

BOARD GENDER DIVERSITY AND SUSTAINABILITY REPORTING TO PRESERVE THE NATURAL ENVIRONMENT: PAST, PRESENT, AND FUTURE RESEARCH

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Abstract: In recent years, “Sustainability Reporting (SR)” has become an essential trend in the business world, recognising the importance of sustainability in supporting long-term growth and corporate social responsibility. Likewise, “Board Gender Diversity (BGD)” has become increasingly relevant, with research showing its positive impact on corporate sustainability practices and financial reporting. Through two keyword analyses, we found a connection between the two concepts, but the qualitative review still needed to be improved. Using a systematic literature review method focusing on articles published between 1998 and 2023. A total of 64 relevant articles were selected from the Scopus database. Analysis was carried out using software such as VOS-Viewer and Biblioshiny via RStudio. The findings of this review are based on previous research, which found an increase in articles related to BGD and SR, especially after 2015. We also succeeded in identifying high-performing journals, publishers, and articles. In the context of the current research, there is a conceptual framework that includes various theories that explain non-financial reporting themes and classify them into several perspectives. Meanwhile, future research directions are identified by providing added value for researchers interested in this research topic.

Keywords: Sustainability reporting, board gender diversity, systematic literature reviews, corporate social responsibility.

Introduction

Over the past few years, sustainability disclosure has become a promising and growing trend in several countries (Jamali & Karam, 2018). This is partly due to the government's recognition of the importance of sustainability in supporting the long-term growth and development of countries where social and environmental issues are unique and significant (Tilt *et al.*, 2021). Local and foreign investors increasingly value transparency and allocate capital based on sustainability considerations. More and more companies are publishing sustainability reports (SR) (Mock *et al.*, 2012; Simnett, 2012), which enable companies to be more transparent in their responsibilities and accountability towards consumers and stakeholders. However, each country has different rules regarding mandatory

sustainability reporting. For example, European Union law requires sustainability reporting for all large and listed companies, excluding small companies. Southeast Asia, Malaysia, Singapore and the Philippines are some countries that require sustainability reporting for public companies. Therefore, the need for sustainability reporting is increasing (Githaiga, 2023).

Gender issues are an integral element of the concept of sustainability. Women are essential in realising sustainability and are often more aware of sustainability issues than men (Arayssi *et al.*, 2020). In addition, female board directors are generally considered to be more likely to avoid risks and pay more attention to stakeholders (Wang *et al.*, 2022). Zalata *et al.* (2019) show

that the presence of female directors on the board significantly increases the accuracy of financial reports. (Isidro & Sobral, 2015; Dobija et al. 2022; Githaiga & Kosgei, 2023) found that gender diversity on boards influences corporate sustainability practices and the quality of financial reporting.

Board of directors with greater gender diversity tend to be more active in implementing sustainability initiatives. In other words, the presence of women on the board of directors can increase the company's commitment to sustainability. This is supported by research that has been conducted (Galbreath, 2018; García-Sánchez et al., 2019). In this context, a gender-diverse board of directors (BGD) is a monitoring tool in corporate governance and one of the main drivers of sustainability. More women on boards of directors positively impact corporate reporting activities due to their greater sensitivity to social and ethical issues and their higher awareness of environmental risks (Giron et al., 2022).

Additionally, BGDs help guide companies in taking more sustainable steps, as they bring diverse perspectives and broaden companies' horizons about the social and environmental impacts of their policies and practices. As awareness of the importance of gender in sustainability increases, BGD is becoming a critical factor in promoting sustainability principles in corporate governance. Therefore, paying attention to gender diversity among board directors is essential to achieving more significant sustainability goals.

However, many researchers have only focused on the relationship between BGD and Corporate Social Responsibility (CSR) (Ji et al., 2020; Kent Baker et al., 2020; Kouki, 2023), and very little research has discussed the relationship between BGD and sustainability report. Some researchers consider CSR and sustainability to be two similar things. Even though the two have different concepts (Bansal & Song, 2017; Sheehy & Farneti, 2021). CSR focuses on societal and social issues, which are usually framed as obligations towards stakeholders

(Bansal & Song, 2017) and often involve various philanthropic activities, sponsorships and other social initiatives to improve the company's image and provide social benefits. Meanwhile, sustainability reports describe a broader policy agenda, forming the basis for sustainable development (Sheehy & Farneti, 2021) to create and maintain conditions of balance between human and business needs. Although the terms of sustainability reports vary greatly, the dominant terms used and recognised by many organisations worldwide are those published by GRI (Brown et al., 2009; Borglund et al., 2010). Some literature clearly shows the relationship between BGD and SR (Singhania, Singh, & Aggrawal, et al., 2023), but unfortunately, research related to this topic is dominated by quantitative research and is still shallow in qualitative analysis (Bektur & Arzova, 2020; Hasan et al., 2022; Injeni et al., 2022; Alhosani & Nobanee, 2023). Through this research, we address this gap. Therefore, more research focusing on the relationship between BGD and SR would help to explore it further.

The objective of this research is to systematically identify and analyse advancements in the field of BGD and SR over time, both theoretically and intellectually. The focus is to conduct a comprehensive literature analysis, encompassing top-tier journals, articles, and influential authors within the domains of BGD and SR. Furthermore, the research aims to elucidate the latest perspectives on subjects and concepts by scrutinising recent articles related to BGD and SR. The final aim is to find a series of themes formed in this study as a reference for future research. To achieve this goal, we analysed 64 articles from the Scopus database, using several software tools to help synthesise the knowledge base on this topic. Thus, this research may provide new avenues for future researchers to conduct research essential for the growth of the BGD and SR fields.

