the most efficient sources as result of the analysis of WoS published materials.

Regarding the analysis of the development of scientific journals as new sources of investigation on the phenomenon of gender plurality (Figure 4), we found a significant increase for the “Journal of Business Ethics and Corporate Governance—The International Journal of Business in Society”.

4.3. Most Cited Papers

The most relevant works are presented in Figure 5, depending on the total citations. For example, in the research perimeter of gender diversity and business performance, the most cited paper is the study of R.B. Adams (2009) published in the “Journal of Financial Economics” summing up 1565 citations. The following most cited papers are by R.J. Ely (2001), published in “Administrative Science Quarterly” with 1015 global citations, followed by R.A. Johnson (1999), published in “Academy of Management Journal” with an overall of 824 citations.

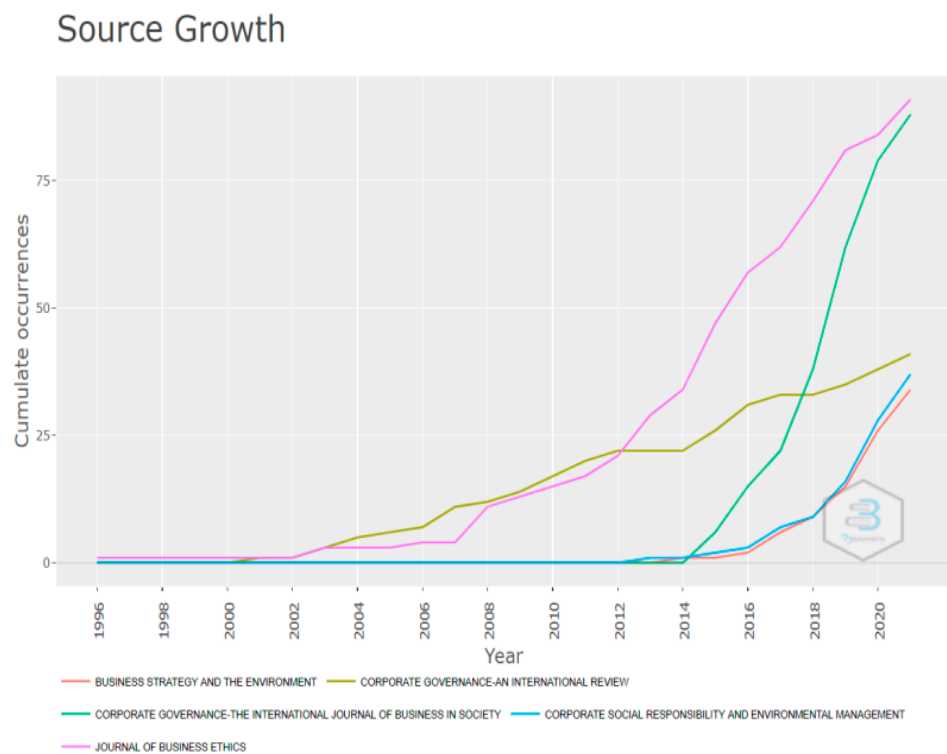


Figure 4. Source growth over time based on the analysis of WoS publications.

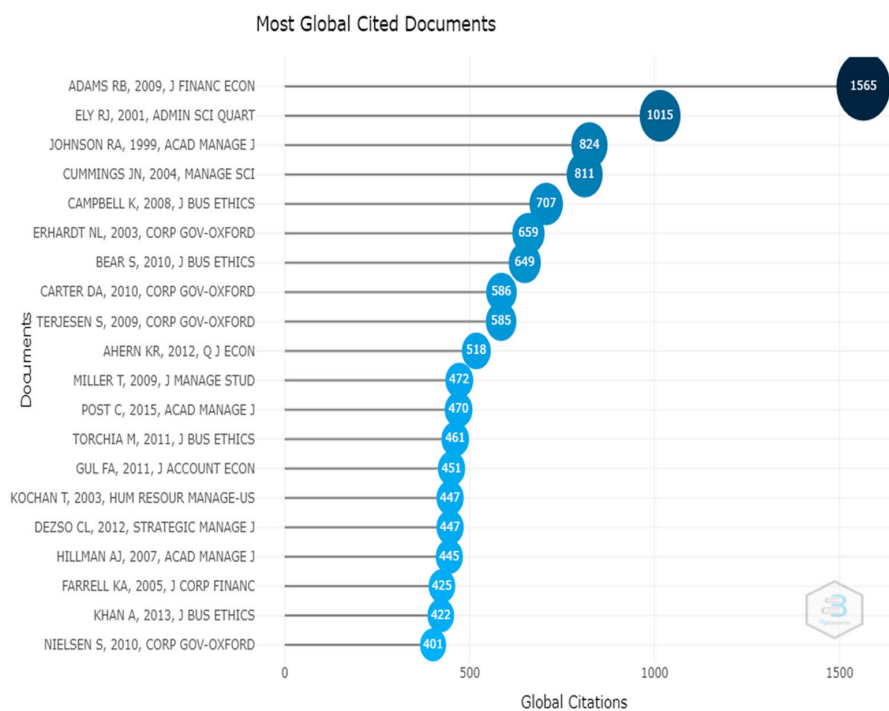


Figure 5. Most globally cited papers based on the analysis of most relevant WoS publications.

4.4. Most Efficient Countries

Next, we were interested in the analysis of scientific production by country (Table 2), aiming to identify and classify the countries that have contributed significantly to the development of knowledge in the fields of gender variety and organizational performance. The analysis revealed that the most productive countries in terms of total citations are the United States (20,183), Australia (6223), the United Kingdom (6193), Spain (2716), and

China (2386). Depending on the average number of citations per publication, Denmark leads with 107.09, followed by the USA (55.91), Australia (49.78), the United Kingdom (34.99), and Norway (32.06).

Table 2. Most productive countries.

Country	Total Citations	Average Article Citations
USA	20,183	55.91
Australia	6223	49.78
United Kingdom	6193	34.99
Spain	2716	21.90
China	2386	21.12
Canada	2010	32.42
Germany	1179	23.58
Denmark	1178	107.09
Italy	1164	18.77
France	774	13.34
Malaysia	699	9.32
Netherlands	621	23.00
Norway	577	32.06
New Zealand	516	18.43
Korea	374	13.85
Lebanon	367	21.59
Turkey	365	20.28
Pakistan	362	10.65
India	329	6.33
Belgium	323	21.53

Source: Authors' processing based on the analysis of WoS publications distributed by country.

