The Current Research Status, Hot Topics, and Emerging Trends in ESG "Greenwashing" at Home and Abroad: A Visual Analysis Based on CiteSpace

Shan Wenjuan

Information of the author：Shan Wenjuan，Master's Student at the International Business School, Jinan University

Abstract

As investors increasingly prioritize companies' ESG performance in their investment decisions, companies with strong ESG performance often secure financing at lower costs. However, some companies engage in ESG "greenwashing" by publishing false ESG reports to pursue economic interests or evade regulation. This paper selects ESG "greenwashing"-related literature from the WOS and CNKI databases as the data foundation. Using the scientific knowledge mapping and literature analysis results as the research subject, the study employs CiteSpace visualization software to create knowledge maps. These maps distill the key insights from the data, aiming to understand the current state of research on ESG "greenwashing" both domestically and internationally. The goal is to provide some reference for future exploration of ESG "greenwashing."

Keywords：ESG "Greenwashing"; Visual Analysis; CiteSpace

Introduction

Since the signing of the Paris Agreement in 2016, there has been growing public attention on environmental governance and sustainable development. As the concept of sustainable development becomes increasingly ingrained, the quality of ESG report disclosures has garnered significant attention from stakeholders. Companies are increasingly aware of the importance of ESG disclosure as a basis for long-term sustainable development and as a reflection of their value. However, the phenomenon of "greenwashing" in ESG disclosures has also begun to emerge, which seriously contradicts the principles of sustainable development. Good ESG performance helps companies alleviate financing constraints, mitigate risks, and ultimately reap the benefits of enhanced value. Recognizing the various positive impacts of strong ESG performance, companies are motivated to engage in "greenwashing" during ESG disclosures. Furthermore, the current ESG reports lack clear guidelines for ESG information disclosure, with no standardized format, quantitative indicators, or data criteria, creating opportunities for "greenwashing" in ESG reporting. Compared to international research on ESG "greenwashing," research in China on this topic is still in its early stages. Therefore, there is a need for deeper exploration and research into ESG "greenwashing." Based on these perspectives, this paper will review and interpret the relevant information on ESG "greenwashing" both domestically and internationally, with the hope of providing useful insights for further research in the field of ESG

"greenwashing."

Chapter One: Research Methodology and Data Sources

1.1 Research Methodology

This study utilizes CiteSpace visualization software, using ESG "greenwashing" related literature from the Web of Science (WOS) and China National Knowledge Infrastructure (CNKI) databases as the data foundation. The analysis is based on the results processed through the scientific knowledge mapping method, extracting key information from the knowledge maps to reflect the development status of domestic and international research on ESG "greenwashing."

1.2 Data Sources

The domestic literature is sourced from the CNKI database. An advanced search for "ESG 'greenwashing'" was conducted, filtering results from "Peking University Core Journals," "CSSCI," and "CSCD." According to the annual trend chart from CNKI, research on ESG "greenwashing" in China began in 2021 and has shown a year-on-year increase. From 2021 to 2024, a total of 33 relevant papers were obtained.

The international literature is sourced from the WOS database. An advanced search for "ESG 'greenwashing'" was performed, selecting the "Web of Science Core Collection." The search results indicate that international research on ESG "greenwashing" started in 2012, with a total of 135 relevant papers identified.

This study examines 35 domestic and 135 international papers on ESG "greenwashing" and conducts a corresponding analysis of the research findings.

Chapter Two: Correlation analysis of domestic ESG "greenwashing"

2.1 Analysis of the current situation of domestic ESG greenwashing

2.1.1 Highly cited literature

An analysis of the five most cited papers in the field of ESG "greenwashing" research in China from 2021 to 2024 reveals the following:

The most cited paper is a 2022 journal article by Huang Shizhong, which examines the internal and external factors driving "greenwashing" behaviors by corporations and financial institutions in their ESG reports and proposes measures for governance and suppression of "greenwashing"[1].

The second most cited paper is a 2021 journal article, also by Huang Shizhong, which focuses on the key points and impacts of the EU's CSRD and NFRD sustainable development reports, highlighting the prevalent issue of ESG "greenwashing" in both domestic and international ESG reports[2].