Sustainability Reporting

Sustainability reports are the main forum for conveying sustainability performance and

effects, regardless of whether the effects are positive or negative (Ariesanti *et al.*, 2019). Several authors argue that sustainability reports influence various stakeholders' decision-making processes, considering economic, environmental, and social aspects (Barrett *et al.*, 2005; KPMG Global Sustainability Services, 2008; Futerra Sustainability Communications, 2010). The first wave of organisations publicising their social and environmental impacts began in the 1970s in the United States and Western Europe (Owen *et al.*, 2001; Kolk, 2010). Since then, there has been significant variation in the voluntary publication of sustainability reports across industry sectors and countries. In the late 1980s, calls for a clear business commitment to sustainable development increased in response to the United Nations Commission on Environment and Development's final report. In the early 1990s, several large organisations began to provide information to stakeholders voluntarily. About their environmental performance (Perez & Sanchez, 2009). The title and scope of sustainability reports vary greatly, ranging from "sustainability report," "social report," "corporate social responsibility report," "social and community report," and "environmental report" (Owen *et al.*, 2001; Kolk, 2010). However, we adopted the term "sustainability reporting" from the Global Reporting Initiative (GRI), which is the dominant sustainability reporting guideline used and recognised by many organisations in the world (Brown *et al.*, 2009; Borglund *et al.*, 2010).

Board Gender Diversity

Gender diversity refers to the ratio of men to women in a particular position in the industry's proportion of men to women (Campos-Soria *et al.*, 2015; Song *et al.*, 2020). Gender differences influence the way decisions are made and the implementation of company strategies to achieve specific performance (Huang, 2013), primarily through strategic decisions (Tang *et al.*, 2018). Gender diversity in the composition of the board of directors is also an essential consideration in determining the company's business direction.

Therefore, in this study, gender is considered an indicator reflecting diversity in the board of directors. Gender diversity within corporate top management has become a highly relevant topic in influencing sustainability initiatives, fueled by the combination of mandatory and voluntary regulations implemented by various countries (Nicolò *et al.*, 2023). Empirical research has shown that the presence of women on the board of directors influences company performance (Duppatti *et al.*, 2020; Paridhi & Arora, 2023). Specifically, Fernandez *et al.* (2019) indicate a positive relationship between gender diversity on the board of directors and sustainability practices. Similar findings have been found by (Zahid *et al.*, 2020). Also, Nicolò *et al.* (2023) found a positive relationship between the proportion of women on the board of directors and the disclosure of sustainability information.

Method/approach

Database Selection

In the information source selection stage, we identified articles and reviews published between 1998 and 2023 (3 October 2023). We chose to use the Scopus database as the primary source of information in this research. The reason for choosing Scopus is because this platform has a larger dataset compared to other platforms, as has been highlighted by several previous studies (Farhan & Iqbal, 2021; Nerantzidis *et al.*, 2022; Suleiman Yahaya *et al.*, 2020). Therefore, Scopus has more articles and journals that have relevant metrics. Additionally, we consider that the Scopus database has extensive coverage in the social sciences domain, especially since 1996, as previous studies have noted (Vieira & Gomes, 2009; Singhanian, Singh, & Aggrawal, 2023). This is important because several sustainability-related publications have existed since this topic emerged in 1998. Therefore, the Scopus database was considered the most appropriate choice for our analysis, following the findings of several previous studies (Singhanian, Singh, & Aggrawal, 2023).

Article Selection

Regarding the two big themes that interest us in this research (board gender diversity and sustainability reporting), we compiled two lists of the most relevant keywords to form sensitive search keywords. This helps us to filter out contributions that fall squarely at the intersection of these two themes. We chose to use the keywords “gender diver*” OR “board gender divers*” as keywords for board gender diversity. Meanwhile, we choose “sustainab* report*” OR “sustainab* disclosure” for sustainability reports. We apply Truncation (*) and Boolean (OR) to form various search terms. For vocabulary between one side and the other, we connect it using Boolean (AND) to clarify the context of its use.

Because this research is a systematic literature review, we carried out several steps in the analysis process. In the first stage, we identified articles through a search in Scopus. This search relies on keywords and Boolean operators entered in Scopus. Our initial search included keywords for each string to see how many publications related to each. In subsequent searches, we linked keywords with other strings to refine the search more precisely. In the second stage, we carried out a screening process by only including scientific articles as articles that we would review. In the third stage, we selected publications that were deemed eligible after manual evaluation of the title, abstract, keywords and content to check their relevance to the research topic. In the final stage, 64 articles that were relevant to the topic for further analysis were obtained (Table 1).

Data Analysis Method

After selecting articles, our next step was to conduct a literature mapping analysis, which involved analysis and visualisation of publication volume, citation analysis, co-citation analysis, and co-occurrence maps. This method helps identify influential scientific works, significant authors, important journals, and other things significantly impacting the research field.

Software

The analysis review was done using two software, VOS-Viewer, and Biblioshiny via RStudio. VOS-Viewer is JAVA-based free, open-source software developed by (Van Eck & Waltman, 2009), primarily for literature data (Van Eck & Waltman, 2009). RStudio is R’s integrated development environment (IDE), which supports direct code execution and tools for drawing and visualisation (Allaire, 2011). We use two software to integrate the benefits of both, as has been done in previous research (Singhania, Singh, & Aggrawal, *et al.*, 2023).

Results and Discussion

We divide the analysis of this topic into three parts. The first part involves reviewing previous research by identifying findings and approaches and looking for trends or patterns related to this topic. The second part examines current research from the researcher’s perspective, and the final part reviews future research, which can help researchers plan research directions and identify future research opportunities.

Table 1: Article selection

No.	Keyword Search Strategy	Scopus
1	TI/ABS/KEY _A “sustainab* report*” OR “sustainab* disclosure”	4.145
2	TI/ABS/KEY _B “gender diver*” OR “board gender divers*”	7.043
3	#1 AND #2	69
4	Exclude: Book chapter, review, conference paper (only article)	(5)
5	Final sample	64

Past Research

The following data presents a bibliographic summary regarding BGD and SR topics. Table 2 lists a summary of all articles. 64 articles were found in 46 journals, indicating that only a few journals dominate.

Apart from that, it can be seen that the number of articles has grown every year by 25.32%, with an average age of 2.42 years. Average citations per doc shows that each document was cited on average 33.78 times by

other documents, research, or other sources on this topic. The number of references in these articles contain 4,645 references or citations to other relevant sources in the context of the research being discussed. There were 189 authors who contributed to writing this research topic, with three being sole authors.