4.5. Analysis from the Perspective of the Impact of the Most Influential Authors

The most cited authors according to the highest number of total citations in the area of gender plurality and business performance were identified as R.B. Adams, C. Post, D. Ferreira, D.A. Thomas, and N. Rahman, who recorded the highest visibility (Figure 6). According to the authors' affiliation criterion, the University of Southampton, Ultera University of Malaysia, and the University of Salamanca had the highest number of publications (Figure 7).

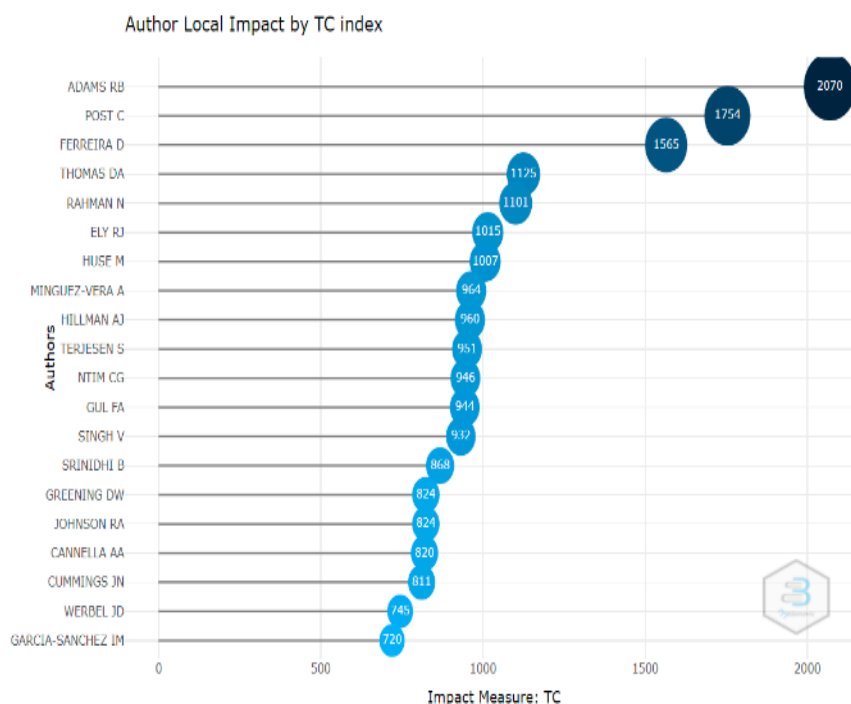


Figure 6. Authors' impact evaluation based on the analysis of citations in WoS publications.

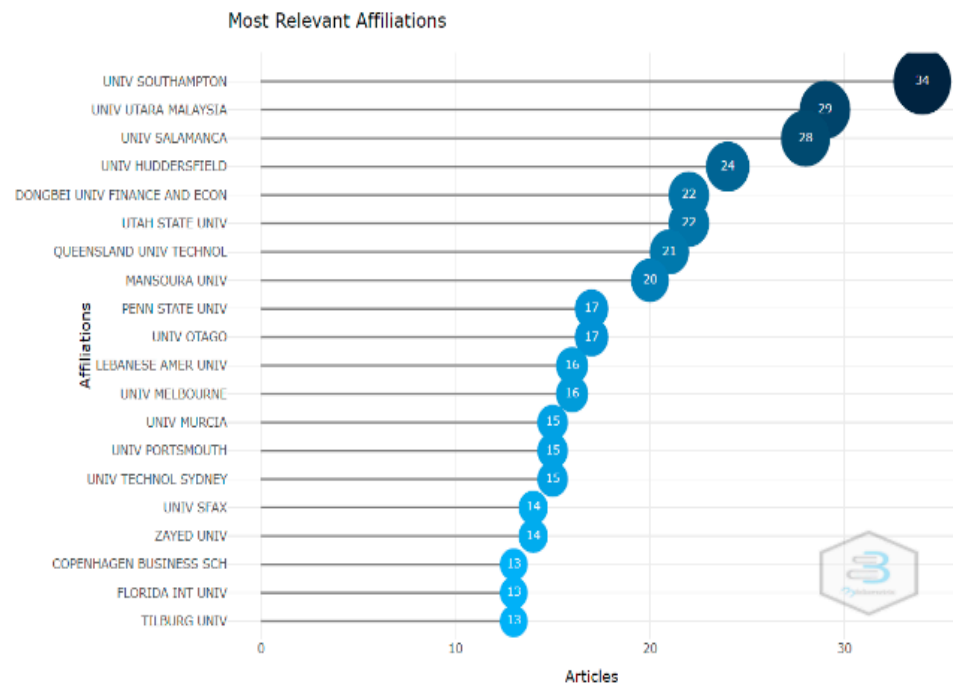


Figure 7. Most relevant affiliations based on the authors’ affiliation declared in the WoS publications.

As distinguished reference authors in terms of the evolution of scientific production over time, C.G. Ntim, I.M. Garcia-Sanchez, and M. Ali Elamer, as well as AA and Martinez-Ferrero, J., must be mentioned. From the perspective of longevity and perseverance in publishing, O.C. Richard stands out with a publication time interval between 2003 and 2021 (Figure 8).

Top-Authors' Production over the Time

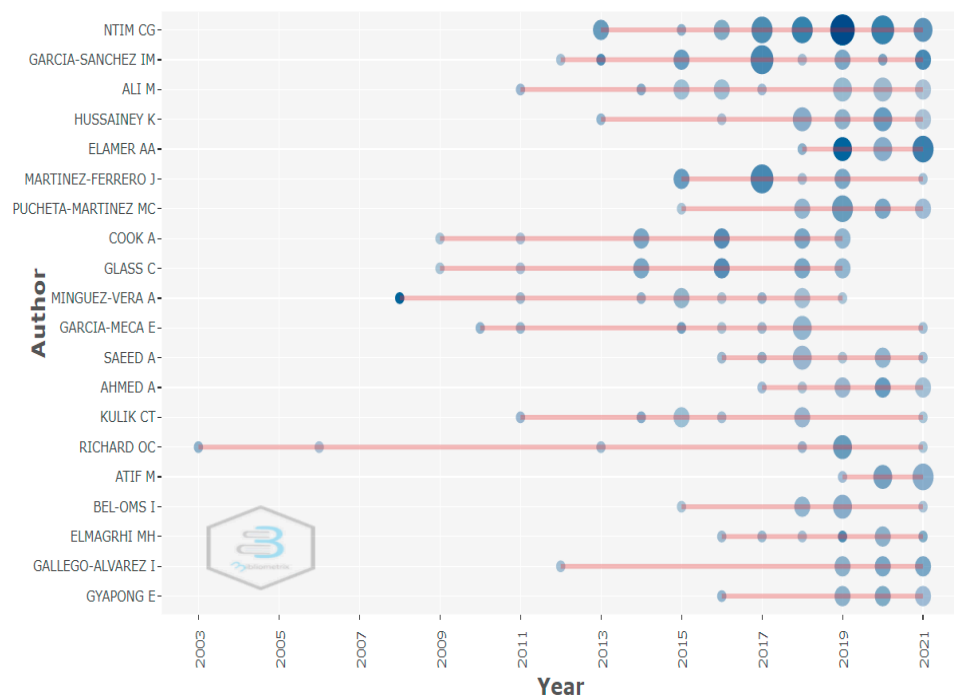


Figure 8. Top authors’ scientific production over time based on the analysis of WoS publications.

