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A Bibliometric Analysis of Greenwashing and Firm Value

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ABSTRACT

Purpose – Greenwashing, traditionally a marketing concept, has gained increasing relevance in economics, finance, accounting, and law. As a result, bibliometric analyses on greenwashing have attracted growing scholarly interest. This study conducts a bibliometric analysis of the literature on greenwashing and firm value, identifying key trends, productive countries, institutions, influential authors, and collaborative networks while examining the relationship between greenwashing and firm value.

Design/methodology/approach – Data were collected from the Web of Science (WoS) database through systematic searches. The analysis includes 473 publications from 2003 to 2024 in disciplines such as environmental sciences, business, management, finance, communication, and ethics. Among these, 170 studies explicitly address both greenwashing and firm value.

Results – The findings indicate a substantial increase in research output, particularly after 2020, with nearly 50 publications per year by 2023. Sustainability, performance evaluation, and transparency emerge as dominant themes. While China leads in research output, European countries exhibit higher collaboration rates. Influential authors, such as Li W and Zhang D, and leading journals, including the Journal of Business Ethics, have significantly shaped the field. Thematic developments indicate a shift from management-centered discussions to a stronger emphasis on sustainability and financial performance.

Discussion – The study provides theoretical and practical insights into the impact of greenwashing on firm value, offering implications for managers, stakeholders, policymakers, and researchers. While greenwashing remains a relatively new research area, its scholarly attention is expanding rapidly. This study contributes by examining both greenwashing and its financial implications, particularly how stakeholders perceive greenwashing and its effects on firm value.

1. Introduction

In recent years, as the environmental effects of global warming and climate change have become increasingly visible, the evaluation of businesses' performance has come to emphasize the information disclosed in financial reports and sustainability disclosures. The demand from stakeholders for sustainability reporting is growing by the day. This shift entails reporting economic activities, performance outcomes, and the environmental, social, and governance-related impacts and potential effects caused by business models. However, one of the most significant risks in sustainability reporting is presenting what does not exist as if it does or creating misleading statements and images to appear better than reality. In the world of sustainability, this practice is known as "greenwashing." While traditionally recognized as a significant concept in marketing (Pendse et al., 2023), greenwashing has evolved beyond its marketing roots to become a relevant term in economics, finance, and law as well. Wolniak (2016) suggests that the term greenwashing emerged as a direct consequence of the development of sustainable development and corporate social responsibility (CSR) concepts. Within the realm of CSR, greenwashing often involves misleading stakeholders to attract more customers, enhance the

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company's image, or secure new investors. However, it does not necessarily involve violations of existing regulations or ethical and environmental social norms.

Lyon & Maxwell (2011) described greenwashing as the "selective disclosure of positive information regarding a company's environmental or social performance, while omitting negative information, to create an overly favorable image of the company (Lyon & Maxwell, 2011). Technically, "greenwashing" constitutes an activity that may qualify as an offense or crime requiring sanctions. In the corporate and financial sectors, the consequences of misleading stakeholders or consumers into making poor decisions through exaggerated claims are no different from market fraud. Deliberately creating information asymmetry and leading third parties to make adverse selections instead of acting according to principles of transparency and honesty and providing stakeholders or consumers with accurate information is considered a crime in economics and finance. If intent is absent, such actions are treated as misdemeanors. These actions not only have the potential to generate unjust gains but, if widespread, could have devastating effects on market integrity and the overall health of the market. The possibility of using the reports submitted by organizations in CSR, regardless of whether we are dealing with mandatory or voluntary reporting, largely depends on the reliability of the data presented in the report (Wolniak, 2016).