Figure 1 shows that the development of this field was slower in the early 2000s (Figure 1) and began to experience an increase in publications

Table 2: A brief overview of bibliometric information

Criteria	Description	Results
Main information about the data	Timespan	2011:2023
	Sources (Journals)	46
	Documents	64
Document contents	Annual growth rate %	25,32
	Document average age	2,42
	Average citations per doc	33,78
	References	4.645
	Keyword Plus (ID)	115
Authors	Author’s keyword (DE)	203
	Authors	189
	Authors of single-authored docs	3
	Single-authored docs	3
	Co-authors per doc	3,23
	International co-authorships %	29,69
Document types	Article	64

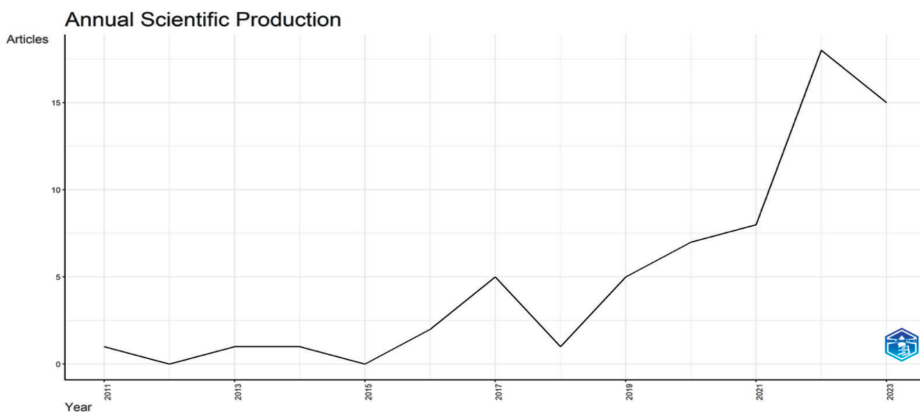


Figure 1: Publication trend form 2011-2023 (October) from Scopus database

after 2015. This occurred due to the growing awareness of sustainability and corporate social responsibility that linked them with diversity aspects (Singhania *et al.*, 2023). This growth reinforces the emerging scope of the BGD and SR fields and the need to delve deeper into the literature further to identify themes for future research. The first article we identified on this topic was published by Miles in 2011, whose literature study found a growing belief in the investment world that companies that empower women and encourage gender diversity are likely to achieve better performance in the long term than those that do not (Miles, 2011).

High-performing Journals

We have carried out an analysis of several journals that are relevant to Board Gender Diversity (BGD) and Sustainability Reporting (SR). The performance of this journal is assessed based on the number of articles published. Table 3 summarises the 10 most productive journals in publishing articles related to BGD and SR topics. Each journal is ranked based on the number of articles published in that journal.

This table provides an overview of journals that have contributed significantly to disseminating knowledge and research related to this topic. For example, Sustainability (Switzerland) and Sustainability Accounting, Management and Policy Journal are the most productive journals with four articles related to this topic.

On the other hand, Table 4 identifies the publishers that publish the most articles related to BGD and SR topics. Publishers are ranked based on the number of articles published in journals related to that topic. This helps in understanding the critical role of publishers in disseminating knowledge in this field. For example, Emerald Group Publishing Ltd is the publisher that has published the most articles related to this topic, with 17 articles, followed by John Wiley and Sons Ltd, which has published seven articles. Knowing information about the journals and journal publishers that distribute the most research can help researchers find the latest and most relevant research in that field more quickly so researchers can update them with the latest developments related to BGD and SR topics.

Table 3: Top 10 journals that published the articles

Rank	Name of Journal	No. of Article
1	Sustainability (Switzerland)	4
2	Sustainability Accounting, Management and Policy Journal	4
3	Business Strategy and The Environment	2
4	Corporate Governance (BINGLEY)	2
5	Corporate Social Responsibility and Environmental Management	2
6	Gender in Management	2
7	Intellectual Economics	2
8	Journal of Accounting in Emerging Economics	2
9	Journal of Applied Accounting Research	2
10	Journal of Business Ethics	2

Table 4: Top 10 publishers that published the articles

Rank	Publisher	No. of Article
1	Emerald Group Publishing Ltd	17
2	John Wiley and Sons Ltd	7
3	MDPI	4
4	Emerald Group Publishing Ltd	4
5	Elsevier Ltd	4
6	Taylor and Francis Ltd	3
7	Business Perspectives	2
8	John Wiley and Sons Inc	2
9	Springer Science and Business Media Deutschland GmbH	2
10	Routledge	2

High-performing Articles

We used the number of citations as an indicator to measure high-performing articles in research and scientific publications on this topic, as has been done in previous research (Alhosani

& Nobanee, 2023). Table 5 presents the most influential research studies on BGD and SR based on a citation matrix from the Scopus database.

Table 5: Top 20 influence research

No.	Author	Year	Period	Sample	Cite
1	(Ben-Amar <i>et al.</i> , 2017)	2017	2008-2014	541 firm-year observations, publicly listed Canadian firms	450
2	(Al-Shaer & Zaman, 2016)	2016	2012	333 public listed companies in the UK FTSE350	187
3	(Ntim & Soobaroyen, 2013)	2013	2003-2009	75 listed corporations in business participation and ownership in South Africa	162
4	(Tamimi & Sebastianelli, 2017)	2017	2016	S&P 500 companies	159
5	(Arayssi <i>et al.</i> , 2016)	2016	2007-2012	350 firm that are listed on the Financial Times Stock Exchange	146
6	(Qureshi <i>et al.</i> , 2020)	2020	2011-2017	812 firms and 5,684 firm-year observations from 22 European countries	111
7	(Zahid <i>et al.</i> , 2020)	2020	2011-2013	878 public listed Malaysian companies	95
8	(Issa & Fang, 2019)	2019	2012-2014	244 firms listed on six different stock markets of the Arabian Gulf	81
9	(García-Sánchez <i>et al.</i> , 2019)	2019	2006-2014	273 firm-year observations of international listed firms from 12 countries	79
10	(Bravo & Reguera-Alvarado, 2019)	2019	2012-2015	375 observations of firms listed on the Madrid Stock Exchange	72