5. Discussion

5.1. Three Plots Field and Trend Topics

Valuable information was obtained through the Sankey diagram (Figure 9) by examining the link between sources, keywords, and authors. The rectangles' height provides data on the relationships between components. The main research topics of the authors most frequently aggregated in keywords—in our case, gender diversity and business performance—were the main focus of our scientific approach and the analysis of the sources in which they were most frequently published. Thus, authors such as I.M. Garcia-Sanchez, J. Martinez-Ferrero, A. Minguez-Vera, C.G. Ntim, M. Ali, Garcia-Meca, E., and Elamer, AA., together with sources such as “Corporate Governance—The International Journal of Business in Society”, “Journal of Business Ethics”, “Corporate Social Responsibility and Environmental Management”, “Human Resources Management Journal” were linked to the main research topics of ‘corporate governance’, ‘gender diversity’, ‘board of directors’, ‘gender’, ‘diversity’, ‘firm performance’, and ‘corporate social responsibility’.

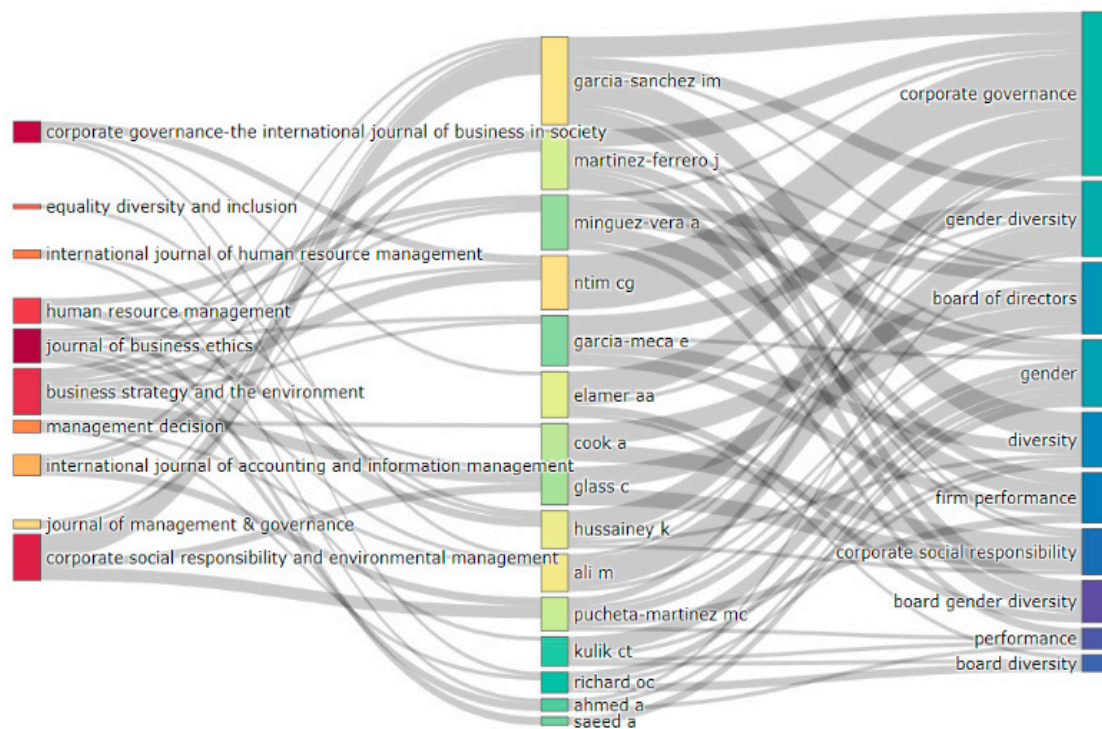


Figure 9. Sankey diagram—Three field plots.

In Figure 10, the diagram of research trends shows an image of the dynamics of the main concerns and some perspectives on recently investigated topics. The appearance of the topics is adjusted to the frequency of the number of words that appear in gender variety and business performance investigation. Thus, the more the word is used and the higher it is placed on the right side of the graph, the more recent its use is. Consequently, ‘corporate social responsibility’, ‘board structure’, ‘corporate governance’, and ‘gender diversity’ have been used since 2016, while ‘board gender diversity’, ‘agency theory’, ‘women directors’, and ‘financial performance’ have been topics of interest in 2021 (Figure 10).



Figure 10. Research trend topics based on the bibliometric analysis of WoS publications.

5.2. Cluster Analysis

5.2.1. Abstracts’ World Cloud and Treemap Analysis

The global cloud analysis of abstracts provides a perspective on the main research topics and trends by exploring the most significant information from the abstracts of publications. Viewing the results of the cloud analysis displays the top 50 most common words that reveal words such as ‘performance,’ ‘board,’ ‘diversity,’ ‘companies,’ ‘gender,’ and ‘executives’ (Figure 11).



Figure 11. Keyword frequency in abstracts of publications based on the analysis of WoS published works.