The third most cited paper is a 2022 journal article by Chen Xiaoyan and Hong Feng, which explores the progress, challenges, and considerations of ESG verification for companies, noting that selective disclosure and "greenwashing" in Chinese companies' ESG reports objectively increase the difficulty of ESG verification[3].

The fourth most cited paper, published in 2023 by Hou Dongde and Wei Yajun,

discusses the localization and innovation of ESG information disclosure in China under the guidance of new development concepts, emphasizing the need to refine regulations related to ESG "greenwashing" to reduce the opportunities for such behaviors by listed companies[4].

The fifth most cited paper, published in 2023 by Zhang Dan, Ma Guotuan, and Feng Yaxian, investigates the external and internal factors contributing to corporate ESG "greenwashing" and offers methods and recommendations for its governance using quantitative indicators[5].

2.1.2 High publishing institution

The top-ranking institution, University of the Chinese Academy of Social Sciences, has published three papers related to ESG "greenwashing." The second-ranking institutions－Nankai University, Southwest University of Political Science and Law, Jinan University, and Xiamen University－each have two related publications. These top five institutions collectively account for 11 papers, representing 33.3% of the total literature, indicating that they are leading research centers in the field of ESG "greenwashing" with significant authority.

2.2 Overview of Domestic ESG "Greenwashing" Research

2.2.1 Keyword Co-occurrence Analysis

Keywords serve to provide readers with a clear understanding of the main ideas of a paper, encapsulating its essence. Therefore, analyzing the keywords related to ESG "greenwashing" helps in further understanding the core concepts of this topic.

Using CiteSpace 6.3.R1 visualization software, the literature on ESG "greenwashing" is analyzed and represented as a knowledge map of keywords. This allows for a more detailed exploration of related information, understanding research hotspots, and tracking the evolution of ESG "greenwashing" research. The time slice is set to one year, resulting in 40 network nodes, 37 links, and a network density of 0.0474, as shown in the domestic ESG "greenwashing" keyword co-occurrence map in Figure 1. The keyword co-occurrence analysis reveals that the core keyword in domestic ESG "greenwashing" research is "greenwashing," with secondary core keywords including "green finance," "financing constraints," and "corporate greenwashing."
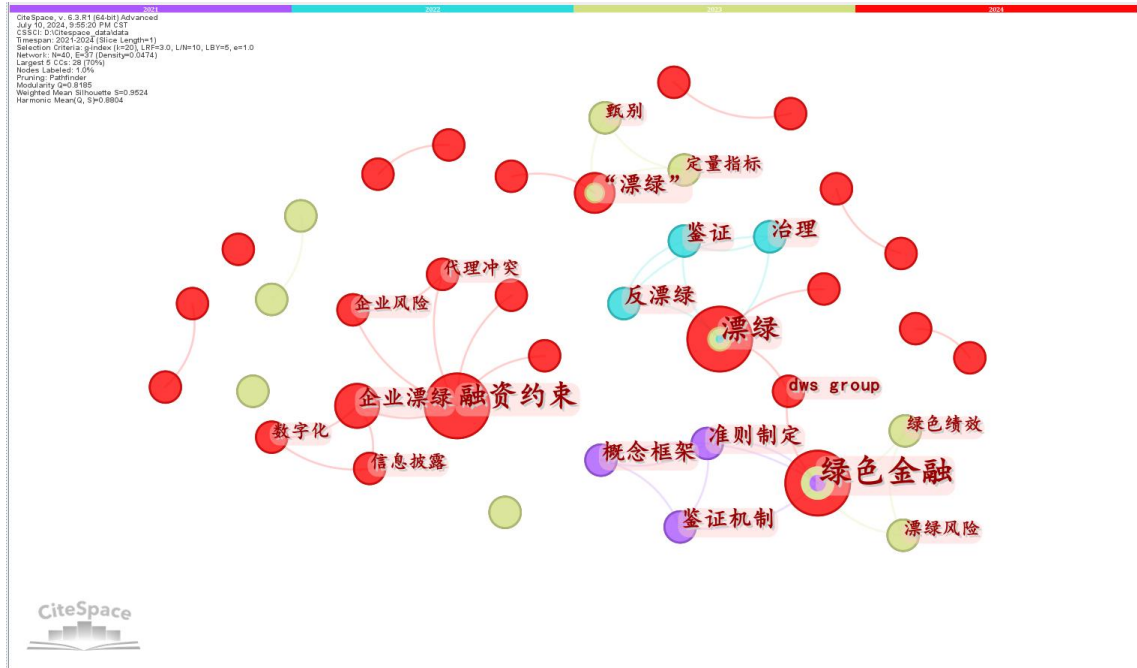
Figure 1. Co-occurrence Distribution of ESG "Greenwashing" Keywords in China (2021-2024)