11	(Furlotti <i>et al.</i> , 2019)	2019	2010-2015	182 companies listed on the Milan Stock Exchange with 878 observations	70
12	(Amran <i>et al.</i> , 2014)	2014	N/A	10 industries, across 13 countries	70
13	(Mahmood & Orazalin, 2017)	2017	2010-2013	114 observations of companies listed on KASE	64
14	(Girón <i>et al.</i> , 2021)	2021	2017	366 large Asian and African companies	34
15	(Vacca <i>et al.</i> , 2020)	2020	2011–2018	168 listed firms in the Italian Stock Exchange	32
16	(Miles, 2011)	2011	N/A	N/A	29
17	(Buallay <i>et al.</i> , 2022)	2022	2007–2016	7,951 observations for 2,116 stock-exchange-listed banks headquartered	27
18	(Cicchello <i>et al.</i> , 2021)	2021	2017	366 large Asian and African companies	22
19	(Bowrin, 2018)	2018	March & April 2014 and July & August 2014	117 companies listed on the stock exchanges of the six countries	19
20	(Jarboui <i>et al.</i> , 2020)	2020	2005-2017	300 UK firms 3,900 firm-year observations	19

The analysis results show that the study conducted by (Ben-Amar *et al.*, 2017) is the most influential study with 450 citations. Her research aims to investigate the impact of women on boards of directors on requests from interested parties for increased public reporting of risks related to climate change. Using the Carbon Disclosure Project as one of the sustainability initiatives, researchers found that the likelihood of companies voluntarily disclosing information about climate change was higher when the percentage of women on the board of directors was more significant. The research results reinforce ongoing global efforts to encourage gender diversity in corporate governance while also showing that the presence of women on boards of directors can strengthen stakeholder management. Another study that has had an influential impact is the work conducted by (Al-Shaer & Zaman, 2016) with 187 citations. This research investigates the impact of gender diversity in the board of directors on the quality of sustainability reporting; after considering

factors such as corporate governance, corporate incentives in reporting, reporting behaviour, and reporting environment, it is found that a gender-diverse board of directors is associated with better sustainability reporting quality. Independent female directors have a more significant impact on the quality of sustainability reporting than other female directors. This study has had such a significant impact on researchers because it was listed in the world's largest economy and was published over a reasonably long period. In this context, studies published in high-impact journals and research involving economically strong areas impact the research community significantly. This may be due to the general perception that research results published in high-quality journals are more robust and trustworthy.

Regarding research methods, we observed that most studies adopted empirical methods using secondary data as much as 85% (Table 6). This proportion is quite significant and there is a striking imbalance when compared with the

number of literature study articles which is only 11%. This imbalance can lead to an excessive focus on analysing existing data rather than building theory or more conceptual research. Researchers should be more inclined to adopt various research approaches, such as literature studies, experiments, surveys, interviews, and document analysis, to help enrich understanding in the research field and provide a more comprehensive perspective on a study. Hasan *et al.* (2022) stated that qualitative research methods can be used to carry out in-depth and comprehensive evaluations or analyses. Qualitative research methods allow researchers

to explore and understand a phenomenon or research topic's deeper, deeper, and more contextual aspects. In other words, this method allows researchers to look beyond data and numbers and try to understand the context, perceptions and dynamics behind the data.

High-performing Authors

To see authors who are high performers in this research topic, we use the number of publications published to show an author's dedication in contributing not only occasionally but regularly to sharing his knowledge with the scientific

Table 6: Literature by research theory and method

Applied Theory	No. of Studies	References
Agency theory	2	(Amran <i>et al.</i> , 2014; Gerwing <i>et al.</i> , 2022)
Institutional theory	2	(Ivic <i>et al.</i> , 2021; Tran <i>et al.</i> , 2021)
Legitimacy theory	3	(Bednárová <i>et al.</i> , 2017; Bello <i>et al.</i> , 2022; Nicolò <i>et al.</i> , 2023)
Stakeholder theory	10	(Cicchello <i>et al.</i> , 2021; Córdova Román <i>et al.</i> , 2021; Daniel-Vasconcelos <i>et al.</i> , 2022; Flórez-Parra <i>et al.</i> , 2023; Hasan <i>et al.</i> , 2022; Issa & Fang, 2019; Mapparessa <i>et al.</i> , 2017; Masoud & Vij, 2021; Tamimi & Sebastianelli, 2017; Yadav & Jain, 2023)
Signalling theory	2	(Giron <i>et al.</i> , 2022; Girón <i>et al.</i> , 2021)
Resource dependence theory	1	(Lim & Park, 2022)
Critical mass theory	2	(Arslan <i>et al.</i> , 2023; Ben-Amar <i>et al.</i> , 2017)
Social identity theory	1	(García-Sánchez <i>et al.</i> , 2019)
Social role theory	1	(Oware & Mallikarjunappa, 2021)
Self-schema theory	1	(Furlotti <i>et al.</i> , 2019)
Mixed theory	25	(Ararat & Sayedy, 2019; Arayssi <i>et al.</i> , 2016; Bowrin, 2018; Buallay <i>et al.</i> , 2022; Dewi <i>et al.</i> , 2023; Erin <i>et al.</i> , 2022; Ghauri <i>et al.</i> , 2021; Githaiga & Kosgei, 2023; Injeni <i>et al.</i> , 2022; Jarboui <i>et al.</i> , 2020; Jizi <i>et al.</i> , 2022; Khunkaew <i>et al.</i> , 2023; Mahmood & Orazalin, 2017; Nirwana & Wedari, 2023; Ntim & Soobaroyen, 2013; Ozordi <i>et al.</i> , 2020; Pasko <i>et al.</i> , 2022; Qureshi <i>et al.</i> , 2020; Singhania, Singh, & Aggrawal, 2023; Singhania, Singh & Aggrawal, <i>et al.</i> , 2023; Velte, 2023b; Wahyuningrum <i>et al.</i> , 2022; Yahya <i>et al.</i> , 2022; Zahid <i>et al.</i> , 2020; Zampone <i>et al.</i> , 2022)
Not described	14	(Adegboye <i>et al.</i> , 2020; Al-Shaer & Zaman, 2016; Alodat <i>et al.</i> , 2023; Bananuka <i>et al.</i> , 2022; Bektur & Arzova, 2020; Bravo & Reguera-Alvarado, 2019; Girón <i>et al.</i> , 2022; Grishunin <i>et al.</i> , 2022; Miles, 2011; Ng <i>et al.</i> , 2023; Paridhi & Arora, 2023; Vacca <i>et al.</i> , 2020; Zumente <i>et al.</i> , 2022; Zumente & Lace, 2023)

