

# BIBLIOMETRICS-BASED AND SYSTEMATIC LITERATURE ANALYSIS OF ESG PRACTICES AND IMPLICATIONS TO FIRM PERFORMANCE

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**Abstract:** *This study focuses on "ESG practices and firm performance" and utilises CiteSpace visualisation software to conduct a bibliometric analysis of 889 articles from the Web of Science core data between 2015 and 2023. The study examines the research status, hotspots, and developmental trajectory in ESG practices and corporate performance while identifying future research trends. The findings indicate an upward trend in annual publications from 2015 to 2023, with a significant surge after 2019. Core authors show limited output, signifying an incomplete research system. Notably, the United Kingdom collaborates most frequently with other nations, whereas China, despite a substantial number of studies, lacks sufficient international cooperation. As capital markets steer towards green investments, bonds, green funds, and innovations, future research in ESG practices and firm performance should delve into the refined manifestations of firm performance and consider the influence of more "green" factors on the relationship between the two. The research conclusions provide valuable reference and practical insights for the academic community to expand the research on the value creation of ESG practices and for companies to embrace ESG initiatives*

**Keywords:** *ESG practices; Firm performance; Bibliometric analysis; CiteSpace*

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## Introduction

ESG (Environment, Social, Governance) represents sustainable development, integrating economic advancement, environmental conservation, and social equity. It serves as a viable approach to address the multifaceted challenges posed by the COVID-19 pandemic, climate change, and economic recessions. ESG imposes three essential requirements on corporate strategic objectives: environmental responsibility, social accountability, and sound corporate governance. As such, it has gained worldwide recognition as a pivotal indicator for evaluating corporate sustainability within the framework of green development objectives (Iamandi, Constantin, Munteanu & Cernat-Gruici, 2019). Over the past decade, ESG has assumed an increasingly integral role in global business operations, with corporations dedicating substantial portions of their budgets to ESG initiatives. According to the statistics reported by Fortune magazine, global corporate spending on ESG initiatives exceeded 20 billion USD in 2018. Additionally, as per the 2022 "Sustainability Reporting in Focus" report by G&A Institute, 96% of the largest companies in the S&P 500 produced ESG reports in 2021.

The concept of ESG has garnered extensive attention from the academic community, as evidenced by the growing number of research papers dedicated to this topic (Gillan, Koch & Starks, 2021). Research in this field spans various areas, including business, socially responsible investing, corporate ratings, and environmental conservation. One of the most debated issues is whether and how ESG practices impact a company's financial performance and value.

From one perspective, research grounded in stakeholder theory and legitimacy theory posits that engaging in ESG practices can benefit stakeholders by enhancing a company's intangible assets, such as reputation, culture, and human capital (Alkaraan, Albitar, Hussainey & Venkatesh, 2022). Furthermore, ESG can foster revenue growth, cost reduction, regulatory and legal compliance, increase employee productivity, and optimise investment and capital expenditures, thereby positively influencing a company's cash flow and performance (Fatemi, Glaum & Kaiser, 2018; Alareeni and Hamdan, 2020). Conversely, some scholars rooted in agency cost theory and shareholder primacy argue that ESG practices may divert a company's attention from its primary goal of maximising shareholder value, resulting in additional expenses, resource waste, and diminished competitive strength. Consequently, they posit that there may be a negative or insignificant relationship between ESG and financial returns (Garcia and Orsato, 2020; Duque-Grisales and Aguilera-Caracuel, 2021). It is evident that while the existing research on the link between ESG and corporate performance is extensive, variations in research perspectives, subjects, and study durations have contributed to considerable disparities in research outcomes. Consequently, further discussions and investigations are warranted to shed light on this complex and dynamic field.

In this context, conducting a bibliometric study on the theme of "ESG Practices and firm performance" contributes to rapidly identifying crucial academic achievements in this field, providing comprehensive insights into the current state of research on the value-creation effects of ESG practices and gaining a clear understanding of the research directions in the domain. This study employs bibliometric analysis and the scientific knowledge map research method to investigate 889 relevant documents from the WOS (Web of Science) database from 2015 to 2023 concerning the impact of ESG practices on corporate performance. CiteSpace is utilised for visual analysis, facilitating a synthesis of the research landscape, evolutionary trajectory, research hotspots, and future research directions in this area.

This study makes significant contributions in several aspects. Firstly, it conducts a rigorous bibliometric analysis of the literature concerning the value-creation effects of ESG practices in enterprises, providing scholars with a comprehensive overview of the current research landscape in this field. Secondly, it identifies the core research topics within the ESG domain, classifying the current research hotspots into four main themes. This categorisation facilitates a deeper understanding of the focal points of research in the area. Moreover, the paper envisages future research trends, offering valuable directions to academic researchers for expanding and enriching subsequent studies. By outlining potential avenues of investigation, the paper aims to stimulate further exploration and advancements in the ESG research field.