2.2.2 Keyword Cluster Analysis

Using CiteSpace 6.3.R1 visualization software, a Log-Likelihood Ratio (LLR) cluster analysis was conducted on ESG "greenwashing" keywords in China from 2021 to 2024. The results are shown in Figure 2 and Table 1. The LLR cluster analysis reveals that the Q value for ESG "greenwashing" in China from 2021 to 2024 is 0.8185, significantly higher than the critical value of 0.3, indicating a high degree of association between the derived modules. Additionally, the S value is 0.9524, which is well above 0.7, suggesting that the cluster analysis has a high level of reliability.

The cluster analysis of domestic ESG "greenwashing" research yielded seven clusters: "#0 Greenwashing," "#1 Conceptual Framework," "#2 Agency Conflicts," "#3 Quantitative Indicators," "#4 Digitalization," "#5 Technological Risks," and "#9 Analyst Attention." While some clusters overlap slightly, others are distinct and exhibit a trend of outward expansion. This indicates that the field of ESG "greenwashing" research in China still requires further exploration.

Figure 2. Keyword Cluster Analysis of ESG "Greenwashing" in China (2021-2024)

Table 1. Keyword Cluster Analysis of Domestic ESG-Related Papers

Sequence	Size	Sub-Cluster Silhouette	Year	LLR Log-Likelihood Ratio Label
#0	6	0.803	2022	Greenwashing
#1	6	1	2021	Conceptual Framework
#2	5	1	2024	Agency Conflicts
#3	4	1	2023	Quantitative Indicators
#4	3	0.95	2024	Digitalization
#5	2	1	2024	Technological Risks
#9	2	1	2024	Analyst Attention

2.2.3 Keyword Timeline Analysis

To understand the evolution of keywords in the field of ESG "greenwashing," CiteSpace 6.3.R1 visualization software was used to create a timeline analysis of keywords from 2021 to 2024, as shown in Figure 3. The keyword timeline analysis for domestic ESG "greenwashing" research reveals that research in 2023-2024 is more concentrated, primarily focusing on topics such as "greenwashing," "financing constraints," "corporate greenwashing," and "digital information disclosure." In contrast, research in 2021-2022 is more dispersed, with a primary focus on "green finance." The analysis indicates that the scope of ESG "greenwashing" research by domestic scholars is not yet broad enough and requires further expansion and study.
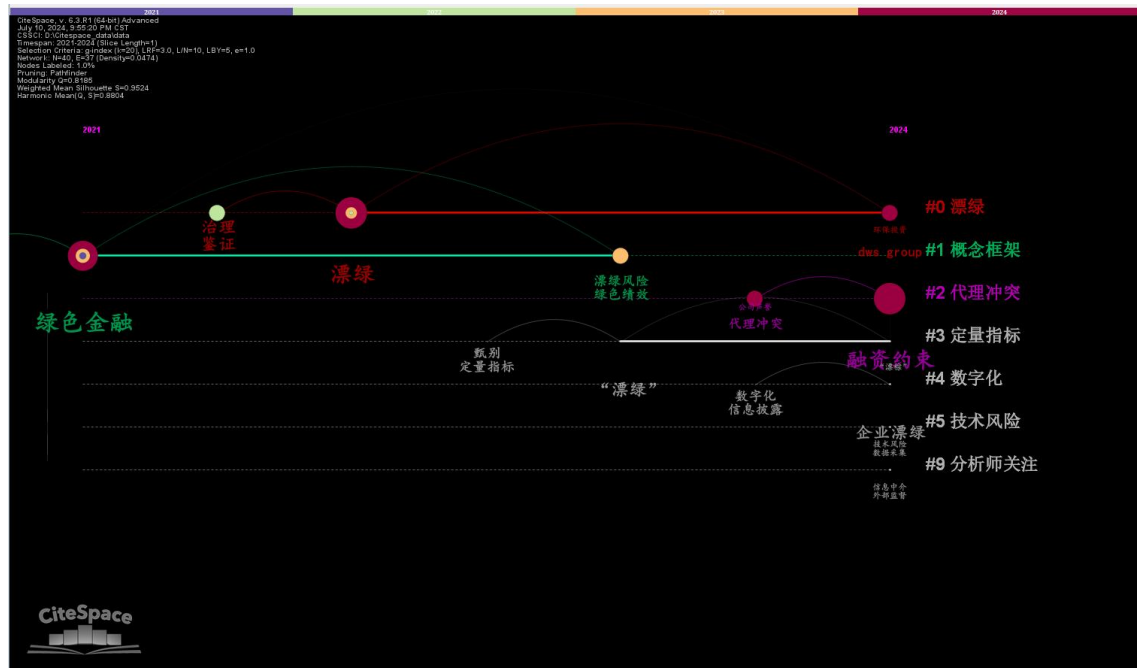
Figure 3. Timeline Analysis of ESG "Greenwashing" Keywords in China (2021-2024)