Method Type		
Empirical – secondary data	55	(Adegboye et al., 2020; Al-Shaer & Zaman, 2016; Alodat et al., 2023; Amran et al., 2014; Ararat & Sayedy, 2019; Arayssi et al., 2016; Bednárová et al., 2017; Bektur & Arzova, 2020; Bello et al., 2022; Ben-Amar et al., 2017; Bowrin, 2018; Bravo & Reguera-Alvarado, 2019; Buallay et al., 2022; Cicchiello et al., 2021; Córdova Román et al., 2021; Daniel-Vasconcelos et al., 2022; Dewi et al., 2023; Erin et al., 2022; Flórez-Parra et al., 2023; Furlotti et al., 2019; García-Sánchez et al., 2019; Gerwing et al., 2022; Giron et al., 2022; Girón et al., 2021, 2022; Githaiga & Kosgei, 2023; Grishunin et al., 2022; Hasan et al., 2022; Injeni et al., 2022; Issa & Fang, 2019; Jarboui et al., 2020; Jizi et al., 2022; Khunkaew et al., 2023; Lim & Park, 2022; Mahmood & Orazalin, 2017; Mapparessa et al., 2017; Masoud & Vij, 2021; Ng et al., 2023; Nicolò et al., 2023; Nirwana & Wedari, 2023; Ntim & Soobaroyen, 2013; Oware & Mallikarjunappa, 2021; Ozordi et al., 2020; Pasko et al., 2022; Qureshi et al., 2020; Singhania, Singh, & Aggrawal, 2023; Tamimi & Sebastianelli, 2017; Tran et al., 2021; Vacca et al., 2020; Wahyuningrum et al., 2022; Yadav & Jain, 2023; Yahya et al., 2022; Zahid et al., 2020; Zampone et al., 2022; Zumente & Lace, 2023)
Empirical – primary data	2	(Bananuka et al., 2022; Zumente et al., 2022)
Theoretical – literature review	7	(Arslan et al., 2023; Ghauri et al., 2021; Ivic et al., 2021; Miles, 2011; Paridhi & Arora, 2023; Singhania, Singh, & Aggrawal, 2023; Velte, 2023b)

community based on his knowledge (Figure 2). It is noted that Cicchiello and Kazemikhasragh have published four papers that are relevant to this topic. They have each published two articles in 2021 and two articles in 2022. This shows that they are not just contributing once in a while but are regularly committed to

contributing their knowledge to the research of this topic. Meanwhile, several other writers predominantly produce one article of scientific work annually. This shows that the researchers have a long-term commitment to research and ongoing contributions.

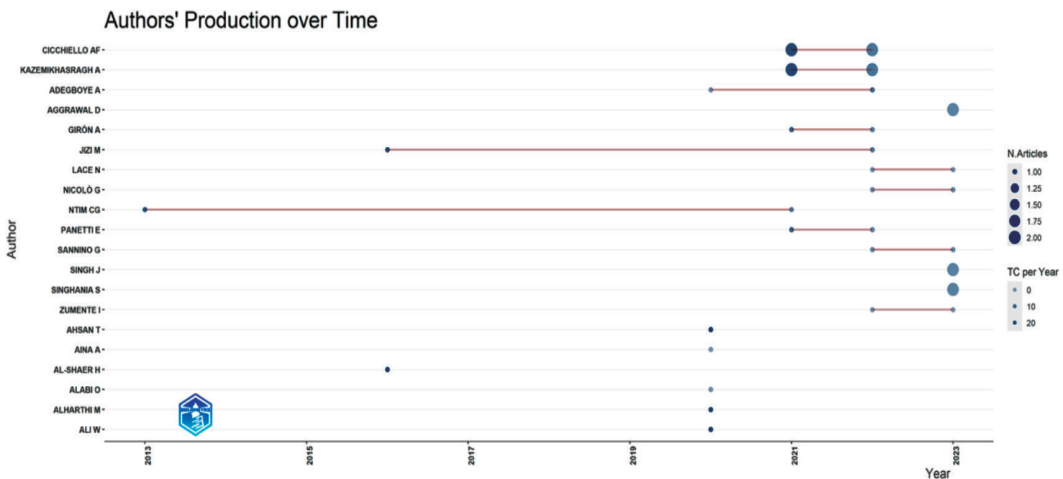


Figure 2: Author’s production over time (collecting sources from biblioshiny)

Apart from that, researchers also need a long time to produce articles on this topic. We suspect they may have conducted their research with more depth and rigour, resulting in more significant research. They may focus more on details and have a deeper understanding of the topic, thereby increasing the quality and validity of their research. In this case, Ntim is proven to be the author with the most extended period of his appearance in literature, from 2013 until his reappearance in 2021. However, he has received a total of 162 citations.

We also include collaboration between researchers involved in this topic. Collaboration between two points of view can contribute to research development. It also improves the quality of papers published with multiple authors because it prevents errors and brings contributions from various scientific disciplines (Tahamtan *et al.*, 2016). In addition, collaboration between researchers is the most common formal way of collaborating in scientific research (Cisneros *et al.*, 2018). When authors from various countries, such as Al-Shaer and Zaman, who represent the United Kingdom and Australia, can work together well in their research, this reflects a deep and multidimensional collaboration (Figure 3).

Figure 4 shows that cross-country collaboration between researchers has reached a reasonable level. Of the 20 countries involved, 12 are collaborating on research on this topic. This indicates that researchers no longer operate within national boundaries but collaborate with colleagues worldwide. Researchers are not simply locked into their local environment; they can explore new ideas and solve problems together. The importance of cross-national collaboration in research must be addressed. By collaborating with researchers from various countries, scientists can bring diverse perspectives to their research. This brings new nuances to thinking and approaches solutions from different angles, helping push research further. This creates an environment that supports the continued exchange of ideas and innovation so that research on this topic can grow in relevance.