## Literature Review

### Bibliometric approach

Literature review through bibliometric analysis is a method widely recognised for its technical rigour, involving a systematic investigation and analysis of published papers on a global scale (Li, Li, Zhu, Zhao, Pu & Song, 2022). Unlike other types of review papers, bibliometric reviews offer a more objective and less biased perspective, as they rely on automated or semi-automated quantitative data and tools (Donthu, Kumar, Mukherjee, Pandey & Lim, 2021). Conducting a bibliometric analysis on literature related to specific topics can assist researchers in gaining a deeper understanding of the fundamental knowledge and knowledge structure within the disciplinary domain (Wan and Dawod, 2022). Additionally, it can provide valuable insights and directions for future research (Lu, Bing, Bi, Liu, Lu, Xun, Wei, & Yang, 2019). Therefore, this paper adopts a bibliometric review to explore the impact of ESG practices on corporate performance.

### Previous bibliometric review studies on ESG

With the rapid growth of ESG, some scholars have endeavoured to conduct literature reviews based on bibliometric analysis, providing valuable insights into the concept of ESG.

Khan (2022) categorized research on ESG ratings from 2012 to 2022 into three main themes: company characteristics and ESG performance, corporate governance and ESG performance, and the financial substance of ESG disclosures. Based on an analysis of 981 articles published in the Scopus database between 2001 and 2021, Senadheera, Gregory, Rinklebe, Farrukh, Rhee, & Ok (2022) predict that the concept of ESG will permeate into a broader range of fields, including green investments, circular economy, and RE100. Drawing from ESG-related research in the Web of Science Core Collection database from 2004 to 2021, Wan, Dawod, Chanaim, & Ramasamy (2023) identified three emerging research trends: examining the factors and economic consequences of ESG within emerging market contexts, analyzing the mechanisms through which ESG influences capital markets, and exploring further aspects of ESG information disclosure and ESG ratings.

The preceding accomplishments have laid a solid groundwork for our research. However, we have observed that the literature utilised in these studies covers a wide array of topics. Yet, they lack a specific focus on delving into the central question that drives corporate ESG practices - whether ESG truly adds value to companies. Additionally, the sample timeframe spans a considerable period, posing challenges in identifying recent and emerging research trends. Our study adopts a more refined approach to address these limitations by narrowing the observation period to 2015-2023, specifically targeting research related to the impact of ESG practices on corporate performance within this specific timeframe. By doing so, we strive to gain a

comprehensive understanding of the current state, prevailing themes, and evolving trends in the realm of ESG practices and its influence on business performance.

## Methods and Data

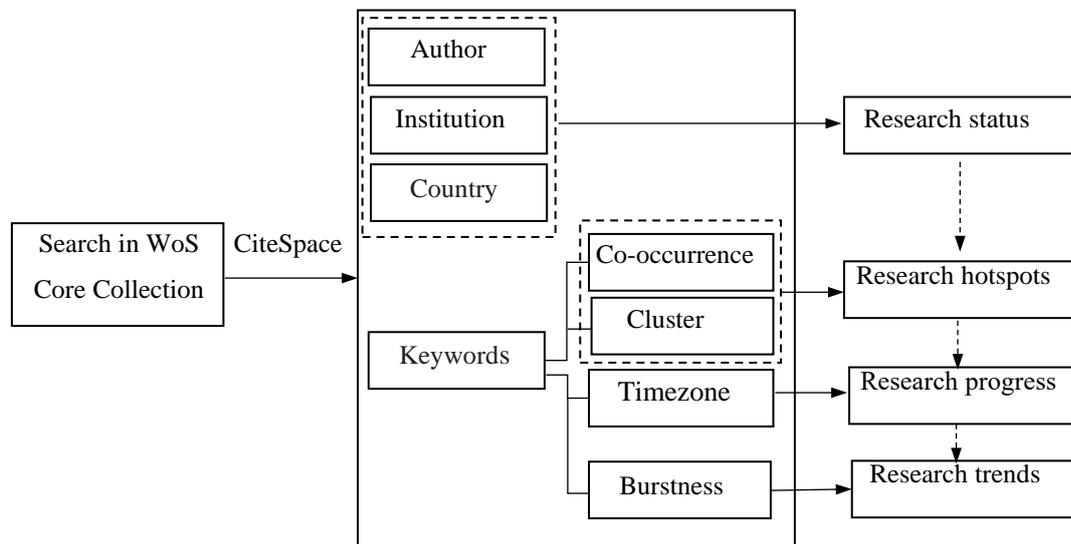
### Data collection

Web of Science is widely acknowledged as one of the most authoritative and extensively used databases globally, housing a vast collection of standardised and top-tier scholarly papers (Birkle, Pendlebury, Schnell & Adams, 2020). We specifically selected the Web of Science Core Collection to ensure a reliable evaluation, guaranteeing standardised and precise results (Khan, 2022). The search was conducted using the theme "ESG OR environment\* soci\* govern\*," AND "firm OR enterprise OR company\* OR corporat\*," AND "performance OR financial performance OR value)," and a series of criteria were applied for filtering, resulting in a total of 889 relevant and valid literature articles.

