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Global trends in board diversity research: A bibliometric view

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Global trends in board diversity research: A bibliometric view

ABSTRACT

Purpose- This study seeks to identify the main research development on board diversity and offers a quantitative synopsis of key themes and contributors, knowledge gaps, and provides directions for further work.

Design/methodology/approach- Using a bibliometric analysis, we assess the patterns in global board diversity research based on co-occurrences of researchers' keywords and publication outputs of 991 articles from the Scopus database. Also, the co-citation network analysis was performed to assess the intellectual structure of board diversity research.

Findings- According to the keyword analysis, we found that researchers focus on the gender diversity of the boardroom while ignoring the cognitive diversity and other aspects of demographic diversity such as educational, ethnic, age, nationality, experience, background, and tenure, pointing to the need for further work to consider other diversity attributes and the interaction between them. Additionally, board diversity research related to (but not limited to) payout policy, cash holding, initial public offerings, small-medium enterprises, and financial institutions are limited.

Originality/value- This study provides a comprehensive evaluation of the development of board diversity research (using a large archival database) and identifies the common construct as well as the potential opportunities for future research directions.

Keywords: Gender diversity; Board diversity; Corporate governance; Board composition; Bibliometric literature review

1. INTRODUCTION

Boardroom diversity is the heterogeneity among board members in terms of age, gender, ethnicity, nationality, education, and experience. The organization needs to have a more diverse boardroom in today's business environment because it provides different perspectives and insights (Elmagrhi et al., 2019; Haque & Ntim, 2018, 2020; Yang et al., 2019). A more diverse board is more effective in problem-solving, network connection, and improves the image of the firm (Fernández-Temprano and Tejerina-Gaite, 2020; Ntim, 2015, 2016). Several countries have been moving towards more diverse boardrooms by implementing a gender quota for women's representation. The most notable amongst them is Norway that initiated this effort in 2003 by enforcing gender diversity (40 per cent female) in boardrooms, followed by several other countries. For example, Finland (in 2005) and Iceland (in 2010) passed laws requiring 40 per cent of firm board members to be women (Nguyen et al., 2020). In 2016, Germany passed a law requiring listed firms to have 30 per cent of women on supervisory boards (Ciavarella, 2017). Recently, California is the first state in the US to pass a law in 2018 mandating firms to have a minimum of one female director on the board by 2019, and any board with five (six or more) members should have a minimum of 2 (3) female directors on the board (Green et al. 2020). These regulatory requirements have triggered a memory of an ongoing debate about the impact of board diversity on various aspects of firms.

The corporate boardroom is responsible for making strategic decisions and helps ensure that the interests of shareholders and managers are closely aligned. It also helps to discipline or remove ineffective management teams (Wellalage and Locke, 2013). It can also help in linking firms with the external environment and facilitating access to external resources (Song et al., 2020; Wellalage and Locke, 2013). The diversity of the board is one way to build an efficient board of directors because diversity brings more perspectives, knowledge, and experience into the boardrooms, which enable the board to perform its duties better (Abdou et al., 2020; Bufarwa et al., 2020; Malagila et al., 2021). Several explanations have been put forward in the literature illustrating the advantages of having a diverse boardroom. Carter et al. (2003) suggest that diversity increases board independence because people from diverse backgrounds might ask questions that would not come from directors with more traditional backgrounds. Adams and Ferreira (2009) confirmed that as the diversity of the board increase, the quality of corporate governance would increase. Moreover, board diversity enhances the organization's connections with external environments. Also, Fernández-Temprano and Tejerina-Gaite (2020) contended that diversity could promote humans' resources motivation and reduce costs from absenteeism and the high turnover of minorities.

To this end, many studies have confirmed that board diversity enhances firm performance (Carter et al., 2003; Song et al., 2020).

Empirically, among the earliest studies on board diversity, Beasley (1996) asserted that board diversity helps to mitigate the likelihood of financial statement fraud. Also, it has been suggested that the effort to monitoring management activities is increased in firms with a more diverse board (Adams and Ferreira, 2009). Additionally, the vast majority of prior studies have examined the performance of firms as an outcome of board diversity. A large number of these studies are in favour of a positive impact of board diversity on firm performance (Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003). Others, however, reported negative or no relationship at all (Adams and Ferreira, 2009; Detthamrong et al., 2017; Guest, 2019). Moreover, the diversity of the boardroom has attracted the interest of scholars not only on corporate performance but from different disciplines. Scholars have linked the board heterogeneity with various aspects of firms, including governance quality (Adams and Ferreira, 2009), firm reputation, innovation (Miller and Triana, 2009); firm risk (Abdou et al., 2020; Sila et al., 2016), capital structure (Adusei and Obeng, 2019), corporate social responsibility (Alnabsha et al., 2018; Alshbili et al., 2020; Bear et al., 2010), payout policy (Byoun et al., 2016), corporate opacity (Upadhyay and Zeng, 2014), and monitoring outcomes (Guest, 2019).

However, after reviewing the literature, we conclude that board diversity is an important aspect for firms' success and performance, the interest of shareholders protection, and the effectiveness of the board of directors. Prior research has a significant contribution to advance our knowledge on board diversity. This topic, however, is still full of remarkable opportunities for more research. This signifies the need for a comprehensive review of the board diversity so that the knowledge structure in the research area can be identified and links for future research directions were suggested. For instance, apart from gender diversity, other board diversity attributes have received limited attention in the literature which is discussed in order to strengthen the importance of these attributes in the corporate finance and management fields. Hence, this review contributes to the literature by providing an overview of the knowledge structure and development of board diversity research and comprehensively synthesizing the literature on the topic. The outcomes of this research would help researchers to understand the current research structure and common themes addressed in the literature. Additionally, the synthesized findings are useful for policymakers and managers to better understanding how research in board diversity is developing and how to translate research findings into practice. To the best of our knowledge, it is the first research to use the Scopus database to perform a combination of systematic literature review (SLR) and rigorous bibliometric analysis on the board diversity research.

Collectively, this review contributes to the current research on board diversity. Given the fact that the literature in this area is rapidly growing, our review and the associated future research agenda that we shape are timely, not only because of the bigger complexity and competitive nature of markets and industries that many firms and their board of directors face today (Campbell and Mínguez-Vera, 2008; Carter et al., 2003; Detthamrong et al., 2017; Erhardt et al., 2003) but also because of the intensified attention that the diversity is receiving in media and political contexts (Sanan, 2019; Thahir et al., 2020), suggesting the practical relevance of the research.

1.1. The rationale of the study

This section presents the motivation behind the use of bibliometric analysis on board diversity research. Although board diversity is a growing trend being included many attributes (gender, ethnic, national, religion, age diversity, board tenure, board experience, board interlock, etc.), policymakers, regulators and researchers are concentrating on gender diversity only as a part of women empowerment around the globe. This is evident by the new regulations introduced in several countries (Norway in 2003, Finland in 2005 and Iceland in 2010) to increase the gender diversity of boards. Furthermore, limited work has focused on evaluating and describing scientific publications from an integrated international aspect. Baker et al. (2020) conducted a bibliometric analysis to explore the development of the board diversity field by using Web of Science (WoS) for data mining. According to Block and Fisch (2020) “Scopus often has a broader coverage of journals than WoS and if you leave out some of the most important journals, that’s a problem.” Interestingly, reviewing Baker study revealed that several leading studies (at least four articles among the top ten) were not included in the review such as Beasley (1996), Carter et al. (2003), Erhardt et al. (2003), and Milliken and Martins (1996). Additionally, by using almost double the number of the sample literature compared to the existing study from the Scopus database only, this study attempts to shed light on some aspects that might not be addressed by articles from WoS.

Furthermore, other review studies on board diversity have been limited to either a single diversity aspect especially gender diversity, or a single outcome like firm performance. For example, Drago et al. (2019) presented research trends (Content analysis and bibliometric analysis) on the gender diversity of interlock directors in the boardroom. Also, Velte (2017) has focused mainly on gender diversity in conducting the review. Similarly, a more recent systematic literature review study conducted by Khatib et al. (2021) has concentrated on two aspects, namely board diversity and financial firms. After reviewing the literature, it is clear the review studies have paid more attention to the gender aspect of board diversity and focus on a single outcome of the board diversity and, as a result, the existing bibliometric study has few limitations. Therefore, the research methods used in this research is a combination of SLR, bibliometric analysis, and network analysis. This method can help to provide a

comprehensive overview and identify the intellectual structure of the field (Kumar et al., 2020). The objectives of this study are as follows: i) to assess the current publication trend of board diversity research; ii) to present the most productive authors, journals, and countries; (iii) to highlight the most influential journal; (iv) to identify the intellectual structure of board diversity research; (v) to highlight most and less studied topics related to board diversity; and (vii) to identify the potential opportunities for future directions and potential collaboration.