In response to the 2008/2009 financial crisis and decreased stakeholder trust, the European Commission launched reforms to improve corporate governance. The goal was to shift from a short-term focus on shareholder value to a more sustainable management approach that considers the interests of various stakeholders, such as customers and employees. A strong stakeholder management strategy is expected to improve environmental, social, and governance performance (ESGP) and could contribute to better financial performance (FINP). From a research standpoint, numerous empirical studies have examined the relationship between ESGP and FINP. Velte (2017) argues that ESGP is a combined measure resulting from various CSR activities. However, under growing pressure to report environmental impacts, some companies selectively disclose only minor impacts, giving the appearance of transparency while concealing their actual performance (Marquis et al., 2016). Efforts by companies with poor ESG performance to build a credible public image through ESG disclosures are referred to as greenwashing (Chen & Dagestani, 2023).

The greenwashing literature identifies three main types of greenwashing: Manipulative greenwashing, where companies exaggerate their social responsibility to engage stakeholders. Clarkson et al. (2008) investigate the relationship between environmental performance and environmental disclosure using a robust methodology. The study finds a positive correlation between environmental performance and discretionary environmental disclosure, aligning with the predictions of economics-based voluntary disclosure theories. These theories suggest that firms with superior environmental performance are more inclined to disclose voluntarily. In contrast, socio-political theories, such as legitimacy and stakeholder theories, propose a negative association, arguing that poor performers use disclosures to enhance their public image.

Selective greenwashing, a type of greenwashing where companies highlight positive environmental actions while hiding negative ones, creating a falsely favorable impression of their overall environmental performance (Lyon & Maxvell, 2011; Marquis et al., 2016).

The last one exterior greenwashing where firms attract external investors by presenting themselves as environmentally responsible (Lyon & Maxwell, 2008). Companies may engage in exterior greenwashing to address stakeholder demands (Vilchez et al., 2017) or actively manipulate stakeholder perceptions through greenwashing practices (Ferrón-Vílchez et al., 2021). Regardless of intent, businesses aim to secure stakeholder support by enhancing their social image. While corporate social and environmental issues are widely studied, research on greenwashing has largely focused on developed countries, with limited attention to its occurrence in developing nations (Chen & Dagestani, 2023).

Greenwashing is commonly regarded as a subfield of green marketing and has become an increasingly pressing issue. Despite its growing importance, limited bibliometric analysis exists, with most studies providing broad overviews rather than delving into specific aspects. The complexity and multidimensional nature of greenwashing have attracted attention from diverse disciplines, as it affects consumers and a wider range of stakeholders. This study addresses a gap in finance research by examining the relationship between greenwashing and firm value through a bibliometric analysis of publications from 2003 to 2024. The analysis

identifies trends and patterns, including productive countries, organizations, authors, and collaborative networks, while exploring the connection between greenwashing and firm value.

The study is structured as follows: the first section introduces the concepts of greenwashing and firm value with a literature review. The second section details the research methodology, including database selection and data preparation for descriptive and network analyses alongside the research questions. Finally, the third section presents conclusions, and offers directions for future research.

1.1. Literature Review

Amid mounting environmental pressures, companies increasingly disclose Corporate Social Responsibility (CSR) reports to showcase transparency and commitment to sustainable practices. However, Chen and Dagestani (2023) identify greenwashing as an emerging issue in corporate reporting, emphasizing the critical role of board. Their study highlights those factors such as female directors, age diversity, educational background, and shareholder aggregation mitigate greenwashing, while local directors and political connections tend to exacerbate it. The research concludes that greenwashing enhances firm value by improving disclosure quality, addressing stakeholder concerns, and easing financial constraints.

Purnamasari and Umiyati (2024) demonstrate that greenwashing has a notable positive impact on financial performance. Their findings suggest that companies use greenwashing to alleviate environmental pressure from stakeholders and enhance organizational legitimacy. The empirical results indicate that greenwashing can significantly boost firm performance.

Fu et al., (2024) analyze the relationship between corporate environmental governance (CEG) and firm value from short- and long perspective and the findings of the study revealed that there is no correlation between CEG and firm value.

Teti et al., (2024) investigate on the presence of market reactions to media announcements in the days after the publication of greenwashing news and observed whether the companies with different corporate environmental performance were differently affected by the greenwashing news. According to study greenwashing announcements have little to nonexistent effect on company cumulative abnormal return in the days following the publication and that corporate environmental performance is a not a differentiating factor.