### Data analysis methods

CiteSpace is one of the most widely embraced and renowned bibliometric analysis programs (Chen, 2020), enabling comprehensive qualitative and quantitative assessments of academic literature. In comparison to other bibliometric software like Vosviewer and Gephi, CiteSpace offers a rich array of network analysis and visualisation capabilities (Che, Kamphuis, Zhang, Zhao & Kim, 2022). Notably, CiteSpace furnishes graphical tools for co-occurrence analysis, leveraging various bibliometric parameters, and provides valuable visual aids for co-occurrence relationship investigations and clustering analyses (Chen and Song, 2019).

The research framework of this study shows as following figure 1:



**Figure 1: Research framework**

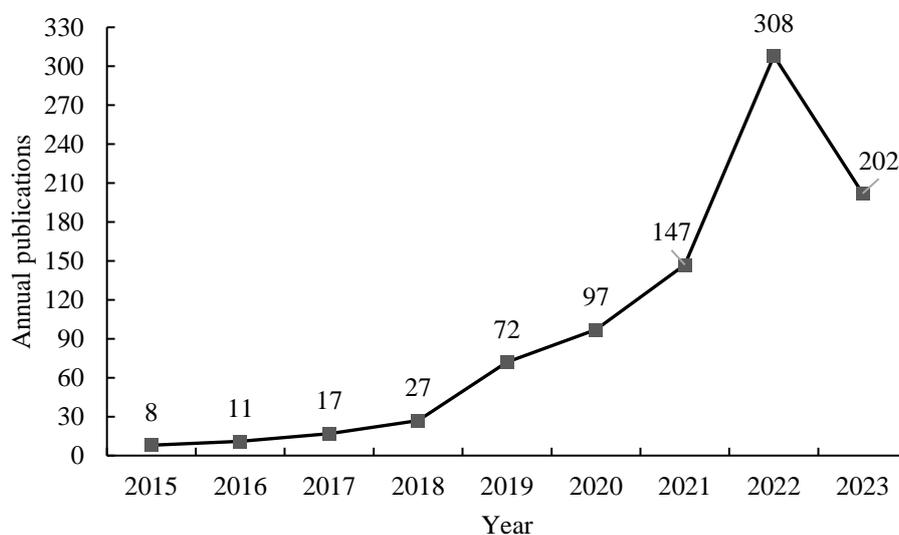
## Results and discussion

### Analysis of research status

#### Analysis of publications

Publication frequency serves as a critical manifestation of researchers' interest in a particular field, enabling the assessment of dynamic developmental trends, levels of attention, and crucial indicators for predicting future advancements. As depicted in Figure 2, between 2015 and 2017, the growth in publication frequency was sluggish. However, in 2017, the theme of "Towards a Pollution-Free Planet" at the Third United Nations Environment Assembly sparked a research fervour in environmental protection and sustainable development across various disciplines. As a result, the annual publication frequency surged after 2018, growing from 17 articles in 2017 to 72 in 2019, nearly sixfold.

The outbreak of the COVID-19 pandemic in early 2020 dealt a severe blow to numerous enterprises. In response, research in this field experienced explosive growth, with the number of publications skyrocketing to 147 in 2021. In 2022, the publication count reached a record high in recent years, with a staggering 308 articles. The research momentum continues to rise, and publication frequency is anticipated to keep climbing in the foreseeable future. This upward trend underscores the unprecedented global attention to green development, sustainability, and environmental protection.



**Fig 2: Annual distribution of articles on related topics**

#### Analysis of authors

Authors are the backbone of scientific research and serve as a testament to the outstanding contributors within a specific field. As indicated in Table 1, among the 291 authors, Ali Uyar, Hamzeh Al Amosh, and Saleh F. A. Khatib stand out with the highest number of publications. Ali Uyar has consistently focused on researching the impact of governance, especially board characteristics, on ESG practices and financial performance. On the other hand, Hamzeh Al Amosh and Saleh F. A. Khatib have extensively discussed the economic value of ESG practices from perspectives such as COVID-19, carbon emissions, and its implications on Jordan, Levant

countries, G20 countries, Gulf Cooperation Council (GCC), European, and even global enterprises.