To achieve the research objectives, we conduct a comprehensive bibliometric review by defining the search string and systematically extracting the sample literature with proper inclusion and exclusion criteria. Then, descriptive analysis was conducted at the first stage, followed by a rigorous bibliometric analysis in the second stage. To identify the intellectual structure of the research on board diversity, citation and co-citation analysis were performed using VosViewer. The co-citation network was formed using VosViewer to view the thematic flow of knowledge and the formation of clusters. Lead papers from the clusters were identified using weighted citation measures.

The rest of the study is structured as follows. Section 2 illustrates the methodology of the study and the descriptive results, followed by the bibliometric assessment, content evaluation, and keywords analysis in Section 3. Section 4 provides a brief discussion and suggestion for further investigations, followed by the conclusion of the study in Section 5.

2. METHODOLOGY

The bibliometric analysis is a useful tool to detect the focus and interest of researchers in a particular topic as it quantitatively evaluates bibliographic material. It refers to the process that is structured to describe all publications related to a particular topic in terms of the leading countries, authors, journal, articles quality, and citations which will enable us in understanding the development of the scientific topic from an integrated point of view. Indeed, it has been suggested that research activities are good tools to understand the development of a scientific field (Block and Fisch, 2020; Ronda-Pupo, 2017). Bibliometric analysis has been widely used in several disciplines including management and business (Behrend and Eulerich, 2019; Block et al., 2019; Castriotta et al., 2019; Md Khudzari et al., 2018; Shi and Li, 2019; Yahaya et al., 2020). In contrast to the review articles, which concentrate primarily on addressing the current progress and problems of a particular topic, the present study aims to identify the global evolution of studies in the board diversity field. To do so, we strictly followed the instructions provided by the novel work of Block and Fisch (2020) to conduct an impactful bibliometric study that evaluates the development of research on boardroom heterogeneity, as it is an effective approach for addressing research

trends on a particular topic by exploring published articles (Block & Fisch, 2020; Hazaea et al., 2021; Zamil et al., 2021).

A combination of bibliometric, network and content analysis are employed in this study. Different software like BibExcel, HistCite, VosViewer has been used in the past academic work for bibliometric analysis (Baker et al., 2020; Khatib et al., 2021; Kumar et al., 2020; Linnenluecke et al., 2020; Yahaya et al., 2020). In this study, VosViewer was used because of the benefits and flexibility in conducting network analysis. The methods used in the analytical structure of this study are presented in Figure 1. It also shows the organization of this study, calculation, indicator, and the tool used.

[Insert Figure 1 about here]

2.1. Defining searching terms

Bibliometric studies should have a clear, transparent, reproducible searching process (Block and Fisch, 2020). However, given that the main research topic is board diversity, we review similar publications and definitions of board diversity to develop the central theme search string (i.e., Baker et al., 2020; Kagzi & Guha, 2018a; Khatib et al., 2020; Khatib et al., 2021). It has been suggested that the diversity of a board can be cognitive (experience, knowledge, and education), or demographic (age, gender, ethnicity, and nationality). Hence, the central theme in this research was all journal papers that cover these terms in the title and abstract. The final search string developed was [(“*board* diversity*” OR “*corporate governance*” OR “*board* of director**” OR “*board* composition*”) AND (*female** OR *gender* OR *women* OR *tenure* OR *age* OR *education** OR *ethnic** OR *nationality* OR *cognitive* OR *demographic**)]. These terms were selected based on the diversity classification of Erhardt et al. (2003), and the common definition of board diversity among scholars (i.e., Khatib & Nour, 2021). By using the term of board diversity, scholars might refer to one or more attributes that are included in the searching string, but they never used this term to refer to other main governance mechanisms such as board size or board independence. Therefore, the main governance mechanisms were excluded from the search string such as independence, board ownership, and board size.

2.2. Search delimiting criteria

The Scopus database was used for data collection in April 2020. The initial search results in 2330 publications that address board diversity. We then followed the three steps inclusion and exclusion criteria to identify the relevant articles in the final sample literature. From 2330 documents, we included only journal articles that have been published in the English language. As shown in Figure 2, 475 articles were excluded at this stage.

Also, we limited the search process to the subject area of finance, business, management, and economics. This process resulted in a final sample literature of 991 research articles published from 1989- 2020 for our literature review and bibliographic analysis.

[Insert Figure 2 about here]

2.3. Descriptive analysis

A descriptive analysis of 991 articles was carried out to know the basic ongoing trend of publication on this topic. To achieve the first research objective, we analyzed the publication trend in terms of total publication by year, country, region, and journal.

2.3.1. Growth of the publication

In the last 32 years, 991 documents had been published in Scopus indexing journals (Figure 3). The oldest document dates back to 1989, and there were no publications recorded until 1992. The number of annual publications remained below 20 articles per year until 2010. At first glance, it is clear that a strong interest in board diversity topic started in 2009. This growth could be due to the introduction of new regulations in many countries. For example, Norway initiative of enforcing gender diversity (40% female) in boardrooms in 2003 followed by several countries that attract researchers' attention to the topic. In 2012, there was a sharp increase in publications, and it was almost doubled in 2013 and 2014. After that, the accumulative number of documents has rapidly increased as a result of the steady increase in the number of annual articles. It should be noted, however, that the majority of these publications are not free, and users have to pay for access. Out of 911, only 117 documents were published as an open-access type. Md Khudzari et al. (2018) have documented that a research paper is more likely to receive more citations if it is published through an open-access journal.

[Insert Figure 3 about here]

2.3.2. Leading journals

The findings indicate that only five publisher agencies owned the top 10 most productive journals (Table 1). Wiley-Blackwell owned three of them. Two journals, including the most productive one within the list, were published by Springer. The remaining five were published by Emerald, Virtus Interpress, and University of Wisconsin Press. The most productive one was Journal of Business Ethics with 59 articles covering 6.3% of the total publications, followed by Corporate Governance (44, 4.7%), Corporate Governance: An International Review (38, 4.0%) but their article published in 2003 was the most cited paper among the top ten with 562 Scopus

citations. The remaining journals were counted for less than 2.5% of total publications, each indicating that these journals have made a small number of contributions to this area.

[Insert Table 1 about here]

3. BIBLIOMETRIC ANALYSIS

3.1. Leading countries and institutions

Collaboration between researchers and countries is necessary for the development of scientific fields. Based on the 911 articles, we conduct the co-authorship analysis for 80 countries that are affiliated with 2028 authors. At first glance, the result showed that the UK and the USA are the leading countries in terms of the number of documents. Table 2 shows that about 50% of the total publications on board diversity topics were contributed by the UK, the USA, and Australia. This indicates that these countries are key players in the development of this topic.

The USA led the list with 238 publications, covering 24% of the total global publications. Despite the fact that Indiana University is the most productive in the USA with total publications (TPi) of 11 documents, it should be noted that it was the 10th most productive institution on board diversity research. Among the 15 countries, four countries only seemed to have more than two-thirds of single-country publications (SCP), namely India (82.4%), the USA (70.2%), Spain (69.9%), and Canada (67.6%). This indicates a strong collaboration between countries. As shown in Table 2, Norway (20.8%) is the least SCP. Finally, out of 24, 19 documents were affiliated to different countries.

The benefit of collaboration between countries is not limited to exchanging knowledge but also a powerful approach for ranking up. Even though Tunisia is a small country, yet 57.2 of its documents were collaborated with 5 other countries, making it the 15th most productive country.

[Insert Table 2 about here]

Figure 4 is a bibliometric map of co-authorships that shows the distribution of countries/territories. The two closer countries in the VosViewer map indicate a stronger association between the two countries. Given that the affiliated countries/territories were clustered into 5 continents, we found that the prolific countries per region came from Asia (31 countries). Europe appeared to be the second continent (20), and Oceania is the least productive region (2) with Africa (11) and America (8) sitting in third and fourth, respectively.

Furthermore, we found that the most productive country is the UK, connected to 42 countries with 120 times of co-authorship, followed by the USA (35 links, 106 times of co-authorships), Australia (23 links, 59 times

co-authorships), Spain (19 links, 36 times co-authorships), France (17 links, 30 times co-authorships), and Germany (16 links, 31 times co-authorships). We also found that two-thirds of the countries were linked with less than ten other countries. Scholars from 8 countries were not associated with any other countries in conducting research on board diversity, namely, Kuwait, Botswana, Serbia, Austria, Nigeria, Slovakia, Kazakhstan, and Croatia. Several reasons may be attributed to the increase of international collaboration among researchers such as strong research funding and a high percentage of foreign postgraduates/ visiting scholars (Md Khudzari et al., 2018).