In Figure 12, the top 50 of the most frequent pair of two words can be visualized, revealing the most frequent combinations of words such as ‘gender diversity’ (12%), ‘cor-

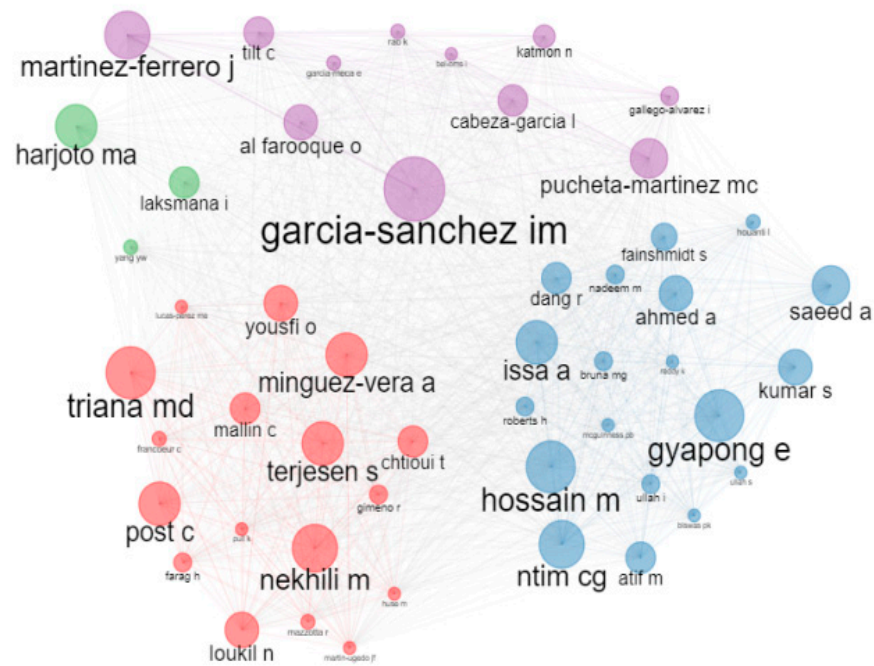


Figure 13. Authors' clustering by bibliographic coupling of WoS examined publications.

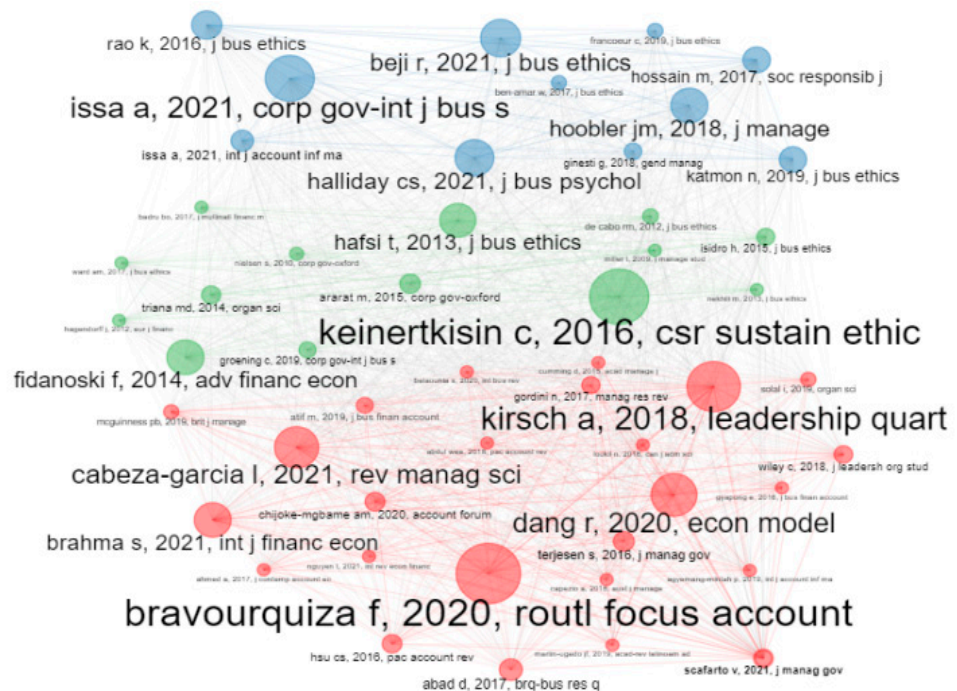


Figure 14. Papers clustering by coupling the WoS examined works.

5.3. Exploring the Map of Major Themes Using Multiple Correspondence Analysis (MCA)

From the mapping of the most salient research topics, three main groups were identified: the red cluster, consisting of different elements of women and business performance, including female directors, company performance, women directors, etc. The green cluster consists of board diversity elements, including board size, board diversity, typology, board independence, sustainable development, and CSR. The blue cluster consists of elements of leadership and gender, with elements such as gender equality, diversity management, compensation of directors, women on boards, culture, etc. (Figure 15).

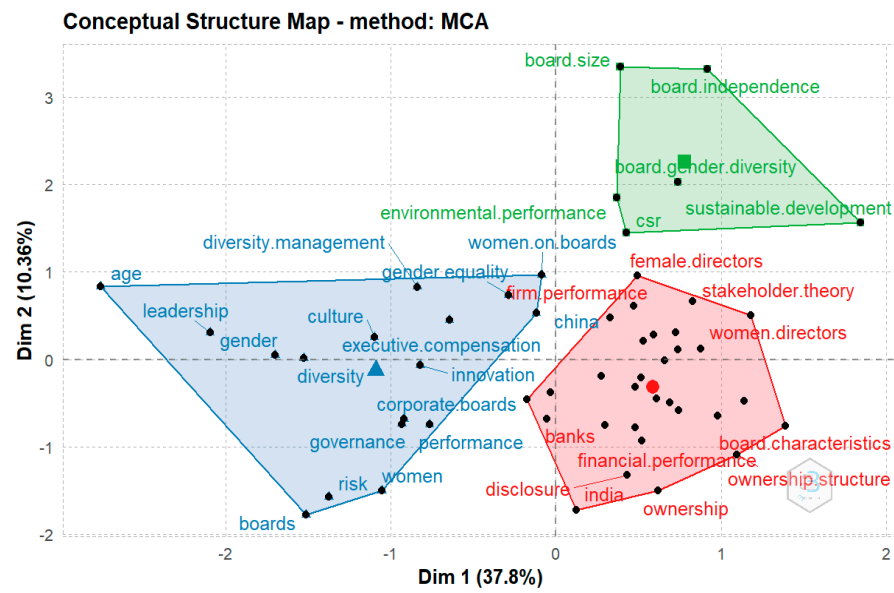


Figure 15. Conceptual Structure Map of gender diversity and business performance most salient research topics based on MCA analysis of WoS publications.

The science mapping and network analysis uncovered the most significant current research trends regarding gender diversity and business performance. This result represents the most significant contribution of this study to the development of the current literature. Identifying the most salient trends and research interests has both theoretical and methodological implications and possible practical implications at the level of business organizations. We proceeded to measure and study keyword co-occurrence and the evolution of the main term occurrences over time (Figure 16), revealed that the terms with the highest increase in occurrences have been ‘corporate governance’ and ‘gender diversity’ (Figure 17).