**Table 1: Analysis of authors from 2015 to 2023**

Count of publication	Number of Authors	Authors' Names
5	3	Ali Uyar, Hamzeh Al Amosh, Saleh F. A. Khatib
4	4	Amina Buallay, Feng He, Aaron Yoon, Ahmed About Ellen Peiyi Yu, Ayman Issa, Alena Kocmanova, Abdullah S. Karaman, Khaled Hussainey, Dongyang Zhang, Victor Barros, Salim Chouaibi,
3	9	Ali Meftah Gerged
2	63	Shunsuke Managi et al.
1	183	Maretno Agus Harjoto et al.

In addition, Laplace's law can be used to investigate the situation of authors with high production capacity, and the specific formula is:  $M=0.794\sqrt{N_{max}}$ , where  $N_{max}=5$ . By applying the law, the Lotka exponent is calculated as  $M=1.775$  (rounded to 2), signifying key authors in the domain. It is evident that the core authors within the domain exhibit relatively limited output, with minimal differences in publication frequency, indicating that a cohesive and comprehensive research system has yet to form fully.

Figure 3 illustrates the collaboration among authors with two or more publications. It can be observed that the co-authorship network exhibits relatively long distances between nodes, indicating that authors in the field of ESG practices and corporate performance research have relatively dispersed academic collaborations and have not yet formed a closely-knit research community.



**Fig 3: Co-authorships of publication**

### Analysis of institutional

Analysing the network relationships between authors' research institutions and their collaborative partners is crucial for understanding the current state of research in the field and predicting future collaborative trends among institutions. The study involved 259 different institutions from which all the authors originated. Table 2 presents the top 27 most productive institutions, each contributing four or more publications to the field. All these highly productive institutions are universities, the top five are University Sfax in Africa, the Capital University of Economics and Business in China, Sapienza University of Rome in Italy, Macquarie University in Australia, and the University of Portsmouth in the United Kingdom. This demonstrates the global attention universities have given to investigating the impact of ESG practices on corporate performance.

**Table 2: Top 27 most productive institutions**

<b>Ranking</b>	<b>Institution</b>	<b>Publications</b>
1	University Sfax	11
2	Capital University Economic & Business	10
3	Sapienza University Rome	8
4	Macquarie University	7
5	University Portsmouth	7
6	Hong Kong Polytech University	6
7	Xi An Jiao Tong University	6
8	Shanghai University Finance & Economic	6
9	Erasmus University	5
10	Ahlia University	5
11	Boston University	5
12	Renmin University China	5
13	Harvard University	5
14	Northwestern University	4
15	Bocconi University	4
16	University Tunis	4
17	Pondicherry University	4
18	Cent South University	4
19	University Roma La Sapienza	4
20	Tianjin University Finance & Economic	4
21	Amer University Middle East	4
22	University Malaysia Kelantan	4
23	University Pisa	4
24	University Turin	4
25	University Int Business & Econ	4
26	University Otago	4
27	Hang Seng University Hong Kong	4



**Fig 4: Cooperative networks among institutions**

Figure 4 illustrates that institutions with higher publication volumes show a strong tendency towards research collaboration. Notably, the top-ranked institution in terms of publication output is University Sfax, and its collaborative network includes Univ Sannio (Chouaibi, Chouaibi & Rossi, 2021), Brunel University, Mansoura University (Boulhaga, Bouri, Elamer & Ibrahim, 2022), Univ Malaysia Sabah, and Univ Sains Malaysia (Adeneye, Kammoun & Ab Wahab, 2022). These collaborations have investigated the relationship between ESG performance and corporate outcomes from various perspectives, such as green innovation, internal control, and capital structure.

#### **Analysis of countries or regions**

Studying the countries or regions in the literature helps identify the most influential nations or areas in the research field. The comprehensive literature spans contributions from 275 countries or regions, as outlined in Table 3, with the top 15 countries still predominantly composed of Western developed nations or regions. Leading the pack is the United States, with an impressive count of 120 publications, closely followed by China with 82 publications. Italy and England also make substantial contributions with 53 and 51 publications, respectively. Furthermore, the recent emergence of India and Malaysia in the top ten signifies a growing recognition of the economic ramifications of ESG practices in Asian countries or regions.

**Table 3: Top 15 Most productive countries or regions**

Ranking	Country or region	Developing/Developed countries	Publications	Degree	Centrality
1	USA	Developed	120	14	0.33
2	People's Republic of China	Developing	82	14	0.17
3	Italy	Developed	53	15	0.14
4	England	Developed	51	27	0.33
5	France	Developed	34	19	0.26
6	India	Developing	32	12	0.11
7	Malaysia	Developing	25	7	0.27
8	Spain	Developed	23	9	0.12
9	Australia	Developed	22	18	0.4
10	Germany	Developed	20	11	0.42
11	Canada	Developed	19	13	0.41
12	Tunisia	Developing	17	5	0.07
13	Netherlands	Developed	17	12	0.56
14	South Korea	Developed	13	2	0
15	U Arab emirates	Developing	12	4	0.19

Figure 5 shows a visualisation of the collaboration network among countries. Analysing the degree of collaboration, it is evident that the United Kingdom has the highest number of external connections, indicating a significant level of collaboration with other countries. Following closely are France and Australia. However, Germany has the highest centrality, indicating its crucial role as a key collaborator in the global network. In addition, China's centrality is only 0.17, indicating that despite its overall high publication output, its international research collaboration is relatively weak.