2.3 Overview of Research Hotspots on ESG "Greenwashing" in China

2.3.1 Keyword Frequency Analysis

To highlight the most frequently occurring keywords in the field of ESG "greenwashing" research in China, Table 2 presents the distribution of the top five high-frequency keywords from 2021 to 2024. The table shows that the top five high-frequency keywords and their first appearance years are "greenwashing" (2022), "green finance" (2021), "financing constraints" (2024), "corporate greenwashing" (2024), and "greenwashing" (2023). These high-frequency keywords indicate that domestic experts and scholars are exploring ESG "greenwashing" by combining it with green finance and financing constraints, laying a foundation for future in-depth discussions.

Table 2. Keyword Frequency Distribution in Domestic ESG "Greenwashing" Research (2021-2024)

Sequence	Frequency	High-Frequency Keywords	First Appearance Year	Centrality
1	5	Greenwashing	2022	0.08
2	4	Green Finance	2021	0.10
3	4	Financing Constraints	2024	0.05
4	2	Corporate Greenwashing	2024	0.03
5	2	"Greenwashing"	2023	0.01

Chapter Three:Analysis of ESG "Greenwashing" Abroad

3.1 Current Status of ESG "Greenwashing" Abroad

3.1.1 Highly Cited Literature

An analysis of the five most cited papers in the field of ESG "greenwashing" research abroad from 2012 to 2024 reveals the following:

The most cited paper is a 2012 article by Zhihong Wang and Joseph Sarkis, which examines whether companies have successfully implemented corporate social responsibility (CSR) governance to achieve positive CSR outcomes, significantly impacting corporate financial performance[6].

The second most cited paper is a 2020 article by Ellen Pei-yi Yu, Bac Van Luu, and Catherine Huirong Chen, which explores mechanisms to reduce corporate ESG "greenwashing" and develops metrics to measure corporate ESG "greenwashing"[7].

The third most cited paper is by Zhihong Wang, Tien-Shih Hsieh, and Joseph Sarkis, which studies the readability of corporate social responsibility reports and evaluates corporate social responsibility performance from environmental and social perspectives using ESG and KLD databases[8].

The fourth most cited paper, published in 2021 by Elizabeth Demers, Jurian Hendrikse, Philip Joos, and Baruch Lev, investigates how ESG did not provide immunity to stocks during the COVID-19 crisis but did offer protection to investments in intangible assets[9].

The fifth most cited paper, published in 2020 by Ali Uyar, Abdullah S. Karaman, and Merve Kilic, uses data from the logistics industry to study whether corporate social responsibility reports serve as a signaling tool or a "greenwashing" tool[10].

3.1.2 Highly Productive Authors

Based on a sample from the WOS database, the most prolific authors in the field of ESG "greenwashing" from 2012 to 2024 were identified. The top author, Zhang Dongyang, published five papers, while 16 other authors each published two papers, tying for second place. Key findings include:

The top two most prolific authors published a total of 37 papers from 2012 to 2024, accounting for 27.4% of the total publications, indicating that there is still significant room for further research in the field of ESG "greenwashing" abroad.