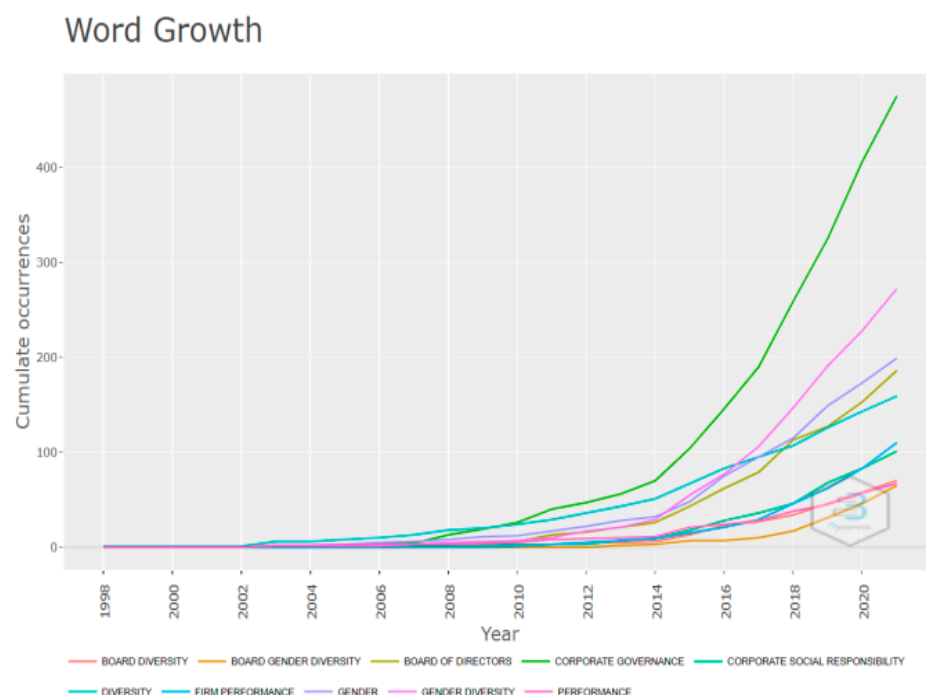


Figure 16. Main co-occurrence terms and keywords per year.

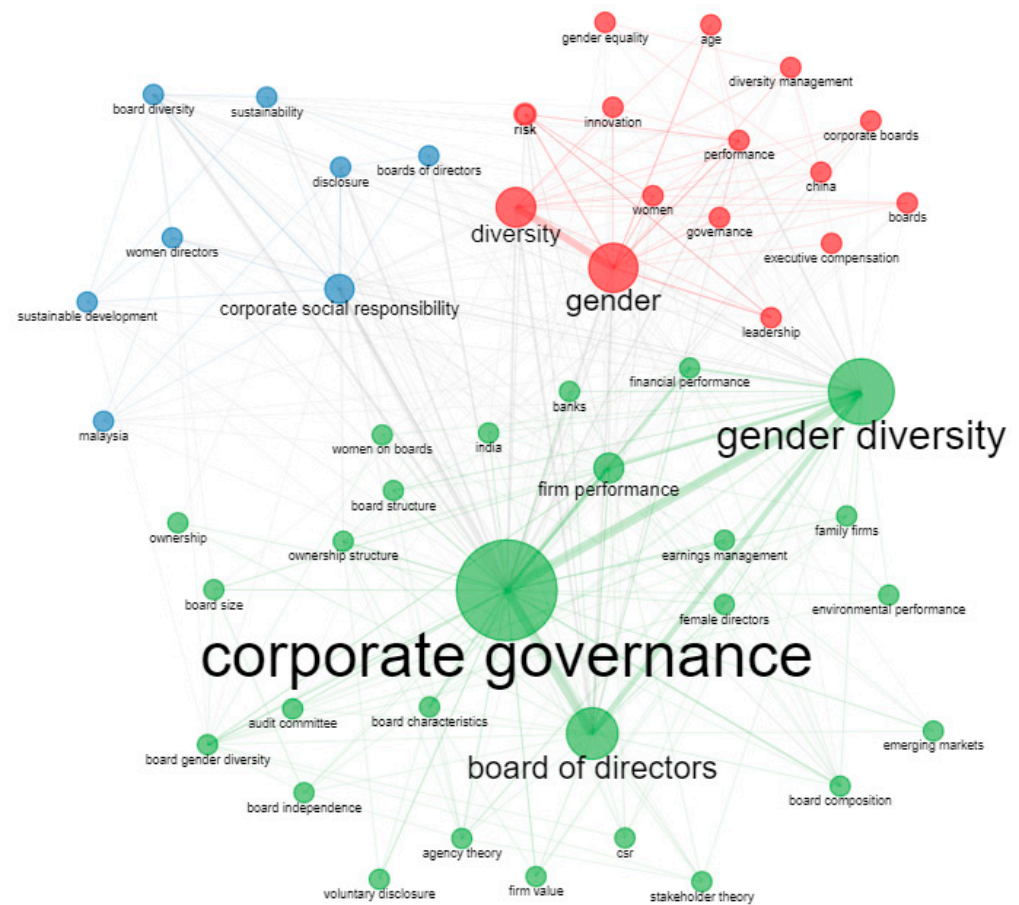


Figure 17. Co-occurrence network analysis on authors' keywords based on the examination of WoS publications.

Analysis of gender variety and business performance highlighted three different colors of boxes, signaling three individual clusters (Figure 17), with the focal points of the network being corporate governance (497.29), gender diversity (152.25), the board of directors (59.01), gender (107.09), diversity (26.56), and corporate social responsibility (34.52).

5.4. Exploring the Co-Citation Analysis Based on Authors, Papers, and Journals

5.4.1. Co-Citation Analysis of Authors

The co-citation analysis among authors for the body of literature investigating the combinations of words for the topic reveals three main clusters, with at least two prominent authors in each cluster. First, R.B. Adams, D.A. Carter, A.J. Hilman, and S. Terjesen share their linkages with the group of authors from their sub-network in the case of the green cluster, while in the case of the red cluster, M.C. Jensen and E.F. Fama are the nodes to be followed. Concerning the blue cluster, J. Pfeffer, A.H. Eagly, and D.C. Hambrick are the nodes to be followed on their respective sub-networks (Figure 18).