Present Research

We claim that this research is “present research” because it reflects current research and is relevant to the context of our research topic. In this research, we organise relevant theories related to BGD and SR and then classify them into several perspectives. In addition, we

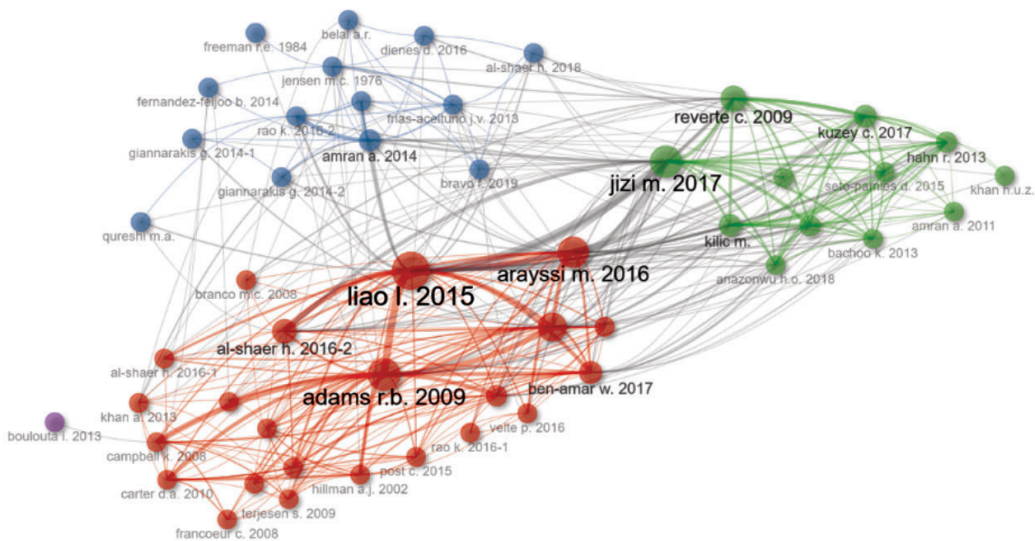


Figure 3: Co-occurrence author

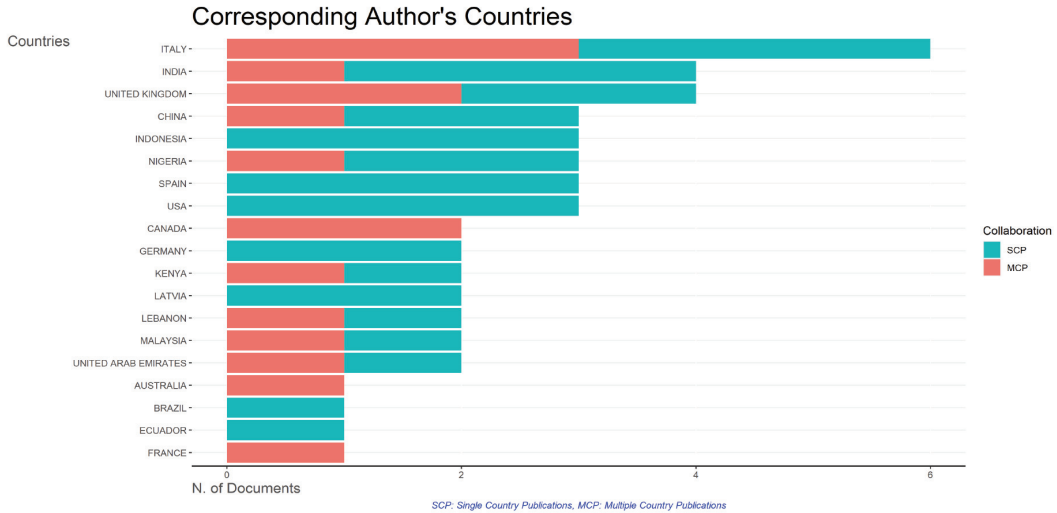


Figure 4: Corresponding author’s countries

formulate a viewpoint based on the literature we reviewed to provide valuable insights and original contributions on this topic.

The Main Theories

The conceptual framework developed in this study includes various theories that explain non-financial reporting themes. Cormier *et al.* (2005) proposed that sustainability reporting practices are quite complex phenomena that cannot be explained by a single theory (Kuzey & Uyar, 2017). Therefore, it is essential to

present a complete summary of these theories to determine their driving factors through subsequent analysis. From several articles that we analysed, we reviewed several theories related to BGD and SR. Then, we classified them into four perspectives (Figure 5). Some researchers only use one theory.

In contrast, others include several theories but do not explicitly mention the theory used. Figure 6 shows that researchers are more likely to use mixed theories than single theories. This reflects that researchers choose this approach

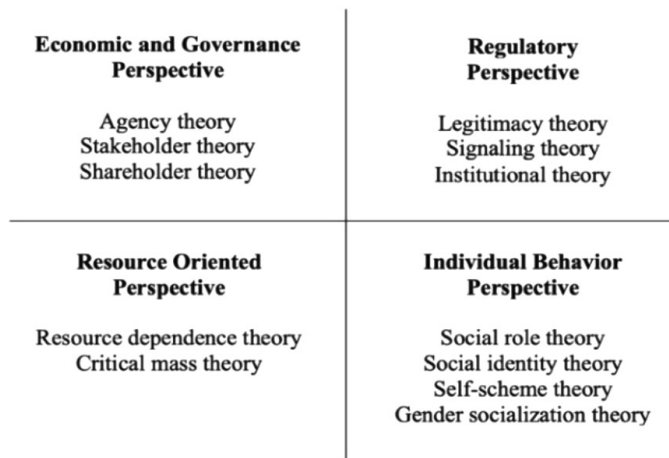


Figure 5: Theoretical perspectives in SR and BGD

to combine various theories to provide a more comprehensive and in-depth view of the problem under study. A mixed theory approach allows them to draw on the richness of explanations from various theoretical viewpoints. Sometimes, different theories complement each other by connecting relevant concepts, which can provide deeper insights. By combining different theories, researchers can better explore the relationships between these concepts, enriching the understanding of the phenomenon under study.