Fig 5: Co-authorships status quo among countries and territory

### Analysis of research hotspots

#### Analysis of Co-keyword

The frequency of keywords largely reflects the research directions and hot topics within the field. To enhance the analysis, irrelevant terms like "performance," "impact," and "firm" were removed, and synonymous keywords such as "Corporate social responsibility" and "CSR" were merged to identify valuable high-frequency keywords.

As shown in Figure 6, the node for "Corporate social responsibility" is the largest, indicating its prevalence as a keyword. ESG has evolved from the foundation of CSR, and research on the economic value of ESG practices is inseparable from exploring the fundamental aspects of corporate social responsibility. Additionally, keywords such as "ESG", "governance", "financial performance", "Sustainability", "disclosure", "risk", "investment", and "cost" have also appeared with high frequencies, indicating that ESG practices are predominantly explored through information disclosure (e.g., Mohammad & Wasiuzzaman, 2021). Moreover, there is a growing trend towards more refined investigations, focusing on sub-dimensions (E, S, G) (Lunawat & Lunawat, 2022), sustainable development (Zhou, Liu & Luo, 2022), and risk (Chairani & Siregar, 2021) to explore the indirect impact of ESG practices on corporate performance.



Centrality is also an indicator reflecting the importance of keywords, measuring the influence of a node within the entire network. As shown in table 4, the centrality of the top 20 keywords is relatively low, with all values below 0.1. This observation suggests that these studies cover a broad spectrum, delving into diverse external factors (such as "risk " and "information") and internal elements (like "management", "cost", and "corporate governance") that have an impact on corporate performance.

### Cluster Analysis of keywords

Keyword clustering analysis is conducted to group conceptually similar keywords and form independent clusters, facilitating further interpretation of the research hotspots. CiteSpace utilises the LLR (log-likelihood ratio) algorithm to provide two metrics, the modularity value Q and the average silhouette value S. In Figure 7, the Q value is 0.5002, and the S value is 0.7506, indicating a highly significant clustering structure in the network and convincing clustering results. 12 clusters are generated, ordered as #0 to #11, with smaller numbers indicating larger cluster sizes and more keywords included. As shown in figure 8, these 12 clusters can be categorised into four main research themes.



Fig 7: Keywords cluster map

#### (1) Theoretical foundation of ESG practices

The first category comprises the theoretical foundation of ESG practices, including #0 ESG performance, #6 ESG disclosure, and #8 Corporate social responsibility. The two major theories underpinning the implementation of ESG performance are stakeholder theory and legitimacy theory.

Stakeholder theory explains how a company's financial performance depends on relationships beyond its shareholders, encompassing a broader range of stakeholders and their operational environment. The instrumental Stakeholder theory emphasises the effective management of relationships with stakeholders to enhance a firm's performance. Stakeholder Theory has become an essential foundational theory for investigating the relationship between ESG performance and corporate value/financial performance and has been widely applied in numerous empirical studies (e.g., Cek and Eyupoglu, 2020; Velte, 2021; Nirino, Santoro,

Miglietta & Quaglia, 2021; Pham, Tran, Le, Vo, Pham & Nguyen, 2022; Ren, Ting, Lu & Kweh, 2022; Bissoondoyal-Bheenick, Brooks & Do, 2023; Menicucci & Paolucci, 2023).

Legitimacy theory introduces the concept of a "social contract" between a company and society, which is particularly relevant for environmental and social disclosures (Maama, Appiah & Doorasamy, 2022). Often considered as a complement to stakeholder theory, Legitimacy theory has also been widely applied in research investigating the relationship between ESG performance and corporate value/financial performance (e.g., Triyani, Setyahuni & Kiryanto, 2020; Abdul Rahman & Alsayegh, 2021; Velte, 2021; Shin, Moon & Kang, 2023).

In addition, scholars have also conducted analyses of ESG practices from the perspectives of resource-based theory, signalling theory, risk management theory and so on. More theoretical foundations will likely be applied to research the economic value of ESG practices in companies.

## **(2) The impact of ESG practices on a company's short-term financial performance.**

The second category focuses on the impact of ESG practices on a company's short-term financial performance. This includes #1 corporate financial performance, #4 earning management, and #9 finance. Research in this theme explores how ESG practices affect various aspects of a company's behaviour and operations.