[Insert Figure 4 about here]

3.2. Leading authors

We found that the 10 most productive authors in board diversity are linked to five countries (Table 3), namely the USA (3 authors), Spain (3 authors), the UK (2 authors), The UAE (1 author), and New Zealand (1 author). The total number of documents of these authors is 55, indicating high collaboration between them. For instance, Alison Cook and Christy M. Glass possessed the same publication number, h-index, and interestingly the same number of citations, indicating that they counted for the same documents. Siri Terjesen and Collins G Ntim are the most contributing and influential authors based on article and citation metrics, both of whom have contributed 10 articles while receiving 1049 and 63 citations, respectively. The third and fourth top authors are Isabel María García-Sánchez and Jennifer Martínez-Ferrero with 9 and 8 documents, respectively. They are followed by Val Singh, Alison Cook, Christy M Glass, Muhammad Nadeem, and Ahmed Ammad, all who have published seven articles each and have received 892, 93, 93, 23, and 23 citations, respectively.

[Insert Table 3 about here]

Given that a collaboration between authors is the most formal approach of intellectual relation in the field of scientific research (Kumar et al., 2020), we further examined the collaboration between authors to understand the commonality of multiple authors. The result revealed that (Cook A. and Glass C.) and (García-Sánchez I.-M. and Martínez-Ferrero J.) are the most collaborated authors with seven joint publications, followed by Singh V and Terjesen S with four publications. These findings indicate that there are various well-built co-author partnerships.

3.3. Journal influence analysis

To evaluate the journal influence in board diversity research, we applied two methods. In particular, we assessed the leading journals in the area of board diversity using the Average Citation per Article (ACA) and the Academic Journal Guide (AJG) rating of the journals. These analyses help us to differentiate between the quality

and productivity of the journal's publications as the number of citations is an indicator of the journal influence. In contrast, the number of publications is an indicator of journal productivity. Following Kumar et al. (2019), we calculated the ACA of the leading journals based on the total citations from the Scopus database. As shown in Table 4, Corporate Governance: An International Review has the highest ACA within the list. Although the Journal of Business Ethics is the most productive journal, it has the third position in terms of ACA. Interestingly, we found that many publications do not always guarantee more citations. For instance, the Journal of Corporate Finance is the least productive journal with 15 studies within the list; nevertheless, it is the second in terms of the average citation per article.

[Insert Table 4 about here]

3.4. Quality of journals analysis

The AJG 2018 was also utilized to evaluate the quality of the studies. It provides a quality ranking of the journals in management and business and categorizes them into the given groups 4*, 4, 3, 2, and 1. One is the lowest quality while 4* is the highest. The AJG rating is an important tool for researchers' promotions in business schools and it is commonly utilized by scholars (Khatib et al., 2021). The results in Figure 5 indicate that a vast majority of board diversity research has been published in unranked journals (326 articles). Interestingly, out of 991 documents, only 33 articles have been published in Grade 4* journals. As shown in Figure 5, researchers were interested in Grade 3 journals, followed by Grade 2 and 1 with 242, 190, 147 articles, respectively.

[Insert Figure 5 about here]

3.5. Citation analysis

We used citation analysis to identify the most popular articles within the board diversity community. It has been suggested that citation analysis counts the number of times other articles cite a particular article to identify the popularity and impact of the article in the scientific field (Kumar et al., 2020). Based on the 'total times cited count' provided by the Scopus database, we have analyzed the citation of 991 studies (see Table 5). The findings suggest that the 10 most cited articles are published by different journals. The most two cited articles were published in 1996. The first one was conducted by Milliken and Martins (Milliken & Martins, 1996) with 1603 citations, followed by Beasley (1996) with 1548 citations. Interestingly, only two articles among this list were found to be mentioned as the top-cited articles by Baker *et al.* (2020). However, among the top ten, two articles were published in each journal; Corporate Governance: An International Review and Journal of Business Ethics.

[Insert Table 5 about here]

3.5.1. Citation trend

We analyzed the references of our sample literature (991 documents) and this analysis resulted in 51951 unique references that were cited by the sample literature. Out of 51951, 5183 articles were locally cited two times or more. The locally cited document refers to the number of citations for an article within our sample of literature. Following Khatib et al. (2021), we used this analysis to evaluate the most influential studies within the board diversity research community. As shown in Table 6, we found that there are 13 research articles with more than 50 local citations including Adams and Ferreira (2009), Campbell and Mínguez-Vera (2008), Carter et al. (2003), Terjesen et al. (2009), Erhardt et al. (2003), and Bear et al. (2010). The results indicated that about 15% of the board diversity research has cited Adams and Ferreira (2009). However, this investigation highlights the thematic trend of board diversity research. After reviewing these studies, we conclude that the thematic series following in board diversity research is not wide and concentrated on agency theory and the influence of board diversity, especially gender diversity of board on firm performance. The research developed from the agency theory introduced by Jensen and Meckling (1976). In this particular case, we found a research gap in that there is a scarcity of theories on the behavioural pattern of board diversity. Some examples of this trend are Carter et al. (2003), Erhardt et al. (2003), Rose (2007), and Francoeur et al. (2008). Thus, we conclude that the nuances and complexities of board diversity are not well served by the theoretical and ontological frameworks in the present literature. Among the top-cited journals is a study conducted by Adams and Ferreira (2009), which is among the earliest studies to highlight the impact of diversity on governance quality. Terjesen et al. (2009) have also provided a literature review on board diversity research.

[Insert Table 6 about here]

3.6. Co-citation analysis

Co-citation also helps to structure literature and the thematic clusters and gaps in the scientific area (Block and Fisch, 2020). It refers to the occurrence of two references in the reference list of a single document. Co-citation analysis helps identify the content and subject area by evaluating the more frequently cited reference together. The occurrence of two publications more than one time on the reference list of an article can be an indicator of the similarity in empirical discipline, methodology, theory, and topic. The co-citation investigation found that there exist 301 pairs of documents that are co-cited with each other at least 10 times. Among these 301 connections, the strongest co-citation connection exists between Campbell and Mínguez-Vera (2008) and Adams and Ferreira (2009); these two are cited together in 64 publications. Table 7 presents the pairs of authors with the

highest number of citations. As indicated in the table, the second strongest co-citation connection exists between Erhardt et al. (2003) and Adams and Ferreira (2009), followed by Rose (2007) and Adams and Ferreira (2009). It should be noted that the highest connection list is concentrated among Adams and Ferreira (2009), Campbell and Mínguez-Vera (2008), Erhardt et al. (2003), Terjesen et al. (2009), Jensen and Meckling (1976), and Carter et al. (2003). This finding confirms our discussion in the earlier section, where the literature on board diversity is focusing on the agency problem, firm performance, and gender diversity of boards.

[Insert Table 7 about here]

3.7. Cluster analysis

To address the fourth objective of this study, we applied the co-citation network analysis, which helps to identify the intellectual structure of board diversity literature. From the co-citation network, several clusters were identified to conduct the content analysis. To study the intellectual structure of the topic ‘board diversity research’, we start by using VosViewer for the co-citation network analysis. Co-citation analysis in VosViewer gave us a TEXT file, which we used in Excel to read the co-citation network. The initial findings resulted in 5183 references that are at least twice co-cited with one another. Among them, 98 articles occurred together more than 20 times. To visualize the co-citation map, VosViewer formed a random cluster map that was too complex to understand. Therefore, we follow Kumar et al. (2019), who relied on the leading 10 papers from each cluster. Similarly, we used the weighted citation count provided by VosViewer to ensure high-quality papers in cluster analysis. The leading ten studies in each cluster with cluster one leading the list. Then, we limited the visualization map of the co-citation network to these leading studies to better understand and analyze the results (Figure 6). We discuss the clusters’ content in the following subsection.

[Insert Figure 6 about here]

3.7.1. Content analysis of the four clusters

Further analysis was conducted on the intellectual structure of board diversity research. At this stage, we conducted an in-depth content analysis of the clusters. Following Khatib et al. (2021), four themes were identified based on the content analysis of the ten leading studies in each cluster. For instance, the majority of studies in cluster one has concentrated on firm performance in relation to board diversity. As shown in Table 8, the themes identified in each cluster are (Cluster 1) firm performance, (Cluster 2) policy change, (Cluster 3) corporate social responsibility and environment performance, and (Cluster 4) governance quality.