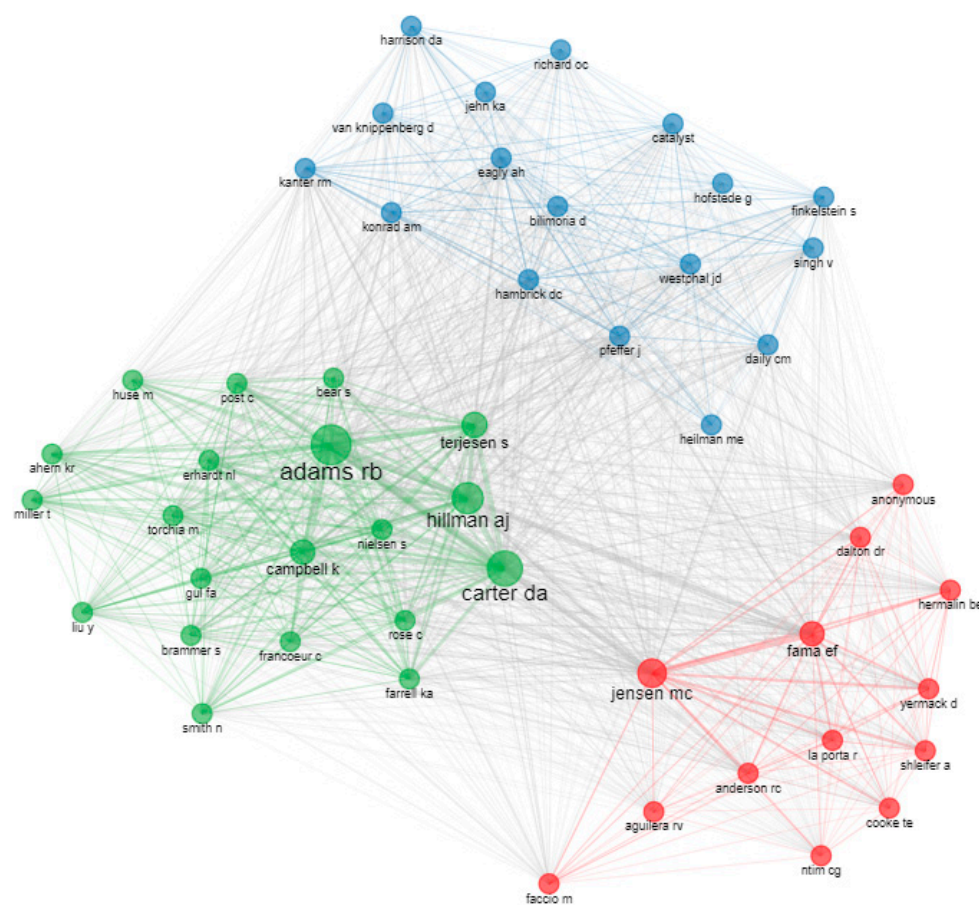


Figure 18. Authors' co-citation analysis based on the examination of WoS publications.

5.4.2. Co-Citation on Papers

The co-citation analysis performed on papers examining the range of words on the theme of gender diversity and business performance has identified four main clusters with three primary papers and their linkages with a set of papers from their sub-network (Figure 19).

The nodes with the highest betweenness in the green cluster are R.B. Adams with the paper “Women in the boardroom and their impact on governance and performance” published in 2009, and D.A. Carter with the paper “Corporate governance, board diversity, and firm value”, published in 2003. The red cluster revealed that the nodes with the highest value for betweenness are M.C. Jansen with the paper “Theory of the firm: Managerial behavior, agency costs and ownership structure” published in 1976 and E.F. Fama with the paper “Corporate Governance and Performance: Evidence from Italian Companies” from 1983. The blue cluster has as its principal nodes the papers of D.C. Hambrick with the title “Upper Echelons: The Organization as a Reflection of Its Top Managers”, from 198, and F.J. Millikken, “Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups”, from 1996. The purple cluster has the node papers, “The impact of board diversity and gender composition on corporate social responsibility and firm reputation” by S. Bear from 2010 and “The Contribution of Women on Boards of Directors: Going beyond the Surface” by S. Nielsen from 2010.

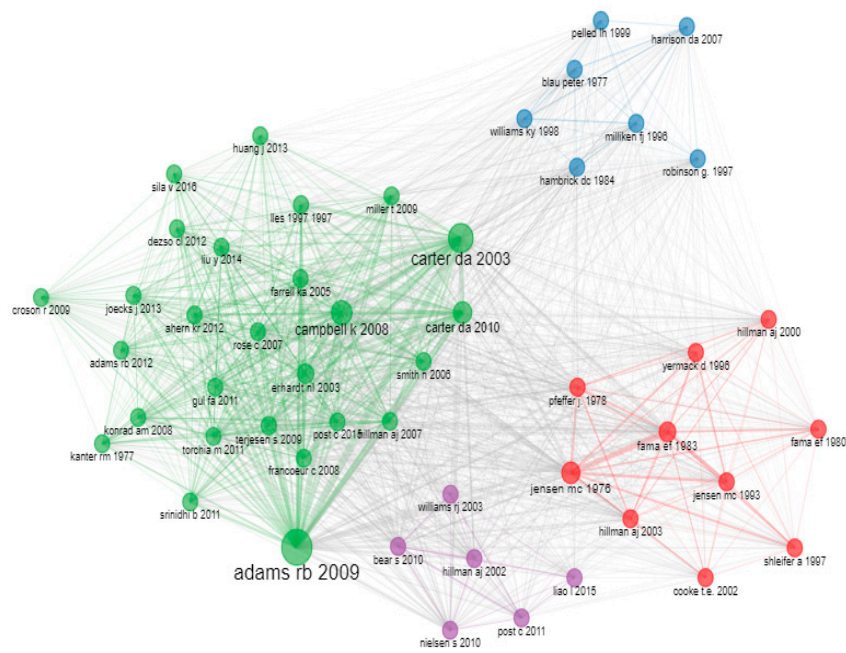


Figure 19. Papers’ co-citation analysis based on the examination of WoS publications.

5.4.3. Co-Citation in Journals

Journals’ co-citation analysis in the literature examined the wide range of terms on gender diversity and business performance and showed the existence of two main groups. “Academy of Management Journal” (74.49), “Strategic Management Journal” (70.93), and “Academy of Management Review” (66.48) are the journals from the blue cluster with the highest values for betweenness. The journals indicated above are the most important in terms of the average route between other pairs of journals and have the highest values of proximity. In the case of the red cluster, we can mention “Journal of Business Ethics” (60.97), “Oxford Handbook of Corporate Governance” (30.91), and “Journal of Financial Economics” (27.47) as the journals with the highest betweenness (Figure 20).