The institution with the most publications is Capital University of Economics and Business, with 18 papers related to ESG "greenwashing." It is followed by City University of Hong Kong with six papers, Rutgers University with six papers, University of Hong Kong with five papers, and Shenzhen University with three papers. These institutions collectively published 28.1% of the total literature, making them key academic centers in this field with substantial influence.

3.2 Overview of ESG "Greenwashing" Research Abroad

3.2.1 Keyword Co-occurrence Analysis

Using CiteSpace 6.3.R1 visualization software, the literature on ESG greenwashing was analyzed and represented as a knowledge map of keywords. This analysis helps in organizing related information, understanding research hotspots, and tracking the evolution of ESG "greenwashing" research. The timeline was set to one year, resulting in 203 network nodes, 501 links, and a network density of 0.0244, as shown in the keyword co-occurrence map of ESG "greenwashing" research abroad. The analysis reveals that the core keyword in international ESG "greenwashing" research is "corporate social responsibility," with secondary keywords including "ESG greenwashing," "performance," "environmental performance," and "disclosure."
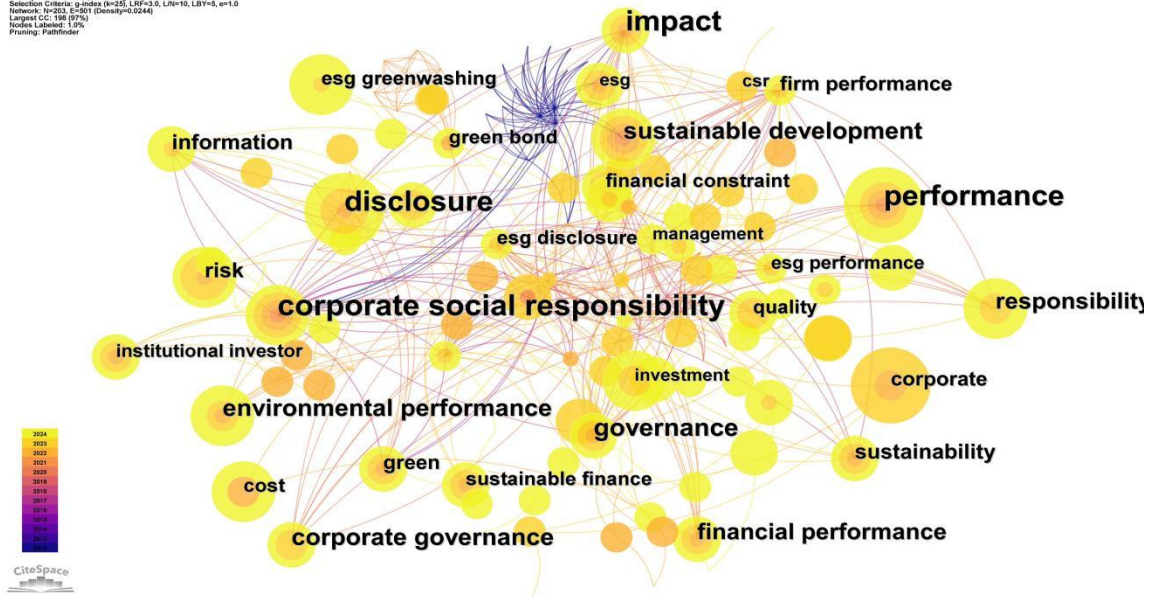
Figure 4. Co-occurrence Distribution of ESG "Greenwashing" Keywords Abroad (2012-2024)

3.2.2 Keyword Cluster Analysis

Using CiteSpace 6.3.R1 visualization software, a Log-Likelihood Ratio (LLR) cluster analysis was conducted on ESG "greenwashing" keywords abroad from 2012 to 2024. The results are shown in Figure 5. The LLR cluster analysis reveals that the Q value for ESG "greenwashing" abroad from 2012 to 2024 is 0.7075, significantly higher than the critical value of 0.3, indicating a high degree of association between the derived modules. Additionally, the S value is 0.9167, which is well above 0.7, suggesting that the cluster analysis has a high level of reliability.