[Insert Table 8 about here]

Cluster one: firm performance

Cluster one is the oldest and largest cluster within the list. Its origin was in the early 1990s and comprises 392 research articles. It has grown consistently since 2005, and researchers have concentrated on how monitoring policy affects board diversity and thus firm performance. The research objective of most of the papers within this cluster is either to examine the impact of a single diversity indicator on the organizational output (Adams and Ferreira, 2009; Campbell and Mínguez-Vera, 2008) or several diversity indicators on the organizational output (Carter et al., 2010; Miller and Triana, 2009). In this particular, case, we found a research gap that these studies mainly explored the large and listed firms. Miller and Triana (2009) took the research on board diversity and firm performance a step further and examined the mediating role of firm reputation and innovation on this association. Theoretically, it is anticipated that having a diverse board will lead to creative ideas, learning, and innovations, and ultimately offer strategic advantages (Miller and Triana, 2009). However, previous research suggests that the relationship between board diversity and financial performance is particularly responsive to different moderators. Future research needs to explore whether various organizational and environmental issues (Aguilera et al., 2008) and behavioural activities and dynamics (Hambrick et al., 2008) could moderate the board diversity-firm performance nexus.

Cluster two: policy changes

Cluster two has 279 articles. This cluster began in the late 1990s and since then has witnessed a gradual increase in the number of published articles. The central theme of this cluster covers corporate policies such as risk-taking. Milliken and Martins (1996) among the first studies in this cluster argued that more diverse organizational groups influence its output through its impact on affective, cognitive, communication, and symbolic processes. Furthermore, Sila et al. (2016) focused on the risk-taking of board diversity and found evidence that a more gender-diverse board is less risk-taking compare to its counterparts. Tuggle et al. (2010) studied the discussion pattern within a board diversity context. By focusing on the small-medium enterprises, Wincent et al. (2010) examined the impact of board diversity on the innovative performance in strategic SME networks. Innovation will attract a noticeable competitive advantage for firms and increase their position in the market (Onileowo et al., 2021; Zhao et al., 2021). Hence, board diversity may stabilise firms in the course of changes and build diverse teams for success.

Cluster three: corporate social responsibility, environmental performance and disclosure

This cluster comprises 145 articles, and its origin is dated to the early 2000s. Researchers in this cluster mainly have concerned about corporate social responsibility (CSR), sustainability, environmental performance, and disclosure. Among the early studies in this cluster, Haniffa and Cooke (2005) discussed the impact of board diversity on corporate social disclosure. By extending the environmental dimensions, Post et al. (2011) argued that boards of directors' composition significantly influence environmental CSR (Al Amosh & Khatib, 2021). Bear et al. (2010) took the research on board diversity and CSR a step further and studied the mediating role of the CSR ratings on the association between board diversity, gender composition, and corporate reputation. Others like Hafsi and Turgut (2013) and Boulouta (2013) examined how board diversity may affect corporate social performance. This cluster opens space for further approaches to measure and improve the value that board diversity brings to firms.

Cluster four: governance quality

This cluster is the most recent one among others, and researchers have mainly explored the board diversity of firms in the context of corporate governance. The year 2014 seemed to be the breakthrough year where the number of publications in this cluster grew remarkably. Brammer et al. (2007) studied the determinants of the ethnic and gender diversity of boards in the UK. Farrell and Hersch (2005) argued that the likelihood of a firm to include a female director on its board in a given year is negatively affected by the number of women already on the board. Gray et al. (2007) investigated the governance and monitoring role of board independence and diversity in Australian firms. Ruigrok et al. (2007) shed light on the interaction between board diversity with other governance mechanisms in Swiss publicly listed firms.

3.8. Keyword analysis

To address the fifth objective of our research, keyword analysis was applied to explore the thematic flow of knowledge on board diversity. Khatib et al. (2021) and Yahaya et al. (2020) argued that the keywords of articles provide a powerful indicator of the common research themes in the scientific field. Hence, we used keyword analysis to address the research objective in two folds. First, we analyzed the frequency of the keyword to highlight the common themes and topics of interest. Second, we used the average year of publication provided by VosViewer software to investigate the evolution of the themes over time.

Keywords co-occurrence analysis conducted in this study involve 1682 authors' keywords from 859 articles (not Scopus indexed keyword). Because of the lack of keywords in 68 journals, the other 132 documents were omitted. Also, synonymic keywords were evaluated before inserting the data into VosViewer. For instance, keywords like 'women on boards', 'women in boardrooms', 'female directors', 'female board participation, and 'director gender' were re-labelled as gender diversity and counted as one keyword. The number of total keywords decreased to 1056 following the re-labelling process. These keywords were inserted in VosViewer for mapping with a minimum of 5 occurrences, and only 96 keywords met the threshold. About 1277 (75.9%) of the keywords have been used once such as 'Assurance' and 'Oil Crisis'. 188 keywords (11.2%) were used two times, and 73 (4.4%) were used three times. Table 9 shows the most fifty frequent keywords in the board diversify literature.

[Insert Table 9 about here]

Although the central theme of our search was board diversity, our results showed that gender diversity appeared to be most common among the keywords with 421 occurrences and 94 links to others while board diversity was slightly less encountered (210 occurrences, 86 links). This indicates that most of the prior studies focused only on gender as an indicator for board diversity (i.e., Carter et al., 2003; Detthamrong et al., 2017; Manita et al., 2020; Pidani et al., 2020; Saha et al., 2019; Sila et al., 2016). The reason for this concentration is that the regulatory requirements for board diversity typically focused on gender diversity with limited attention on the other aspects of board diversity and, therefore, the researchers attention is mostly the same. Furthermore, we noticed several sub-attributes, substrate, and mechanism were used in naming the board diversity, for example, demographic diversity 14 occurrences (i.e., Kagzi and Guha, 2018b; Miller and Triana, 2009), ethnic diversity 35 occurrences (i.e., Cheong and Sinnakkannu, 2014; Chuah and Hooy, 2018), national diversity 20 occurrences (i.e., Darmadi, 2011; García-Meca et al., 2015), age diversity 11 occurrences (i.e., Kagzi and Guha, 2018b; Shehata et al., 2017), and board tenure 5 occurrences (i.e., Fernández-Temprano and Tejerina-Gaite, 2020; Li and Wahid, 2018).

Given that board diversity is considered as one of the governance mechanisms, it was expected to be significantly linked with other keywords that refer to corporate governance such as board independence and board size. Yet, few studies linked board diversity to board effectiveness (Northcott and Smith, 2015). This is evident by the number of keyword occurrences and the link strength of board diversity and effectiveness. Figure 7 shows that 'board diversity' and 'effectiveness' total link strength is only nine, indicating that both keywords appeared together in the same study nine times. Also, the total link strength of gender diversity- board effectiveness is only

seven. Martinez-Jimenez et al. (2020) found that there is a negative association between board diversity and board effectiveness.

[Insert Figure 7 about here]

Furthermore, the colours in Figure 8 show the thematical evolution of board diversity research by presenting the average year of publication where the keyword occurs. It helps to understand the development of the studies related to board diversity as well as the focus of researchers. Studies on board diversity before 2010 concentrated on the equal opportunities for gender representation in boardrooms, but now scholars use the term board diversity instead. For instance, Bernardi, Bean, and Weippert (2002) used the term equal opportunities and argued that companies with more gender-diverse boards, signal this fact to stockholders and investors by including pictures of their boards in their annual.

Several keywords refer to the focus of studies were identified, such as ‘financial institution’, ‘listed firms’, ‘small and medium enterprises (SMEs)’, ‘state-owned, and ‘bank sector’. The results indicate that research interest on board diversity in SMEs (Dang et al., 2018; Shehata et al., 2017), and banks (Garba and Abubakar, 2013; García-Meca et al., 2015) were less as evidenced by the occurrence number and also the total link strength of 6 and 13, respectively. However, given the evolving nature of organizations, technologies, markets, and regulations, the impact of board diversity on several aspects of firms is often evaluated. One important aspect is firm performance, as it is the ultimate objective for all stakeholders. Keywords referring to firm performance were repeated 176 times. Apart from the governance parameters, researchers focus on the performance aspect of firms behind implementing board diversity. Yet, empirical evidence is still inconclusive (Adams *et al.*, 2009 [USA]; Ciavarella, 2017 [Five countries]; Detthamrong *et al.*, 2017 [Thailand]; Erhardt *et al.*, 2003 [USA]). Several explanations have been put forward in the literature illustrating the inconsistent evidence such as different theoretical backgrounds (Song et al., 2020), analysis methodologies issues like sample size and endogeneity problem (Fernández-Temprano and Tejerina-Gaite, 2020; Wang et al., 2019), and measures of board diversity and financial performance (Baker et al., 2020; Wellalage and Locke, 2013).