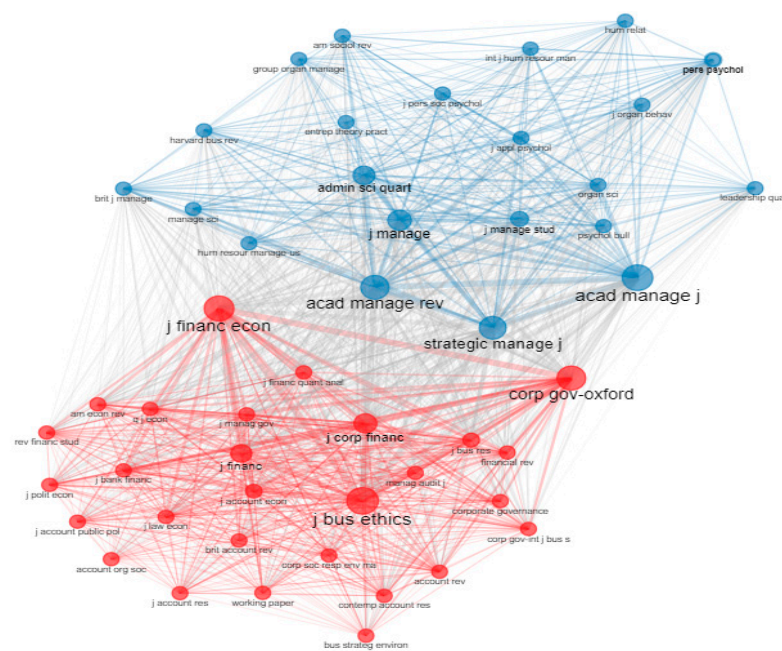


Figure 20. Journals’ co-citation analysis based on the examination of WoS publications.

5.5. Map of Research Field Collaborations

Regarding collaboration between authors, the highlights in the network are C.G. Ntim, with A.A. Elamer, A.M. Zalala, H.A. Abdou, and M.H. Elmagrhi being part of the yellow cluster. The red cluster composed by I.M. Garcia-Sanchez, J. Martinez-Ferrero, and E. Garcia-Meca and the blue cluster composed by A. Cook and C. Glass are the other main sub-graphs of the whole network (Figure 21).

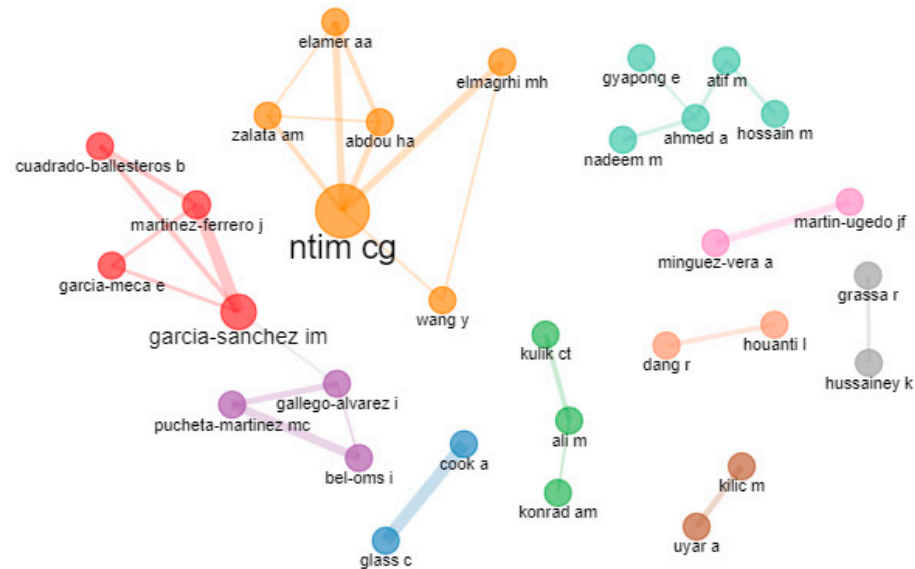


Figure 21. Authors' collaboration network analysis based on the investigation of WoS publications.

The most significant collaborations between institutions (Figure 22) are found in the red cluster represented by Southampton University, Huddersfield University, Mansoura University, and the University of Birmingham.

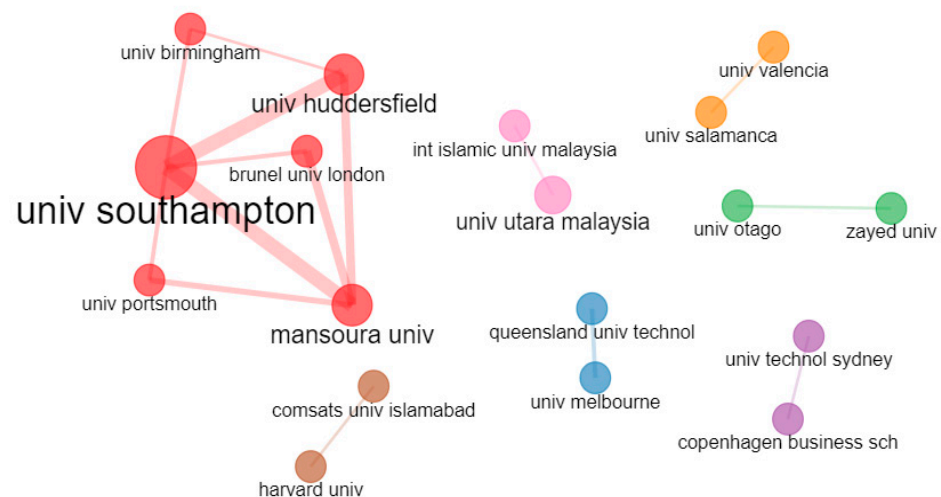


Figure 22. Institutions' collaboration network analysis based on the investigation of WoS publications.