Several findings support the notion that ESG practices can be beneficial in various financial aspects. For instance, ESG practices have been shown to help reduce financial risks (Atif and Ali, 2021), alleviate financing constraints (Christensen, Serafeim & Sikochi, 2021), enhance the company's productivity (Shaikh, 2022), reputation (Agoraki, Giaka, Konstantios & Patsika, 2023), profitability (Kim and Lee, 2020), and market value (Pedersen, Fitzgibbons & Pomorski, 2021). Even amid the constraints posed by the COVID-19 pandemic, ESG disclosure has been found to contribute to financial stability and risk mitigation (Zhang and Lucey, 2022; Yoo and Managi, 2022). Research by Liu, Ju & Gao (2021) indicates that ESG practices foster stakeholder trust, garner stakeholder support, and provide strategic resources for corporate development, ultimately improving investment efficiency. Luo, Wei & He (2023) also explored the comprehensive ESG ratings' impact on Chinese companies' trade credit financing and found that strong ESG performance significantly increases the likelihood of accessing trade credit. This body of research underscores the importance of ESG practices in influencing a company's financial outcomes and highlights their potential to bring positive changes to various financial aspects.

Some studies suggest that there might not be clear relationships between ESG activities and certain financial aspects, such as debt costs (Di Tommaso and Thornton, 2020), equity costs (Rojo-Suárez and Alonso-Conde, 2023), innovation capability (Cohen, Gurun & Nguyen, 2020), profitability (Atan, Alam, Said & Zamri, 2018), and firm value (Bissoondoyal-Bheenick et al., 2023). For instance, Cohen et al. (2020) examined the relationship between ESG practices and innovation capability in the energy industry. They found that natural gas, energy, and oil-producing companies had lower ESG practices but were still innovators in the patent domain, suggesting a lack of a direct link between the two. Moreover, some scholars have concluded that while ESG may enhance employee and managerial awareness, it could decrease innovation output (Zheng and Lee, 2018).

One possible explanation for these inconsistent research findings is that ESG may not impact companies in the same way across the board. Importantly, companies' ESG factors can vary

significantly depending on national institutions, social environments, industries, and geographic locations (Bissoondoyal-Bheenick et al., 2023). External factors, such as legal systems, can also influence the value effects of ESG. Therefore, the effectiveness, boundaries, and pathways of ESG practices in influencing financial performance remain critical areas of research interest.

### **(3) ESG practices and implications on corporate sustainable development.**

The third category encompasses ESG practices and implications on corporate sustainable development. This includes #3 Sustainable finance, #5 Renewable energy, and #7 Environmental performance.

Within this scholarly domain, there is a resolute emphasis on corporate ESG performance, with the ultimate objective of fostering sustainable development over the long term. Scholars and experts agree that achieving sustainable growth is feasible, provided businesses worldwide take on the mantle of environmental stewardship. This stewardship encompasses endeavours like minimising carbon emissions, embracing renewable energy sources, and proactively mitigating climate-related risks. Crucially, the success of these initiatives hinges on the availability of sufficient financing and prudent investments, thereby bolstering the financial performance of enterprises (Zhang & Lucey, 2022).

Although positive ESG practices may not yield immediate benefits, poor ESG performance could lead to additional costs for companies. For instance, it may tarnish the reputations of corporate boards and managers (Welch and Yoon, 2022), result in pollution-related expenses, fines, public warnings, and criticism (Gillan et al., 2021). Alsayegh et al. (2020) argue that integrating ESG considerations into strategic management can help companies cultivate competitive advantages, enhance operational efficiency and reputation, reduce waste, thereby fostering shared value and sustainable performance.

### **(4) Research perspectives and methodologies**

The last category focuses on the perspectives and methodologies employed in research, which includes #2 Gender, #10 Panel data, and #11 Governance.

One perspective revolves around internal factors, such as CEO characteristics, equity concentration, controlling shareholder pledging, and board attributes and so on.

Kim, Park, & Shin (2022) explored the relationship between facial masculinity of male CEOs in South Korea and their ESG performance, finding that CEOs with more masculine facial features tend to exhibit stronger ESG performance. Wang, Qi & Zhuang (2023) studied the collusion effect of multiple large shareholders on corporate ESG performance and concluded that companies with multiple large shareholders generally have lower ESG performance compared to those with a single dominant shareholder. Huang, Luo, Wang & Xiao (2022) demonstrated that the pledging of controlling shareholders' stocks for personal loans significantly deteriorates a company's ESG performance and ESG disclosure quality. Husted & Sousa-Filho (2019) found that board size and the presence of independent directors positively influence ESG disclosure, while the duality of female directors and CEOs has a negative impact on ESG disclosure. In contrast, Arayssi et al. (2020) found that female board participation contributes to conveying a positive corporate image through increased social responsibility. Independent boards and women's participation act as catalysts in achieving an effective balance between corporate financial goals and social responsibilities.