The cluster analysis of ESG "greenwashing" research abroad yielded nine clusters: "#0 sustainable investments," "#1 esg disclosure," "#2 exxon-valdez," "#3 social and governance," "#4 mutual funds," "#5 climate change risk," "#6 financial constraints," "#7 green bonds," and "#8 stakeholder." The analysis indicates that there is still significant potential for further exploration and expansion in the field of ESG "greenwashing."
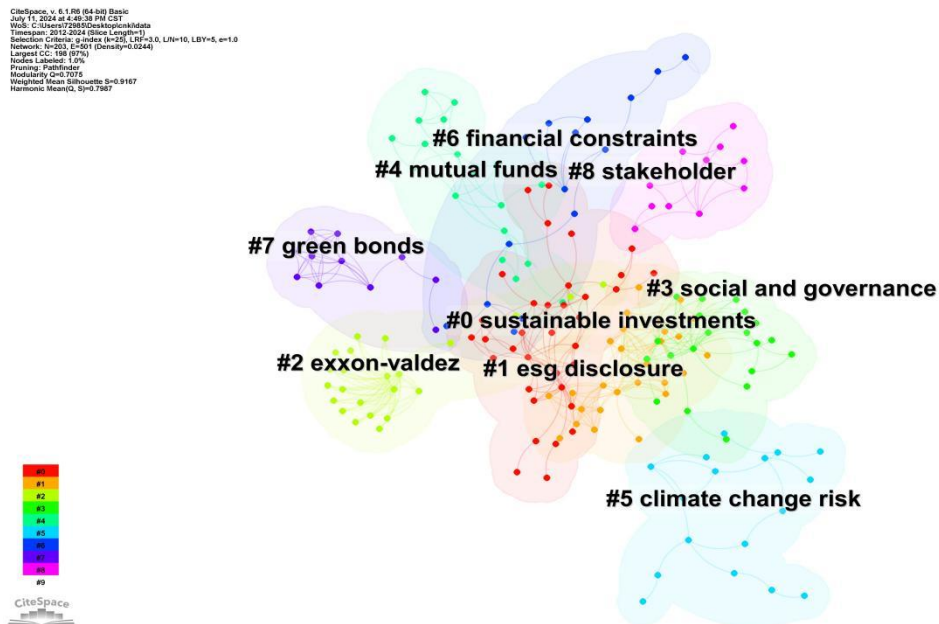
Figure 5. Keyword Cluster Analysis of ESG "Greenwashing" Abroad (2012-2024)

3.2.3 Keyword Timeline Analysis

To understand the evolution of keywords in the field of ESG "greenwashing," CiteSpace 6.3.R1 visualization software was used to create a timeline analysis of keywords from 2012 to 2024, as shown in Figure 6. The keyword timeline analysis for ESG "greenwashing" research abroad reveals that research from 2017 to 2024 is more concentrated, with a focus on topics such as "ESG disclosure," "impression management," "firm performance," "governance," and "impact." In contrast, research from 2012 to 2017 was more dispersed, primarily focusing on "corporate social responsibility." The analysis indicates that international scholars have a broad coverage of topics within the field of ESG "greenwashing."
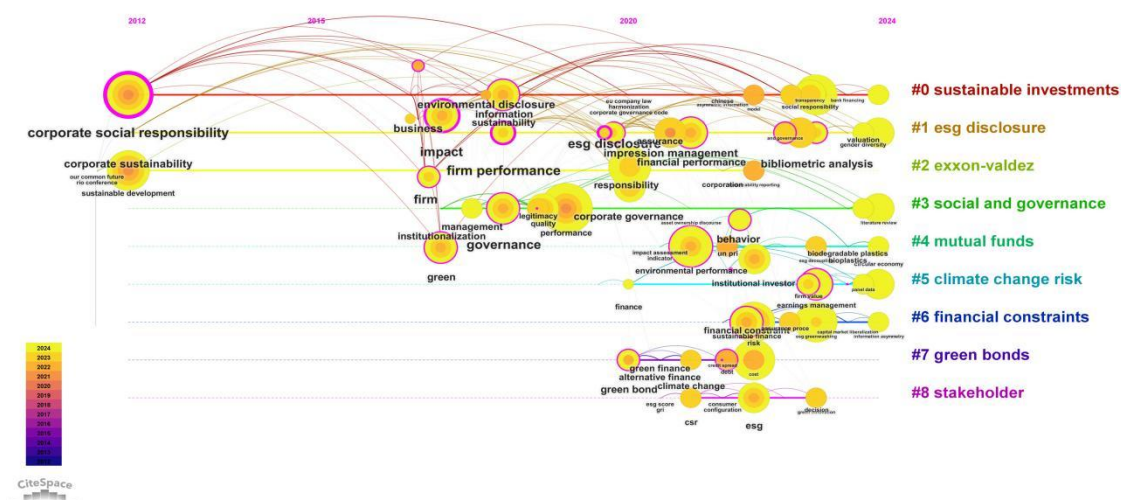
Figure 6. Timeline Analysis of ESG "Greenwashing" Keywords Abroad (2012-2024)