Additionally, several recent topics have attracted scholars’ attention including the relationship between board diversity and payout policy (Sanan, 2019; Thahir et al., 2020), corporate social responsibility committee (Eberhardt-Toth, 2017), or environmental policy (Li et al., 2017). Keywords containing corporate social responsibility ‘CSR’ were encountered 71 times, and ‘CSR disclosure’ was encountered 28 times. The keywords ‘sustainability’ and ‘sustainability disclosure’ were used 27 and 9 times, respectively.

Given that the endogeneity issue is one of the essential factors affecting board diversity research, several strategies were employed to control and address this issue such as two-stage least squares (2SLS) (Kao et al., 2019; Wang et al., 2020) and the generalized method of moments (GMM) (Waheed and Malik, 2019; Wellalage and Locke, 2013). We notice that the keyword 'GMM' has been recently used in a few publications related to board diversity (occurrences: 9, average publication year: 2017.67). Similarly, methods like the difference-in-difference method and structural equation method occurred less than 5 times (i.e., Arnaboldi et al., 2020; Busru et al., 2019; Khan et al., 2019; Nekhili et al., 2020). It should be noted that, concerning the board diversity, several other organizational aspects have received little attention. This is evidenced by the keyword occurrences number, in which the keywords of these occurred less than 5 times such as research and development, mergers and acquisitions, assets management, strategic management, cash holdings, and others.

4. DISCUSSION AND FUTURE RESEARCH AGENDA

This section provides a discussion about the findings of the research objective and presents several gaps for future research activities. The first and foremost challenge is that, despite the increase in board diversity literature in the past decade, there is still a lack of focus on all aspects of board diversity. The analysis showed that although the central theme of our search was board diversity, our results revealed that gender diversity to be the most common among the authors' keywords, indicating that most of the prior studies have focused only on gender as an indicator for board diversity (i.e., Carter et al., 2003; Detthamrong et al., 2017; Manita et al., 2020; Pidani et al., 2020; Saha et al., 2019; Sila et al., 2016). Hence, future studies need to consider other diversity attributes and the interaction between them not only gender diversity but also ethnic, national, religion, age diversity, board tenure, board experience, and board interlock. In a similar vein, there is a lack of literature that studies how the skills and characteristics are translated into board processes and, hence, how they contribute to the firm's overall performance. In other words, a necessity exists to better comprehend board dynamics. Addressing this knowledge gap is important because an original board diversity study can provide critical managerial insight into the benefits and pitfalls of board diversity attributes.

Additionally, there is a need for conceptual studies on the behavioural aspects of board diversity. We have found in the citation and cluster analysis that researchers have focused on agency problems on exploring the board diversity aspects. Walt and Ingley (2003) argued that the ability of women and other minority groups to participate in boards is affected by the role of binding social behaviour. Similarly, Johnson et al. (2013) highlighted the need for more research to be undertaken to untangle the interaction among behavioural, contextual factors, and director characteristics. We, therefore, argue that there is still a need to build an extensive theory covering the behavioural

aspects of board diversity. Such theoretical aspects will enable researchers to have a better understanding of the behavioural and contextual factors that influence the diverse preferences of directors that may potentially lead to conflicts of interest between the groups. Focus on this knowledge void is important to comprehend the full set of behavioural and contextual components and develop optimal policy and firm strategies in different country settings. Also, an institutional theory perspective (DiMaggio, 1988) could be utilized to analyze how certain actors produce new systems and how industry norms and culture changes make room for more diverse boards. As firms go international, they have to adjust to various cultural and regional attributes and regulatory recommendations of the host nations, which might influence firm performance. Future lines of inquiry can build on the research on international business and explore the position of board diversity in different stages and types of internationalization, for instance, foreign direct investments, international joint ventures, and cross-border mergers and acquisitions. This line of research is principally promising to expand the current focus on static institutional structures to longitudinal dynamics and processes. As literature largely incorporates just one theoretical view that is supposed to prevail, future researchers should employ multiple theoretical frameworks to more intensely exploring multifaceted diversity, which also includes the testing of opposing theories to determine which theory provides the utmost explanatory power. For instance, scholars could merge cultural and institutional angles to evaluate the relative value of each on board diversity. This will develop more innovative research contributions that come from linking theories from different fields.

Furthermore, more work needs to consider the unique characteristics of developing markets in Africa, Asia, and South America as we found that most of the studies are contributed to developed countries especially the USA, UK, and Australia. We do not call for a mere replication of prior research, but future researchers should take advantage of the markets, cultural, and regulation differences between developed and developing nations. Sarhan et al. (2019) and Ramly et al. (2017) have conducted cross-country studies. But there is a need for more such studies. Addressing this knowledge gap is crucial because a seminal board diversity research can decide whether there are cross-country similarities or differences in board diversity aspects, and contributions to society. For example, cross-country comparisons should explore how board diversity aspects (or lack thereof) impacts regional, national, and international policies as well as managers behaviour. Thus, Researchers should address these voids in upper echelons research to build a deeper conceptual model.

Moreover, there is a need for industry-specific and cross-industry studies. We found that researchers have focused on non-financial listed firms without taking into account the industrial differences. We have come across a handful of sector-specific and cross-sector studies. Anwar et al. (2019) limited their study to the agriculture

sector. Garba and Abubakar (2013) investigated the board diversity of the banking industry. We, therefore, encourage scholars to consider the unique features of a single industry-specific like SMEs, industrial, property, and banking sectors. Researchers need to carry industry-specific studies to present a better understanding of the subject area. Research in these dynamic industries has a great possibility to enlighten decisions by management, stakeholders and policymakers.

Finally, several recent topics are expected to have more attention from researchers in the future like the CSR committee and environmental policies. Only a few studies have been devoted to explore the association between boardroom heterogeneity and payout policy. Yet, these studies seemed to concentrate on dividend policy ignoring share repurchase practices. Having reviewed the literature we found that several other topics were less investigated such as cash holdings, research and development policy, audit committee, initial public offerings (IPOs), compensation, capital structure, innovation, cost of capital, and sustainability disclosure, pointing to the need for more research on these areas. Board diversity research on firm outcomes is considerably needed to develop our understanding of the growing diversity of boards. Tackling this knowledge void is essential to policymakers who can then best direct efforts toward certain board diversity aspects. For example, board diversity characteristics (e.g., ethnic, national, religion, age diversity) could interact with country-level institutional attributes (e.g., economic freedom, economic growth and innovativeness) to determine the consequences at various levels. Also, we would encourage academics to investigate whether board diversity moderates simultaneous relations with management or/and stakeholders, which may affect financial performance.

5. CONCLUSION

The purpose of this study is to identify the main research development in the field of boardroom heterogeneity. We have used a bibliometric analysis to assess the patterns in global board diversity research based on co-occurrences of author keywords, affiliated institutions and countries, co-authorships, and publication outputs. The data used in this study were retrieved from Scopus (991 journal articles in total). Overall, the results suggest that the number of articles has been rapidly increasing for the last 5 years. This is mainly due to the introduction of new governance and diversity regulations in many countries and the impact of the global financial crisis in 2008 that was attributed to the poor corporate governance quality with a special focus on the board diversity research. Also, our research demonstrates that although diversity is frequently treated as gender or ethnic diversity, it is a much more complex and multidimensional concept. Interestingly, about 50% of the total global publications were contributed by the USA, the UK, and Australia. The UK is leading the list with 120 times of co-authorship (linked to 42 different countries).

We built on earlier efforts in this area and include a detailed analysis of the most dominating research aspects that are newly investigated with board diversity like (but not limit to) financial policy, sustainability, and risk management which can be potential hot topics for further research. We have also presented the most organizational aspects that have been well-explored like firm performance. In addition, as evidenced by the number of occurrences, the results indicate that research interest on board diversity of financial institutions and SMEs is a recent topic but less common in relation to board diversity. Similarly, the generalized method of moments is an approach that has recently been used in a few studies in an attempt to overcome the endogeneity issue. A very limited number of studies, however, have applied methods such as the difference-in-difference method, structural equation method, GMM, and simultaneous equation modelling as their keywords occurred less than 5 times. Most importantly, the majority of the studies focused on the demographic aspect (gender). One possible explanation for this is that the regulatory requirements typically focus on gender diversity with limited attention on other diversity aspects. This paper contributes to the literature by providing a comprehensive exploration to describe and evaluate the development of board diversity research from an international perspective as it is the first to rely on a larger database (Scopus). We developed and organized our results into different groups, indicated the key knowledge gaps, and recommended how to move forward to create comprehensive and meaningful insights for both scholars and policymakers by highlighting the importance of board diversity literature and unveiling patterns in theory, data, methods, and content. Developing from this basis, this paper then debates future research possibilities.