Another perspective involves considering external factors, such as the COVID-19 pandemic, the digital economy, and market competition and so on. Akhtaruzzaman, Boubaker, & Umar (2022) revealed a significant impact of media coverage index on the ESG leader index during the COVID-19 pandemic. Ren, Zeng, & Zhao (2023) found that digital finance influenced corporate ESG performance through green innovation and external regulations. In contrast to the findings in developed countries, Martins (2022) revealed that emerging market companies responded to competitive pressures by making significant and notable adjustments in their ESG practices.

### **Analysis of research trends**

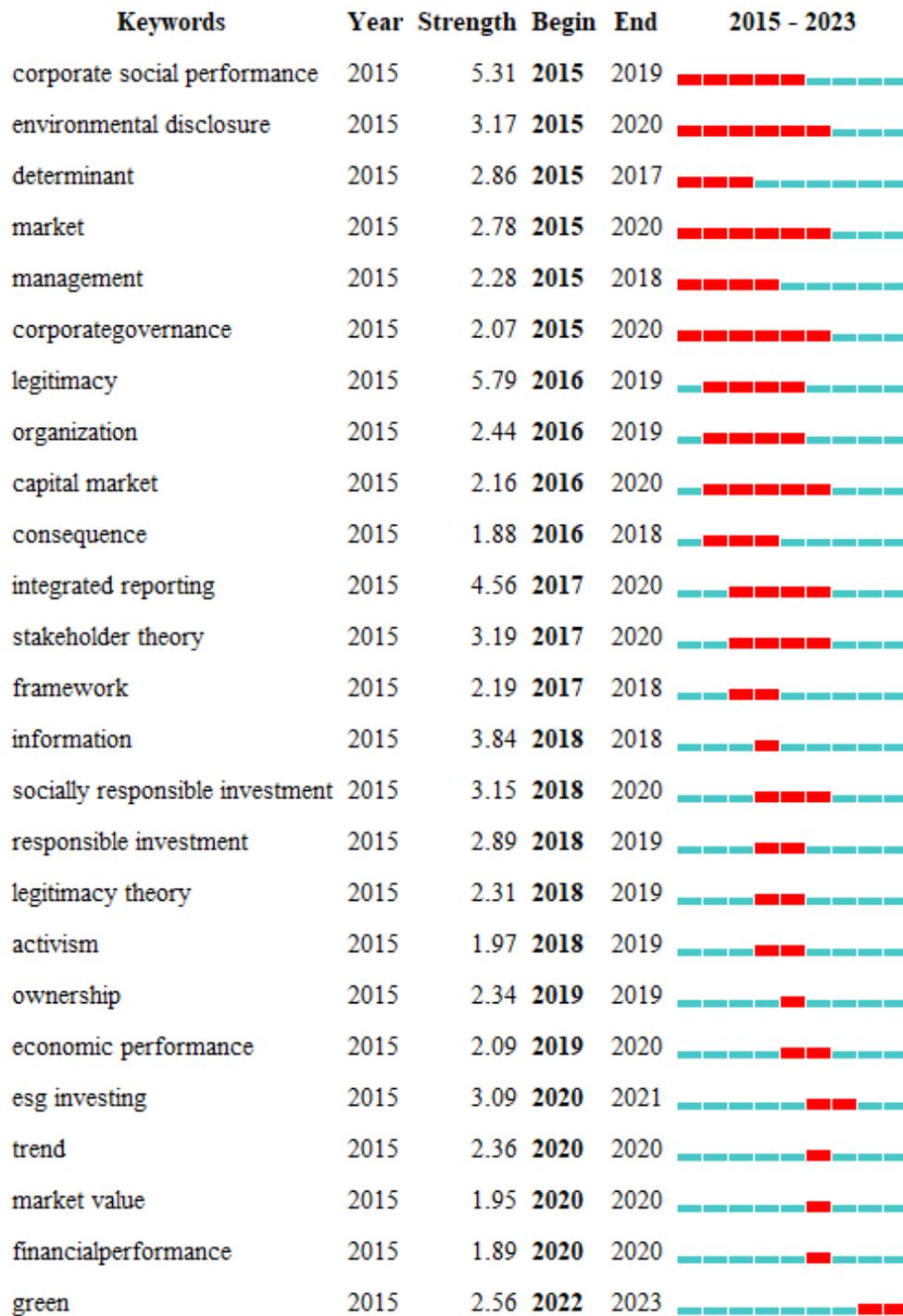
Keyword burst analysis is a valuable tool for discerning the research trends within a particular field. This analytical approach involves identifying keywords that experience a significant surge in usage during a specific period. Figure 8 illustrates the entire period (2015-2023) using a blue line, while the red line signifies the citation burst (Yang, Shao & Wu, 2019).