3.3 Overview of Research Hotspots on ESG "Greenwashing" Abroad

3.3.1 Keyword Frequency Analysis

To highlight the most frequently occurring keywords in the field of ESG "greenwashing" research abroad, Table 3 presents the distribution of the top five high-frequency keywords from 2012 to 2024. The table shows that the top five high-frequency keywords and their first appearance years are "corporate social responsibility" (2012), "disclosure" (2020), "performance" (2019), "impact" (2017), and "governance" (2018). These high-frequency keywords indicate that international experts and scholars are exploring ESG "greenwashing" by combining it with corporate social responsibility and information disclosure, laying a foundation for future in-depth discussions.

Table 3. Keyword Frequency Distribution in International ESG "Greenwashing" Research (2012-2024)

Sequence	Frequency	High-Frequency Keywords	First Appearance Year	Centrality
1	31	corporate social responsibility	2012	0.6
2	28	disclosure	2020	0.12
3	26	performance	2019	0.02
4	26	impact	2017	0.19
5	16	governance	2018	0.34

3.3.2 Keyword Burst Analysis

Keyword burst analysis provides a visual representation of the time distribution and sudden emergence of keywords, helping to pinpoint when certain keywords appeared and how they were used over time. Using CiteSpace 6.3.R1 visualization software, a burst analysis of ESG "greenwashing" research keywords from 2012 to 2024 was conducted, as shown in Figure 7.

The keyword burst analysis map highlights keywords that saw a sudden increase in literature within certain years, effectively showcasing the cutting-edge dynamics and development trajectories in the field of ESG "greenwashing." The analysis reveals the emergence of popular keywords related to ESG "greenwashing," such as "corporate sustainability," "perspective," "institutionalization," "industry," and "environmental disclosure." The keyword with the highest burst intensity is "corporate sustainability" (1, 2012-2021).

Top 25 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2012 - 2024
corporate sustainability	2012	1	2012	2021	
perspective	2017	1.33	2017	2018	
institutionalization	2017	1.28	2017	2019	
industry	2017	1.14	2017	2022	
environmental disclosure	2018	2	2018	2022	
management	2018	1.17	2018	2019	
board	2019	1.2	2019	2020	
green bond	2020	1.42	2020	2022	
determinant	2020	1.19	2020	2021	
corporate social responsibility	2012	1.66	2021	2022	
csr	2021	1	2021	2024	
corporate	2022	2.05	2022	2024	
cost	2022	1.52	2022	2022	
socially responsible investing	2022	1.07	2022	2022	
internet of thing	2022	1.07	2022	2022	
esg reporting	2022	1.07	2022	2022	
mutual fund	2022	1.07	2022	2022	
un pri	2022	1.07	2022	2022	
sustainability reporting	2022	1.07	2022	2022	
debt	2022	1.07	2022	2022	
model	2022	1.07	2022	2022	
climate change	2021	1.24	2023	2024	
mutual fund performance	2023	1.16	2023	2024	
strategy	2023	1.16	2023	2024	
legitimacy	2019	0.85	2023	2024	

Figure 7. Burst Analysis of ESG "Greenwashing" Keywords Abroad (2012-2024)

Chapter Four:Conclusion and Outlook

Using the scientific knowledge mapping method and CiteSpace 6.3.R1 software to create knowledge maps, supplemented with charts generated by Excel, this study reflects the basic development trajectory of ESG "greenwashing" research both domestically and internationally. In-depth analysis of related research has also been conducted to explore future directions in the field of ESG "greenwashing."