Main Areas in The Study of Board Gender Diversity and Sustainability Reporting

Combining theories from several perspectives forms the foundation of understanding and guides practice in this context. This approach helps us identify and combine different viewpoints in our study of BGD and SR. This also allows us to link various theories to concrete practices that companies can use to improve their sustainable performance and corporate governance. This way, we can generate more in-depth and applicable insights into this topic. We have identified several relevant relationships and outcomes from BGD and SR. Figure 6 presents a holistic picture of the topics of BGD and SR.

BGD Affects Company Performance

A diverse board of directors is expected to have a more balanced view and pay more attention to sustainability reporting because sustainability reporting is a way for companies to communicate their performance in terms of environmental, social and corporate governance to stakeholders (Al-Shaer & Zaman, 2016; Dewi *et al.*, 2023). It was found that sustainability reporting can mediate the relationship between gender diversity on the board of directors and company performance (Al-Shaer & Zaman, 2016; Dewi *et al.*, 2023). The relationship between gender diversity on the board of directors and company performance is complex and depends on factors such as company characteristics (Bektur & Arzova, 2020) and sustainability aspects (Khunkaew *et al.*, 2023; Velte, 2023a). In addition, it not only has a quantitative effect in measuring the company’s financial performance but also has a qualitative effect in terms of improvements within the company (Isidro & Sobral, 2015), which refers to improving non-financial aspects of company operations and reporting (Dewi *et al.*, 2023). In other words, the presence of women on boards positively impacts things that are only sometimes financially measurable, such

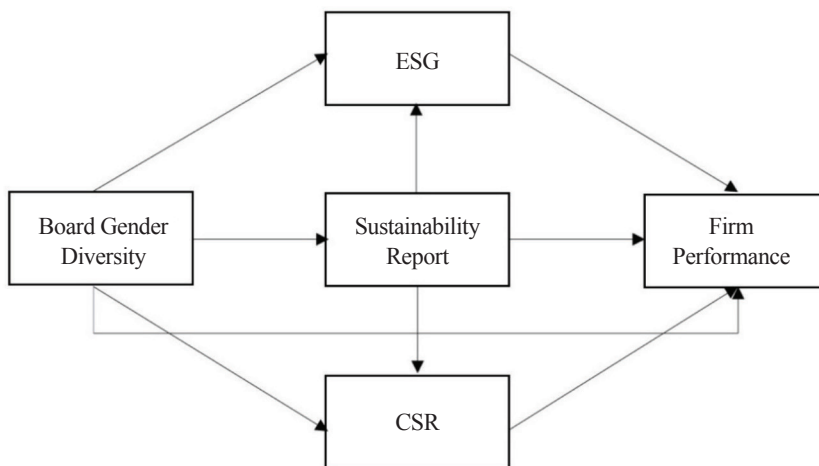


Figure 6: Points of view in SR and BGD literature

as sustainability reports. Several studies have found a positive relationship between gender diversity on the board of directors and firm performance (Bektur & Arzova, 2020; Qureshi et al., 2020; Khunkaew et al., 2023) while (Arayssi et al., 2016) found that board presence Female directors influence company risk and performance through sustainability reports.

BGD Influences the Disclosure of Sustainability, SDGs and CSR

Gender diversity on boards of directors not only reflects uniqueness (Tran et al., 2021) and equality (Furlotti et al., 2019; Singhania, Singh & Aggrawal, et al., 2023) but can also have a positive impact on how companies report and implement sustainability practices (Erin et al., 2022; Hasan et al., 2022; Githaiga & Kosgei, 2023; Nicolò et al., 2023), Corporate Social Responsibility (Issa & Fang, 2019; Jizi et al., 2022; Velte, 2023b), and Sustainable Development Goals (Giron et al., 2022; Zamponi et al., 2022). Women on boards of directors bring a broader perspective, which often includes more significant concern for social and environmental issues. They tend to pay more attention to long-term sustainability rather than focusing on short-term profits. Additionally, they bring greater demands for accountability and are often more active in asking critical questions, challenging the status quo, and demanding transparency in company practices. The presence of women on boards of directors can also strengthen a company's ability to interact with stakeholders, listen to their concerns, and build stronger relationships, all of which contribute to improvements in corporate sustainability reporting and practices (Hasan et al., 2022).

Sustainability Reports Influence SDGs and CSR Practices

Sustainability reports enable companies to communicate their SDG contribution to stakeholders (Galeazzo et al., 2023). This contribution can be in the form of information that includes a commitment to Corporate

Social Responsibility (CSR), including various initiatives that support the Sustainable Development Goals (SDGs) set by the UN (Ivic et al., 2021). Sustainability reports can influence corporate actions and become a driver for implementing SDGs into an organisation's sustainability strategy (Anasi et al., 2018; Lozano, 2015) and a driver for CSR practices (Sebrina et al., 2023). By encouraging the implementation of the SDGs into business strategies, sustainability reporting helps companies to be more aware of their impact on sustainable development goals. This can motivate organisations to integrate SDG principles and goals into their business planning. Sustainability reports reveal how the organisation influences the economy, environment, and surrounding society, as well as the extent of its contribution to achieving the SDGs (Ariesanti et al., 2019). For example, companies can set goals and initiatives that explicitly contribute to achieving the SDGs. This reflects the company's commitment to solving global problems such as poverty, inequality and climate change. Through good reporting, organisations can understand, communicate and manage their contribution to the SDGs (Saraswati et al., 2022). Companies can adopt sustainable practices and integrate sustainability information into their reporting. Gunawan et al. (2022) found that the trend of sustainability reporting is increasing every year, which indicates a positive impact on CSR practices.