Zhi et al., (2024) investigated the influence of investor attention on corporate greenwashing. The study's moderation analysis indicates that improving internal controls and increasing environmental subsidies can amplify the suppressive impact of investor attention on greenwashing practices. Additionally, the heterogeneity analysis reveals that this inhibitory effect is more pronounced in state-owned enterprises and firms experiencing significant financing constraints.

Laufer (2023) defines corporate "greenwashing" as a form of corporate disinformation, suggesting that the issues and challenges involved in achieving fair and accurate corporate social reporting are similar to those encountered in ensuring corporate compliance with legal requirements.

Li et al., (2022) found that greenwashing positively impacts corporate financial performance (CFP), although this effect diminishes under stringent environmental regulations and reverses when media favorability is low. The findings suggest that stakeholders often struggle to detect greenwashing in emerging economies characterized by high information asymmetry. However, robust local environmental regulations and unfavorable media coverage can help reduce this asymmetry, making greenwashing more easily identifiable.

Wu et al., (2020) explore the impact of information transparency on a firm's strategies and social welfare, identifying both the positive and negative aspects of greenwashing. The study finds that low transparency encourages profit-driven firms to engage in greenwashing through visible investments. While greenwashing hinders consumers from making informed purchasing decisions, it also increases CSR spending. On the other hand, sufficiently high transparency eradicates greenwashing. It incentivizes socially responsible firms to make additional visible investments to respond to the threat of greenwashing by profit-driven firms. However, as transparency rises, this further investment tends to decline.

Testa et al., (2018a) examine how various environmental communication strategies affect firm value and operating performance, drawing on a panel of 3490 publicly traded companies across 58 countries and 19

industries. Their findings reveal that greenwashing offers no financial advantage, while brownwashing is linked to poorer financial performance.

Testa et al., (2018b) emphasize that while institutional pressures typically promote the adoption of proactive environmental practices, stakeholder influence can either facilitate genuine integration or lead to superficial implementation. For instance, pressure from suppliers and shareholders tends to drive meaningful corporate greening, whereas pressure from customers and industrial associations often fosters greenwashing.

Parguel et al., (2011) found that experimental results highlight the negative impact of a low sustainability rating on corporate brand evaluations in the context of CSR communication. This is because consumers attribute fewer intrinsic motives to the brand. Consequently, sustainability ratings have the potential to discourage greenwashing and motivate ethical companies to maintain their CSR efforts.

2. Research Methodology

As stated in Pritchard's (1969) study, bibliometric analyses are now clearly applied in all studies aiming to quantify written communication processes, and it is evident that this method has gained widespread acceptance within the field of information science. In recent years, there has been a growing focus on bibliometric analysis in the context of greenwashing. Studies by Lin et al., (2024), Pendse et al., (2023), Goyal et al., (2023), Andreoli et al., (2017), and Nagy-Kercso and Kontor (2024) have conducted comprehensive bibliometric analyses to trace the evolution of greenwashing within the field. Montero-Navarro et al., (2021) explored greenwashing literature in agriculture, the food industry, and food retail, while Kishan and Azhar (2024) provided a bibliometric analysis of greenwashing in sustainability reporting. Sneideriene and Legenzova (2024) focused on greenwashing prevention in ESG disclosures, and Sundarasen et al., (2024) presented an overview of greenwashing in the context of sustainability reporting. Ziabina et al., (2024) utilized bibliometric analysis to examine how the level of greenwashing influences the development of a country's brand.

This study also employs bibliometric analysis, utilizing numerical and visualization techniques, to further extend the literature on greenwashing. Its unique contribution lies in examining the relationship between greenwashing and firm value.

2.1. Research Objectives and Questions

The growing significance of greenwashing and its implications on firm value has drawn attention from researchers across various disciplines, such as economics, business, marketing, and finance. Despite this interest, there remains a gap in the literature concerning the bibliometric analysis of studies that specifically explore the relationship between greenwashing and firm value. This study seeks to address this gap by employing a bibliometric approach to analyze the trends, patterns, and contributions within this emerging field. The following research questions are addressed in this bibliometric analysis.