Like others, our study might also have some limitations. The search technique used in this study was restricted to search within titles and abstracts. However, some research might not refer to the board diversity within the titles and abstracts. Hence, the finding of the search string used in this study may not cover all publications available on Scopus that are related to board diversity. Also, we limited our search to the search scope to business, management, finance, and economic fields but some researchers have used other keywords (e.g., board heterogeneity, gender differences, member diversity, etc.). Further research could make a comparison of the outputs from multiple databases such as WoS and Scopus.

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TABLES

Table 1: The most productive journals on board diversity publication and the most cited documents.

Journal name	TP	The most cited document	Time cited
Journal of Business Ethics	59	Campbell and Mínguez-Vera (2008)	492
Corporate Governance Bingley	44	Kiliç et al. (2015)	53
Corporate Governance: An International Review	38	Erhardt et al. (2003)	562
Corporate Ownership and Control	23	Nguyen and Faff (2006)	37
Gender in Management	22	Thiruvadi and Huang (2011)	49
CSR and Environmental Management	18	Frias-Aceituno <i>et al.</i> (2013)	161
Journal of Management and Governance	17	Lückerath-Rovers (2013)	135
Business Strategy and the Environment	16	Glass et al. (2016)	40
Journal of Corporate Finance	15	Farrell and Hersch (2005)	357

*Notes: CSR; corporate social responsibility, TP; total publications

Table 2: The top 15 prolific academic institutions and countries in board diversity topic

Country	TPc	SCP %	Leading institution	TPi
The USA	238	70.2	Indiana University	11
The UK	138	41.3	University of Southampton	15
Australia	93	55.9	Queensland University of Technology	10
Spain	83	69.9	Universiti Utara Malaysia	25
France	43	53.5	University de Montpellier	6
Italy	41	61	Universita Bocconi	7
China	40	27.5	Dongbei University of Finance and Economics	5
New Zealand	37	48.6	University of Otago	10
Canada	34	67.6	Hec Montreal	7
India	34	82.4	Guru Nanak Dev Universit	3
Germany	32	46.9	Universitat Witten/ Herdecke	4
Norway	24	20.8	NHH Norwegian School of Economics	4
Pakistan	24	29.2	Comsats University Islamabad	9
Tunisia	21	42.8	Universite de Sousse	5

SCP single-country publication, TPi total publications for an institution, TPc total publications for country

Table 3: List of the 10 most productive authors in board diversity research topic

Author's name	Year of 1st publication	TP	H-index	TC	Affiliation	Country
Terjesen, Siri	2008	10	7	1049	American University	USA
Ntim, Collins G.	2013	10	6	63	University of Southampton	UK
García-Sánchez, Isabel María	2012	9	5	111	Universidad de Salamanca	Spain
Martínez-Ferrero, Jennifer	2015	8	5	89	Universidad de Salamanca	Spain
Ahmed, Ammad	2015	7	3	23	Zayed University	UAE
Cook, Alison	2015	7	6	93	Utah State University	USA
Glass, Christy M.	2015	7	6	93	Utah State University	USA
Nadeem, Muhammad	2017	7	3	23	University of Otago	New Zealand
Singh, Val	2001	7	6	892	Cranfield University	UK
Pucheta-Martínez, M.C.	2016	6	4	17	Universitat Jaume I	Spain

*Notes: TC; total citations. TP; total publications

Table 4: Average citation per article of top journals

Journal name	TP	No citations	ACA
Journal of Business Ethics	59	4791	81.2
Corporate Governance Bingley	44	532	12.1
Corporate Governance an International Review	38	4127	108.6
Corporate Ownership and Control	23	134	5.8
Gender in Management	22	276	12.5
CSR and Environmental Management	18	586	32.6
Journal of Management and Governance	17	491	28.9
Business Strategy and the Environment	16	296	18.5
Journal of Corporate Finance	15	1498	99.8

Table 5: Top 10 articles by the number of total Scopus citations

No	Author	Citations	Journal	AJG
1	Milliken et al. (1996)	1603	Academy of Management Review	4*
2	Beasley (Beasley, 1996)	1548	Accounting Review	4*
3	Adams et al. (Adams & Ferreira, 2009)	1173	Journal of Financial Economics	4*
4	Carter et al. (Carter et al., 2003)	946	Financial Review	3
5	Haniffa et al. (2005)	605	Journal of Accounting and Public Policy	3
6	Erhardt et al. (Erhardt et al., 2003)	592	Corporate Governance: An International Review	3
7	Campbell and Mínguez-Vera (Campbell & Mínguez-Vera, 2008)	526	Journal of Business Ethics	3
8	Goodstein et al. (1994)	494	Strategic Management Journal	4*
9	Terjesen et al. (2009)	467	Corporate Governance: An International Review	3
10	Bear et al. (Bear et al., 2010)	453	Journal of Business Ethics	3

Table 6: Documents with over 100 local citations

Author	Local citations	Focus of the study
Adams and Ferreira (2009)	151	The impact of female directors on the quality of corporate governance and performance
Campbell and Mínguez-Vera (2008)	112	Gender diversity of boardroom and firm performance
Carter et al. (2003)	92	Corporate governance and firm value
Terjesen et al. (2009)	91	A review of board gender diversity
Erhardt et al. (2003)	86	Gender diversity of boardroom impact on firm performance
Bear et al. (2010)	80	Gender diversity and corporate social responsibly
Rose (2007)	75	Gender diversity of boardroom and firm performance
Torchia et al. (2011)	70	Gender diversity of boardroom and firm innovation
Jensen and Meckling (1976)	67	Agency theory
Nielsen and Huse (2010)	59	Strategic involvement and decision-making role of female directors
Francoeur et al. (2008)	56	Gender diversity of board and top management impact on firm performance
Post and Byron (2015)	56	Gender diversity of boardroom and firm performance
Carter et al. (2010)	51	Ethnic and gender diversity impact of financial performance

Table 7: Document pairs with more than 30 times of co-citation

No	Author 1	Author 2	Number of co-citations
1	Adams and Ferreira (2009)	Campbell and Mínguez-Vera (2008)	64
2	Erhardt et al. (2003)	Adams and Ferreira (2009)	47
3	Rose (2007)	Adams and Ferreira (2009)	45
4	Campbell and Mínguez-Vera (2008)	Rose (2007)	44
5	Adams and Ferreira (2009)	Carter et al. (2003)	42
6	Francoeur et al. (2008)	Campbell and Mínguez-Vera (2008)	41
7	Erhardt et al. (2003)	Carter et al. (2003)	40
8	Terjesen et al. (2009)	Adams and Ferreira (2009)	39
9	Terjesen et al. (2009)	Campbell and Mínguez-Vera (2008)	38
10	Erhardt et al. (2003)	Campbell and Mínguez-Vera (2008)	37
11	Francoeur et al. (2008)	Adams and Ferreira (2009)	35
12	Bear et al. (2010)	Adams and Ferreira (2009)	33
13	Jensen and Meckling (1976)	Adams and Ferreira (2009)	31
14	Rose (2007)	Erhardt et al. (2003)	30

Table 8: Top 10 lead papers in clusters using a weighted score of citations

Cluster 1 (Red, 392 papers)	Cluster 2 (Green, 279 papers)
Adams and Ferreira (2009)	Berger et al. (2014)
Agrawal and Knoeber (2001)	Cumming et al. (2015)
Beasley (1996)	Gul et al. (2011)
Campbell and Mínguez-Vera (2008)	Nguyen et al. (2015)
Carter et al. (2003)	Jansen and Kristof-Brown (2006)
Carter et al. (2010)	Milliken and Martins (1996)
Erhardt et al. (2003)	Sila et al. (2016)
Goodstein et al. (1994)	Terjesen et al. (2015)
Kiel and Nicholson (2003)	Tuggle et al. (2010)
Miller and Triana (2009)	Wincent et al. (2010)
Cluster 3 (Yellow, 145 papers)	Cluster 4 (Blue, 133 papers)
Bear et al. (2010)	Arfken et al. (2004)
Boulouta (2013)	Brammer et al. (2007)
Hafsi and Turgut (2013)	Brammer et al. (2009)
Haniffa and Cooke (2005)	Farrell and Hersch (2005)
Harjoto et al. (2015)	Francoeur et al. (2008)
Johnson et al. (2013)	Gray et al. (2007)
Liao et al. (2015)	Ruigrok et al. (2007)
Post et al. (2011)	Singh et al. (2008)
Rao and Tilt (2016)	Terjesen et al. (2009)
Zhang et al. (2013)	Walt and Ingley (2003)