6. Conclusions

In this paper, we set out to investigate how gender diversity relates to business performance, highlighting the research dynamics of this topic and identifying potential future research paths. The specific research field started to increase in 2015, and the most productive journals are "Journal of Business Ethics", "Corporate Governance—The International Journal of Business in Society", "Corporate Governance—An International Review", "Cor-

porate Social Responsibility and Environmental Management”, and “Business Strategy and the Environment”. Results of bibliometric network analysis showed that the most cited articles are those of R.B. Adams (2009) published in “Journal of Financial Economics”, the work of R.J. Ely (2001) published in “Administrative Science Quarterly”, and the work of R.A. Johnson (1999) published in “Academy of Management Journal”. Regarding the authors’ impact, the analysis highlighted that R.B. Adams, C. Post, D. Ferreira, D.A. Thomas, and N. Rahman are the authors with the highest visibility. In contrast, from the point of view of the authors’ affiliations, the University of Southampton, the University Utara Malaysia, and the University of Salamanca have the highest number of publications. Furthermore, analyzing sources, keywords, authors, I.M. Garcia-Sanchez, J. Martinez-Ferrero, A. Minguez-Vera, C.G. Ntim, M. Ali, Garcia-Meca, E., Elamer AA., and sources such as “Corporate Governance – The International Journal of Business in Society”, “Journal of Business Ethics”, “Corporate Social Responsibility and Environmental Management”, and “Human Resources Management Journal”, it was noticed that were linked to the main research topics of ‘corporate governance’, ‘gender diversity’, ‘board of directors’, ‘gender’, ‘diversity’, ‘firm performance’, and ‘corporate social responsibility’.

It is worth mentioning that cluster analysis of authors’ contributions by coupling recognized four groups of authors’ coupling. Authors such as M. Hossain, E. Gyapong, C.G. Ntim, A. Issa, and R. Dang have as their main research interests issues like ‘firm performance’, ‘impact’, and ‘corporate governance’, which formed the blue cluster. Other authors such as I.M. Garcia-Sanchez, J. Martinez-Ferrero, E. Al Faroque, M.C. Pucheta-Martinez, and C. Tilt have developed studies focused on topics such as ‘governance’, ‘firm performance’, and ‘performance’, which constitute the purple cluster. Themes such as ‘directors’, ‘corporate governance’, and ‘firm performance’ having as representative authors M.D. Triana, A. Minguez-Vera, C. Post, M. Nekhili, and S. Terjesen, formed the red cluster.

In a similar embodiment, clustering papers revealed three clusters: the green cluster has as main topics ‘corporate governance’, ‘directors’, and ‘firm performance’; the red cluster focuses on papers examining ‘corporate governance’, ‘women directors’, and ‘firm performance’; and finally the blue cluster mainly investigated ‘financial performance’, ‘governance’, and ‘gender diversity’. Analyzing the main categories of topics identified in the scientific literature that examines gender diversity’s connection to business performance differentiates the cluster of different items related to women and business performance, including women directors, company performance, and executive board composition, while the second category includes items concerning the diversity of directors’, including committee size, director gender variety, and independence of directors. The last cluster is connected to leadership and gender and contains items such as gender equality, diversity management, women, women on boards, and culture. Comparing the findings of this study to other significant works, it is observed that the results are convergent with those of Sánchez-Teba et al. [4], Mumu et al. [35], Arora [40], and Baker et al. [13].

The methodological implications of this synopsis analysis lie in the cluster analysis results. The findings indicate that the following future research topics would be of interest in aiming to deepen the investigation into the relationship between board gender variety and business performance: (i) a dynamic analysis that includes other demographic variables such as age; (ii) studies in the concept of diversity on the board of directors; (iii) examination of certain personality traits of women members of the board of directors such as inclination towards negotiation, openness to collaboration, optimism versus conservatism, risk aversion, empathy, etc. correlated with non-financial performance measured in terms of sustainability; (iv) investigation of various cultural aspects that influence the work performance of women directors and enhance or not the performance of the business; (v) and cognitive and behavioral analysis of women directors and the influence of identified patterns on business policies, both financial and CSR, well-being climate at work, waste recycling, and transparency of corporate governance.

In terms of co-citations, R.B. Adams, D.A. Carter, A.J. Hilman and S. Terjesen, M.C. Jensen, E.F. Fama, J. Pfeffer, A.H. Eagly and D.C. Hambrick are the most prolific authors,

while the papers “Women in the boardroom and their impact on governance and performance” of R.B. Adams, “Corporate governance, board diversity, and firm value” of D.A. Carter, “Theory of the firm: Managerial behavior, agency costs and ownership structure” of M.C. Jansen, “Corporate Governance and Performance: Evidence from Italian Companies” of E.F. Fama, “Upper Echelons: The Organization as a Reflection of Its Top Managers” of D.C. Hambrick, “Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups” of F.J. Milliken, “The impact of board diversity and gender composition on corporate social responsibility and firm reputation” and “The Contribution of Women on Boards of Directors: Going beyond the Surface” of S. Nielsen are the reference papers of the investigated field.

The journals, “Academy of Management Journal”, “Strategic Management Journal”, “Academy of Management Review”, “Journal of Business Ethics”, “Oxford Handbook of Corporate Governance”, and “Journal of Financial Economics” are the most representative in this analyzed field, whilst the most successful collaborations have been identified to be C.G. Ntim with A.A. Elamer, A.M. Zalala, H.A. Abdou, and M.H. Elmagrhi. At the same time, I.M. Garcia-Sanchez, J. Martinez-Ferrero, and E. Garcia-Meca made joint work, as well as A. Cook and C. Glass. Scientific collaborations between the following institutions: Southampton University, Huddersfield University, Mansoura University, and the University of Birmingham proved to be the most prolific partnerships.

Moreover, the results also indicate potential practical implications from a managerial decision-making perspective. The correlations between gender diversity, governance, and business performance have clear implications for board composition and the board of directors’ structure, as well as for managerial compensation and benefits for achieving performance targets. Thus, as shown by Goyal et al. [75] and Bilan et al. [76], in the case of companies where gender discrimination is unequivocally identified, men are more likely to benefit from different types of compensation. So, the present study provides a premise for investigating the interdependence between gender discrimination, work opportunities, and their impact on performance indicators. Following the same idea, the influence of leadership [77–79] and governance practices on organizational culture, work climate, communication functions, and collective well-being directly affects the performance of companies. Therefore, the results of our analysis demonstrate the need to align companies’ strategies with SDG 5 objectives to achieve performance and sustainable development goals.

The principal limitation of this study is the information collected from a single database (Web of Science) from the sampled papers, as a greater variety of articles and topics could be obtained using other databases, such as Scopus, Science Direct, Google Scholar, or others. Thus, for these reasons, the interpretation of findings is limited to some extent. However, despite these limitations inherent in any study, we believe that the results obtained have both theoretical and practical value and can be a premise in identifying other avenues of scientific research or for deepening those already existing and highlighted by the literature on board gender variety and business performance. In addition, female cognitive, cultural, and behavioral patterns that may result from more stratified and in-depth future research may reveal other valences of the role of women executives in business organizations that may interest the business environment for awareness and development of current trends in innovation and creativity in almost any business.

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