As shown in Figure 8, there is a hierarchical relationship among the research hotspots concerning corporate ESG practices and firm performance. In the early stage (2015), "corporate social performance," "management," and "corporate governance" were prominent keywords, indicating that prior research focused more on exploring how companies incorporated ESG principles into their operations and the outcomes of such actions. During the period of 2016-2017, there was a burst of keywords such as "Legitimacy," "organisation," "capital market," "consequence," "integrated reporting," and "framework." This surge suggested that while implementing ESG strategies had proven effective, academia remained sceptical about the accuracy of ESG information disclosure, especially concerning environmental aspects. Consequently, during this phase, there was a greater inclination towards investigating the significance of regulatory bodies in enhancing disclosure policies and standardising ESG criteria.

Starting from 2018-2019, keywords such as "social responsibility investment," "responsibility investment," "activism," and "economic performance" emerged, indicating that scholars began contemplating the potential economic value of ESG performance from an investment perspective. In 2020, keywords such as "ESG investing," "market value," and "financial performance" came to the forefront. Scholars delved into diverse manifestations of corporate performance, examining the relationship between ESG performance and corporate outcomes from market value and book value perspectives, and accumulated substantial empirical research. The surge in the popularity of the keyword "green" in 2022 has continued to date.

Regarding firm finance, some scholars have started exploring the role of ESG performance in promoting green finance, encompassing aspects such as green bonds (Baldi & Pandimiglio, 2022), green banking (Gunawan, Permatasari & Sharma, 2022), and green funds (Kuzmina, Atstaja, Purvins, Baakashvili & Chkareuli, 2023).

In corporate management, future research should focus on the impact of factors such as green innovation and green investment on the relationship between ESG performance and corporate outcomes. Taking green innovation as an example, it has garnered increasing attention in recent years due to its contributions in resource conservation, environmental protection, and financial performance. As a vital component of society, businesses are actively exploring green innovation to enhance their competitiveness and achieve sustainable green development (Harel, Schwartz & Kaufmann, 2021).



**Fig 8: Top 25 keywords with the strongest citation bursts**

## Conclusion

With the gradual strengthening of the incorporation of ESG principles into corporate development strategies and operational management processes, the concept of ESG has been discussed in academic literature for over 30 years. ESG research has established a solid foundation and witnessed varying degrees of diversification and deepening in content and themes. Distinguished from other literature reviews on ESG, this study adopts a more targeted approach by constructing a research framework on "ESG Practices and Corporate Performance" based on literature visualisation analysis. Focusing on a corpus of 889 articles from the Web of

Science core database spanning 2015 to 2023, CiteSpace was employed to visually analyse the quantity, authors, institutions, countries, and keywords of the literature, enabling a comprehensive summary of the current status, hotspots, developmental trajectory, and future trends in this research domain. The conclusions drawn in this study serve as valuable references and practical insights for the academic community to expand the scope of ESG value-creation research and for businesses to implement ESG practices. The main findings can be summarised as follows:

Regarding current research, the annual publication output from 2015 to 2023 shows an upward trend. However, the number of publications between 2015 and 2018 was relatively limited. Since 2019, there has been explosive growth in the annual publication output, and the enthusiasm for publishing has increased yearly. This significant surge can be attributed to the influence of the COVID-19 pandemic and the thematic conference "Towards a Pollution-Free Earth" organised by the United Nations Environment Programme. Regarding authors, institutions, and countries, the core authors within the field have contributed relatively little, and there is a minimal disparity in the number of publications among them. Currently, a well-established research system has not yet been formed. While a few highly productive authors have formed collaborative relationships, individual efforts still dominate. Universities are the primary contributors to publications, and institutions with higher publication output exhibit a noticeable trend of collaborative research.

In terms of research hotspots, a key co-occurrence analysis indicates that "corporate social responsibility", "ESG", "governance", "financial performance", "sustainability", "disclosure", "risk", "investment", and "cost" are currently the continuously monitored topics in the ESG and corporate performance domain. These topics cover a wide range of research areas. By applying keyword clustering, the research hotspots can be categorised into four main groups: theoretical foundation of ESG practices, the impact of ESG practices on a company's short-term financial performance, ESG practices and implications on corporate sustainable development, and research perspectives and methodologies in ESG research.

Regarding research trends, the financial sector has been evolving towards green investments, bonds, funds, innovations, and other related areas. Since 2020, there has been a surge in keywords such as "ESG investing," "market value," "financial performance," and "green." Consequently, the future research direction entails further refining the manifestations of corporate performance and considering the influence of additional "green" factors on the relationship between ESG practices and corporate performance.

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