Table 9: The top 50-most frequent keywords for the period 1989–2020

Keyword	TO	Keyword	TO	Keyword	TO
Gender Diversity	421	Family Ownership	21	Financial Institution	14
Corporate Governance	326	Board Size	21	Culture	13
Board of Director	284	Nationality Diversity	20	Leadership	13
Board Diversity	210	Emerging Market	20	Bargaining	13
Firm Performance	176	Malaysia	19	Audit Committee	12
Board Independence	109	Board Effectiveness	17	Corporations	12
CSR	71	China	17	Decision-Making	12
Disclosure	42	Innovation	17	India	12
Ethnic Diversity	35	Agency Theory	16	Payout Policy	12
Ownership Structure	31	Risk-Taking	16	Stakeholder Theory	11
Committees	31	IPOs	15	Age Diversity	11
Earnings Management	28	Resource Dependency Theory	15	Upper Echelon Theory	10
CSR Disclosure	28	Australia	14	CEO	10
Sustainability	27	Demographic Diversity	14	Ethics	10
Top Management	26	Capital Structure	14	ECSR	10
Risk	23	Compensation	14	Endogeneity	10
Bank Sector	22	Listed Firms	14		

* TO time occurrence, CSR corporate social responsibility, IOPs initial public offerings, CEO chief executive officer, ECSR environmental corporate social responsibility.

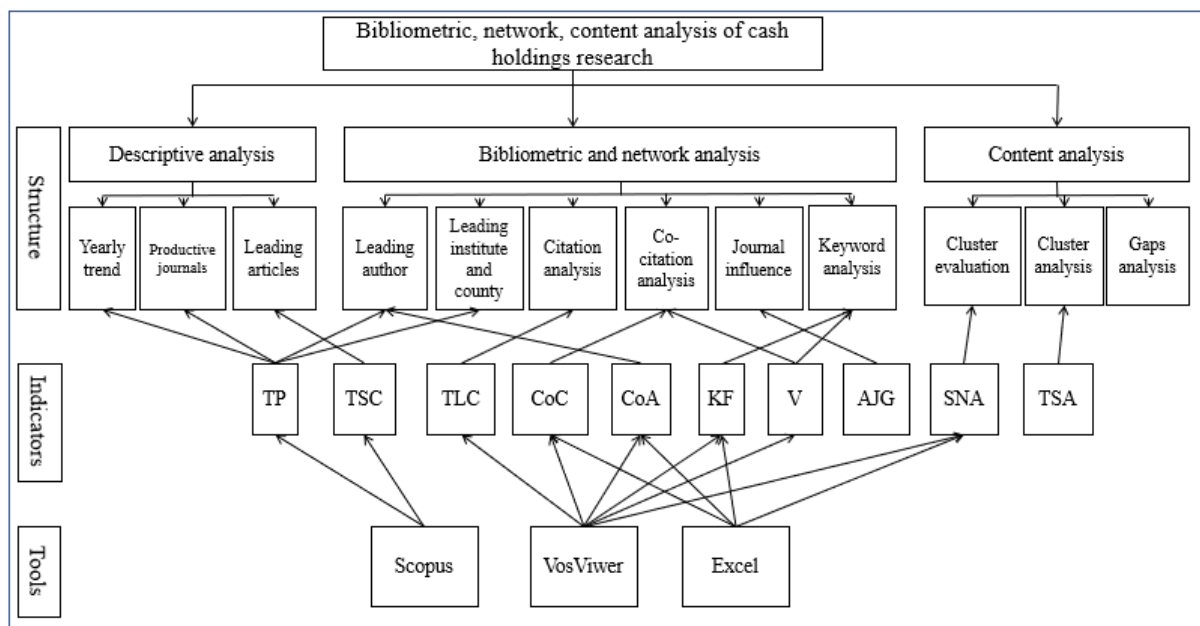


Figure 1: Analytic structure of this paper.

Note: TSA thematic structure analysis, SNA social network analysis, AJG academic journal guide, V visualization view, KF keyword frequency, CoA co-authorship, CoC co-citation count, TLC total local citation, TSC total Scopus citation, TP total publications.

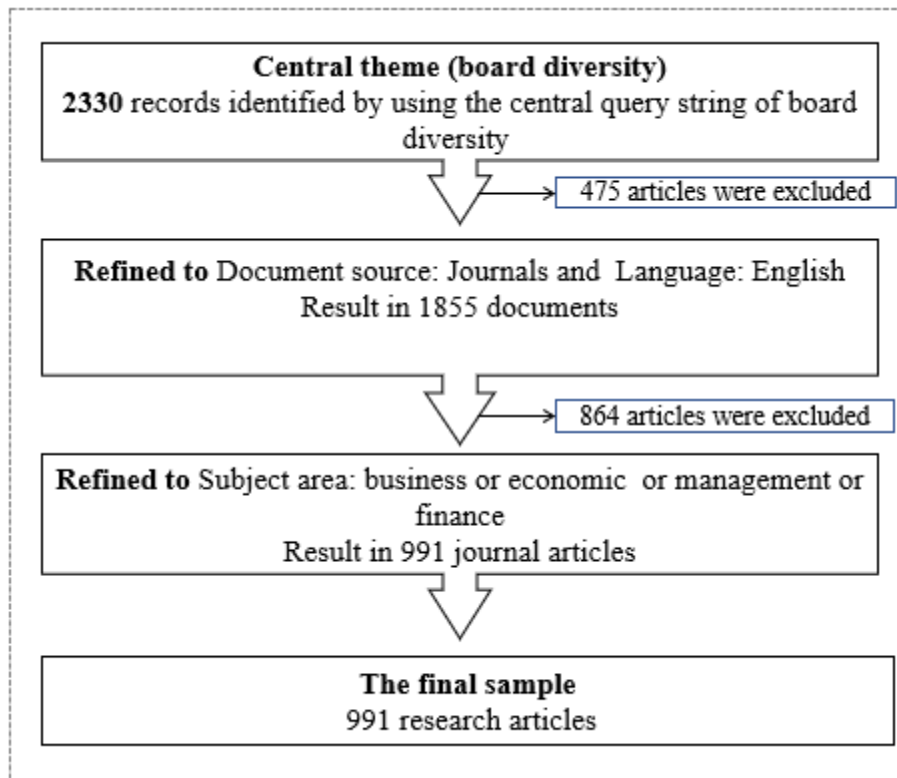


Figure 2: Flowchart of searching strategy and data collection process

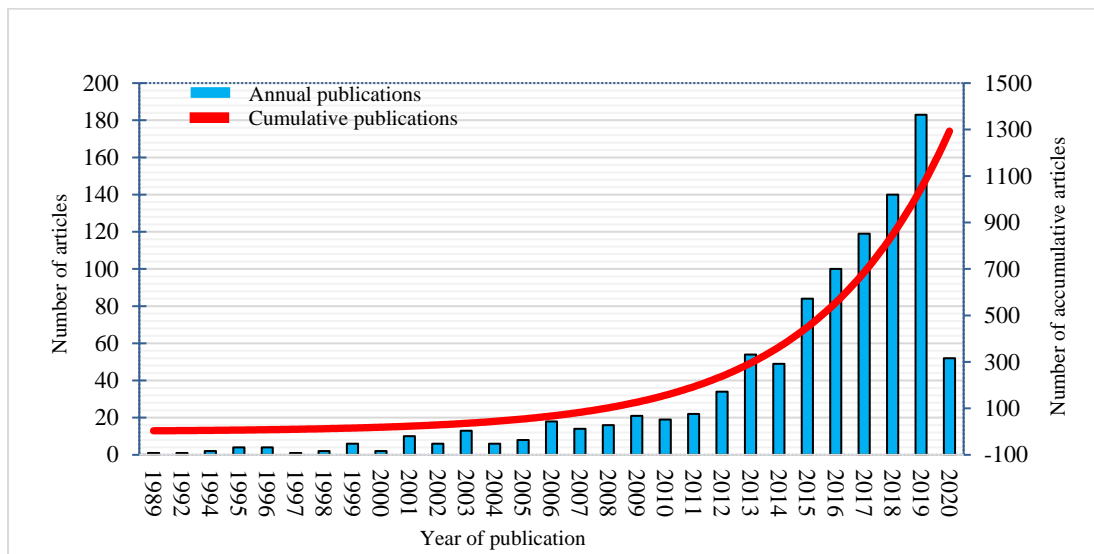


Figure 3: The cumulative and annual numbers of publications on board diversity research