4.1 Conclusion

By thoroughly examining the core literature on ESG "greenwashing" research from 2012 to 2024 by domestic and international experts and scholars, we have provided a comprehensive overview of the current state and overall development trends in this field. The specific conclusions drawn are as follows:

First, from the analysis of core institutions publishing research on ESG "greenwashing," the top five institutions publishing in domestic journals are the University of the Chinese Academy of Social Sciences, Nankai University, Southwest University of Political Science and Law, Jinan University, and Xiamen University. In contrast, the top five institutions publishing in international journals are Capital University of Economics and Business, City University of Hong Kong, Rutgers University, University of Hong Kong, and Shenzhen University.

Second, from the perspective of research hotspots, domestic scholars mainly focus on keywords such as "greenwashing," "green finance," "financing constraints," and "corporate greenwashing." International scholars, on the other hand, focus on keywords like "corporate sustainability," "perspective," "institutionalization," "industry," and "environmental disclosure." There is a need to further strengthen interdisciplinary research on ESG "greenwashing."

4.2 Outlook

Building on the existing research on ESG "greenwashing" both domestically and internationally, future research can be developed in the following three areas:

First, explore mechanisms to reduce the impact of ESG "greenwashing" behaviors from multiple perspectives. Companies, recognizing the benefits of strong ESG performance, may exaggerate their environmentally friendly image in their communications. Future research could focus on identifying specific factors that reduce ESG "greenwashing."

Second, from an external regulatory perspective, there is a need to establish comprehensive ESG information disclosure systems and regulatory frameworks. Government regulatory agencies must oversee and standardize corporate ESG information disclosures. By aligning domestic ESG disclosure practices with international standards, improving transparency and regulatory norms, and encouraging the implementation of enforceable ESG disclosure regulations, companies will be better able to compare their ESG information across sectors, thereby strengthening their competitive edge.

Third, from within the company, there is a need to emphasize improving internal management systems and controlling environmental costs from various aspects, allowing the company to achieve greater benefits. Many companies lack a long-term vision and do not fully understand the implications of environmental costs, focusing only on visible issues related to environmental costs.

References

[1] Huang Shizhong. Greenwashing and Anti-Greenwashing in ESG Reports [J]. Finance and Accounting Monthly, 2022, (01): 3-11.

[2] Huang Shizhong. Writing a New Chapter in EU ESG Reporting: A Review from NFRD to CSRD [J]. Finance and Accounting Monthly, 2021, (20): 16-23.

[3] Chen Xiaoyan, Hong Feng. Corporate ESG Verification: Progress, Problems, and Reflections [J]. Chinese Certified Public Accountant, 2022, (09): 79-83+3.

[4] Hou Dongde, Wei Yajun. Constructing the ESG Information Disclosure Framework for Listed Companies: A Perspective Based on New Development Concepts [J]. Finance and Law, 2023, (05): 3-17.

[5] Zhang Dan, Ma Guotuan, Feng Yaxian. The Motivation, Identification, and Governance of Greenwashing in ESG Reports [J]. Friends of Accounting, 2023, (10): 103-108.

[6] Wang Z., Sarkis J. Corporate Social Responsibility Governance, Outcomes, and Financial Performance [J]. Journal of Cleaner Production, 2017, 162: 1607-1616.

[7] Yu E. P. Y., Luu B. V., Chen C. H. Greenwashing in Environmental, Social, and Governance Disclosures [J]. Research in International Business and Finance, 2020, 52: 101192.

[8] Wang Z., Hsieh T. S., Sarkis J. CSR Performance and the Readability of CSR Reports: Too Good to be True? [J]. Corporate Social Responsibility and Environmental Management, 2018, 25(1): 66-79.

[9] Demers E., Hendrikse J., Joos P. ESG Did Not Immunize Stocks During the COVID-19 Crisis, But Investments in Intangible Assets Did [J]. Journal of Business Finance & Accounting, 2021, 48(3-4): 433-462.

[10] Ali Uyar A., Karaman A. S., Kilic M. Is Corporate Social Responsibility Reporting a Tool of Signaling or Greenwashing? Evidence from the Worldwide Logistics Sector [J]. Journal of Cleaner Production, 2020, 253: 119997.