Disclosure of Sustainability, SDGs and CSR Affects the Performance of the Company

Sustainable companies gain a greater level of legitimacy in the eyes of stakeholders. They are considered a company that complies with regulations, cares about its operations' environmental and social impacts, and is committed to acting ethically. This legitimacy can lead to greater stakeholder trust and support, which can help the company in the long run. Research shows that SDG disclosure can positively influence company performance (Bektur & Arzova, 2020; Lawati & Hussainey,

2022). Investors assume that companies committed to achieving the SDGs demonstrate strong social and environmental responsibility (Subramaniam *et al.*, 2023) and have plans and efforts to contribute to global sustainable development goals. As a result, investors tend to view these companies as more attractive investments because they prioritise sustainable factors. Integrating sustainability factors into CSR practices allows companies to contribute to sustainable development, meet social and environmental demands, and positively impact all stakeholders. Pasko *et al.* (2022) found that when interacting with factors such as board size, share ownership concentration, and CEO dual leadership, CSR practices positively impact a company’s financial performance. This confirms that companies focusing on good CSR practices perform better (Khunkaew *et al.*, 2023). One aspect used to assess financial performance is the sustainability report. Gold and Md. Taib (2020) found that corporate sustainability reporting practices positively impact company performance.

Future Research

Keyword co-occurrence analysis is based on the idea that when two concepts or keywords appear together in documents or literature, this indicates that there is a conceptual relationship or correlation between the two (Kumar *et al.*, 2021). In other words, if two keywords often appear together in the same context, this indicates a connection or relevance between the concepts within a particular research framework. Keyword co-occurrence analysis is used to identify relationships between concepts or topics that frequently appear together, and this can help researchers find emerging themes or topics that have potential for further research (Donthu *et al.*, 2021). Following previous research (Singhania, Singh, & Aggrawal, 2023), we used VOS-Viewer software to analyse the occurrence of keywords by considering a specific minimum frequency. In this analysis, of the 188 existing keywords, 55 keywords met the specified minimum frequency threshold. Figure 7 shows that the keywords “sustainability reporting” and “gender diversity” appear with high frequency,

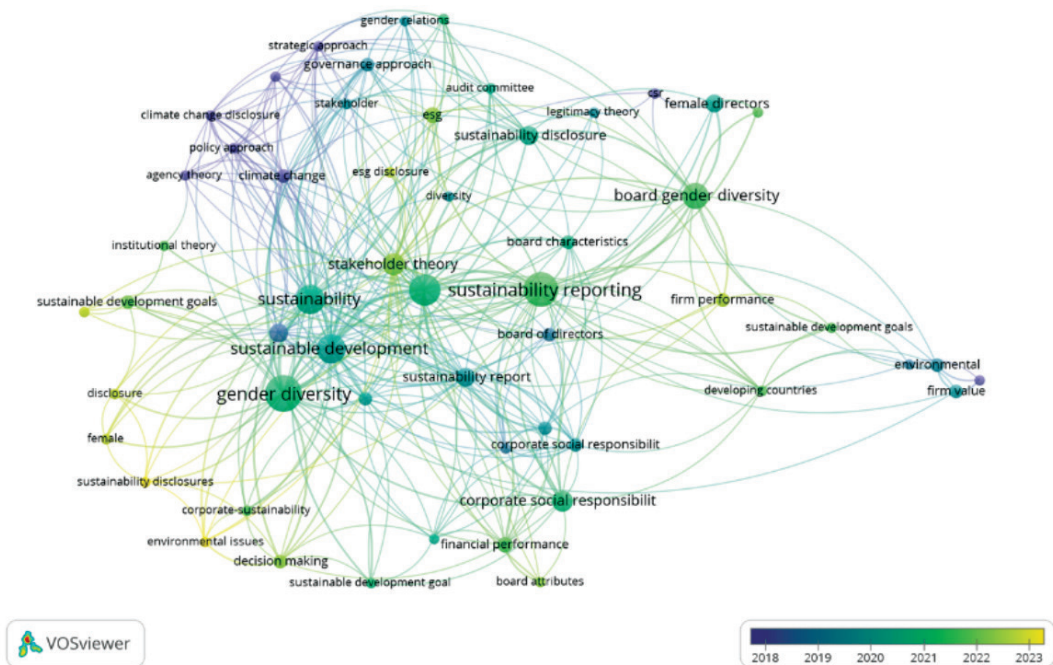


Figure 7: Keyword analysis results using the VOS-Viewer application

indicating that research or literature on gender diversity and sustainability reporting often includes both concepts.

Meanwhile, themes that have the potential to be explored in future research are marked in yellow. Some of the themes that we have identified as references for future research are related to “Environmental, Social, and Governance (ESG)” and “firm performance.” From the literature that we have reviewed, we found that there are only two pieces of literature that discuss board gender diversity and ESG, namely (Arayssi *et al.*, 2016; Zumente & Lace, 2023), three pieces of literature discuss ESG and company performance, namely (Bektur & Arzova, 2020; Qureshi *et al.*, 2020; Grishunin *et al.*, 2022). This suggests that these themes fall within the growing scope for future research in this domain and can be studied empirically and theoretically in greater depth.

Conclusions

Over the past decade, several researchers have highlighted themes and frameworks regarding the relationship between BGD and SR. This framework provides a holistic view that the presence of women on the board of directors can increase a company’s commitment to sustainability and improve sustainability reporting. From the analysis of the performance of selected documents, this research tries to reveal the various intellectual developments that occurred in this domain and provides several main contributions. First, this study identifies growth and development in terms of time and geographic distribution. Second, this research identifies high-performing journals, articles, and authors, which will help future researchers understand works on this topic. Third, this study identifies thematic groups that indicate concepts and topics experiencing significant developments in this topic. Finally, this research has revealed a range of subjects that have developed over the period and has identified themes that have potential for future exploration. Overall, the results show that although research in this area has progressed

over the period, this topic has great potential for future research. Moreover, most of the research is empirical (89%), while others are conceptual (11%); therefore, a qualitative approach can be taken for future research.

This study has several limitations that need to be addressed in future research. First, this research only uses journals that have been reviewed by experts (peer-reviewed journals) as the only reference source. Although this journal has benefits in ensuring the quality of research, many studies are also published in other forms. These limitations need to be considered when interpreting the results of this study. Second, we used a selection strategy based on specific criteria, including only articles. Although these criteria have been used in many studies, the strategy may only cover some possibilities. Different strategies can produce different sets of data and results that can be viewed differently. Therefore, future research should implement different methods to complement this research.

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Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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