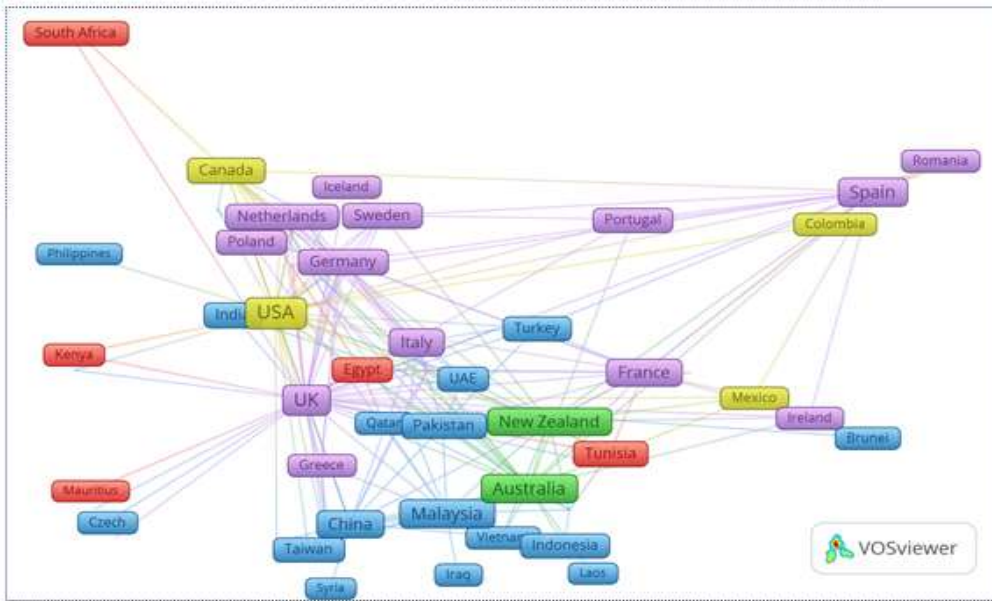


Figure 4: Co-authorship network of countries

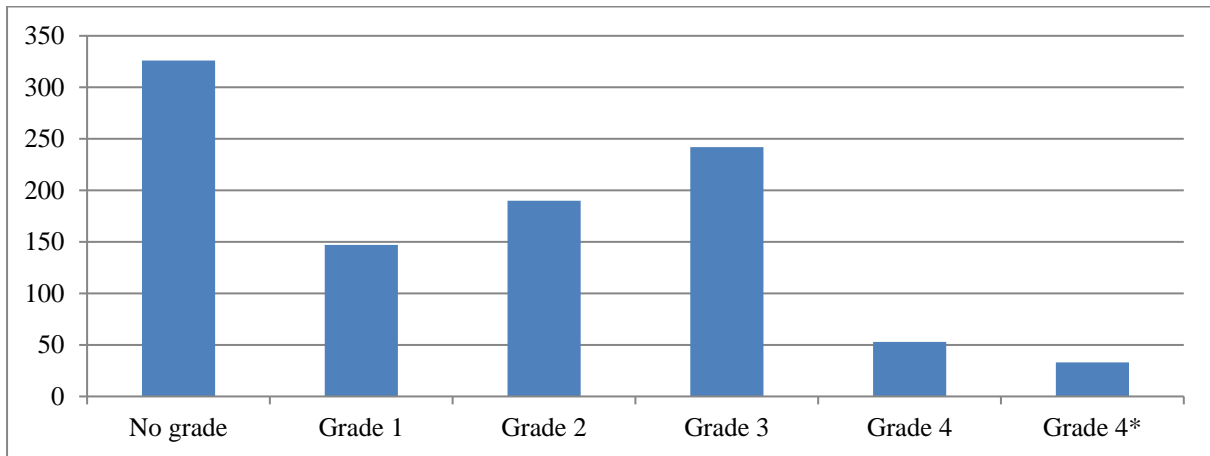


Figure 5: Academic Journal Guide (AJG) 2018 rating of 991 articles

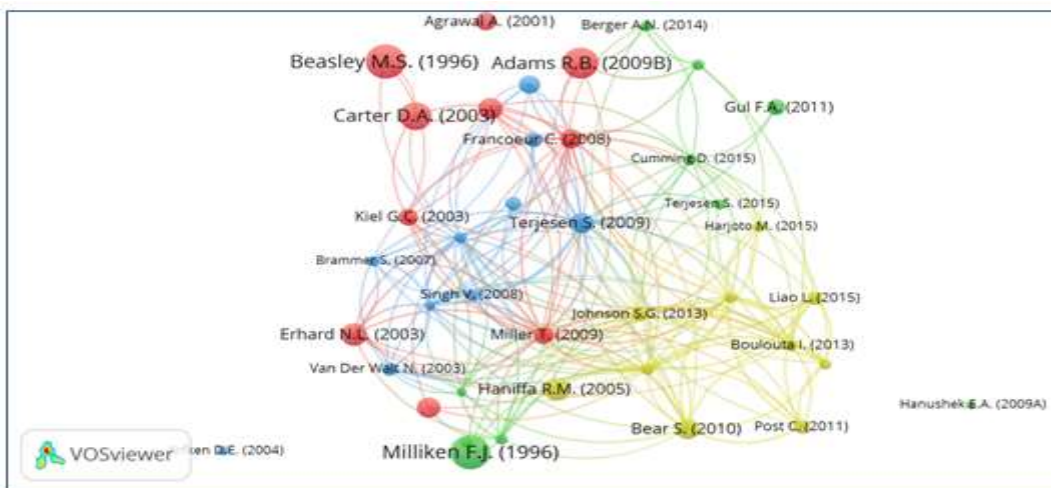


Figure 6: Co-citation network of lead papers

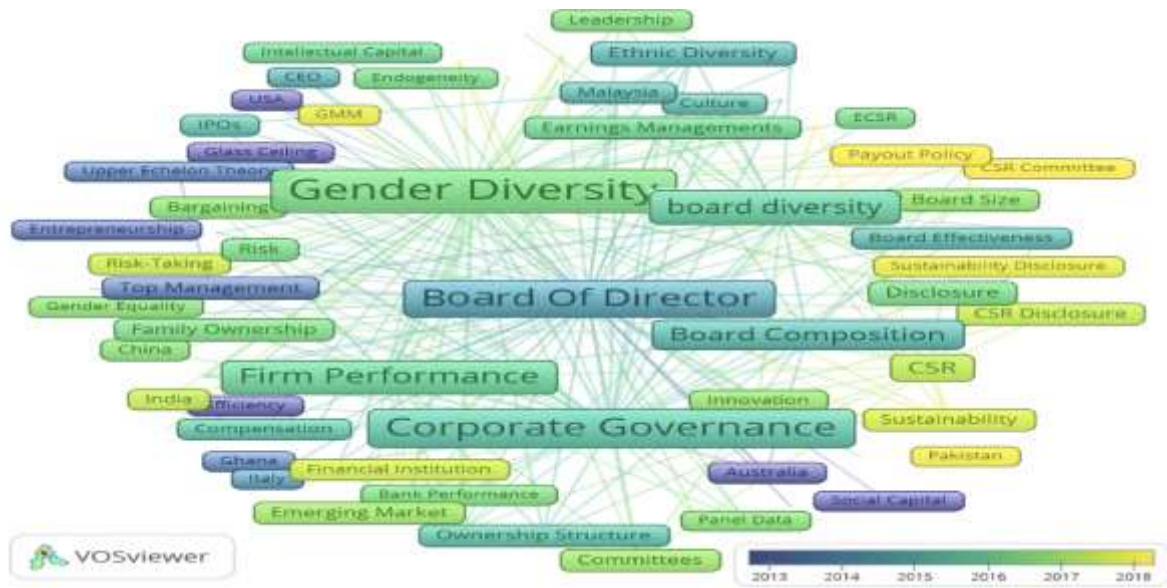


Figure 7: The bibliometric map of author keywords co-occurrence with five Minimum occurrences and overlay visualization mode. Notes: The following URL can be used to open Figure 8 in VosViewer: <https://bit.ly/34mE9d7>.