RQ1: What are the historical trends and patterns in research on greenwashing and firm value based on publication volume, citations, and key milestones?

RQ2: Which journals are most frequently chosen for publishing research on greenwashing and firm value, and what are their key characteristics (e.g., disciplines covered)?

RQ3: Which regions or countries contribute most to research on greenwashing and firm value?

RQ4: What are the key themes and topics emerging in research on greenwashing and firm value, as identified through keyword analysis?

RQ5: What are the common authorship patterns and collaborative research networks in studies addressing greenwashing and firm value?

The main goal of this study is to offer a comprehensive overview of academic publications indexed in the WoS database by examining the research landscape, highlighting the most influential works and contributors, and identifying gaps and opportunities for future research.

2.2. Data Collection

The bibliometric study begins with process design. Following this, the next phase involves data collection, which is divided into three sub-stages. The first sub-stage is data retrieval, where the Web of Science database was chosen due to its comprehensive access to resources such as reference and citation data from academic journals, conference proceedings, and other multidisciplinary documents. Relevant keywords were identified, articles were listed, abstracts were reviewed, and suitable articles were manually selected. The second sub-stage involves loading the data and converting it into a format suitable for the bibliometric tools used. The third sub-stage is data cleaning, where duplicated and misspelled elements are identified and removed to ensure the data's quality (Aria and Cuccurullo, 2017). The flowchart of data collection process is shown below:

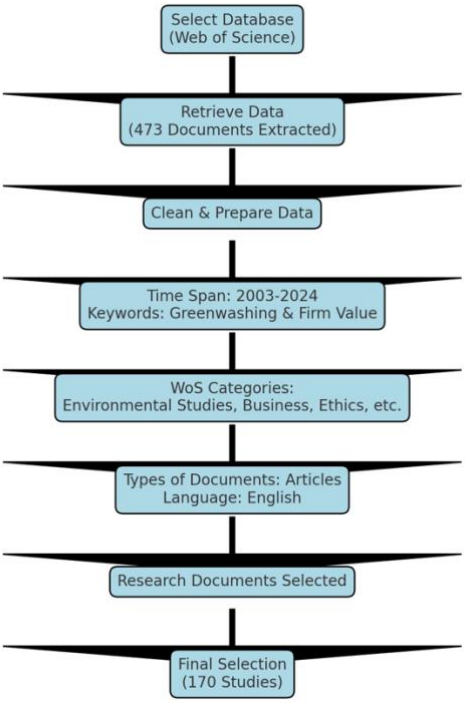

Figure 1. Flowchart of document selection for bibliometric analysis

The software tools utilized in this study include VOSviewer, which is widely used for bibliometric analysis and science mapping through the graphical representation of bibliometric maps (Aria and Cuccurullo, 2017). Additionally, the Bibliometrix R-package, written in the R programming language, was employed for its extensive capabilities in quantitative research in bibliometrics and scientometrics. Furthermore, Biblioshiny, a web-based application that accompanies the Bibliometrix package, was also used in this study.

2.3. Data Analysis and Findings

This study utilized both descriptive and network analysis methods. Descriptive analysis offers a comprehensive literature overview, covering aspects such as publications, authors, journals, key themes, and topics. Network analysis enhances this by visualizing research collaboration patterns, citation networks, keyword co-occurrence, and collaborative relationships between institutions or countries. In summary, while descriptive analysis provides a snapshot of key statistics within the research field, network analysis explores the relationships and interactions between research entities, offering more profound insights into how knowledge is created and disseminated (Pendse et al., 2023).

2.3.1. Descriptive Analysis

This section of the study outlines the different aspects of the descriptive analysis conducted. First, the graphs extracted from 170 articles will be presented, followed by detailed explanations to interpret and provide context for the data displayed.

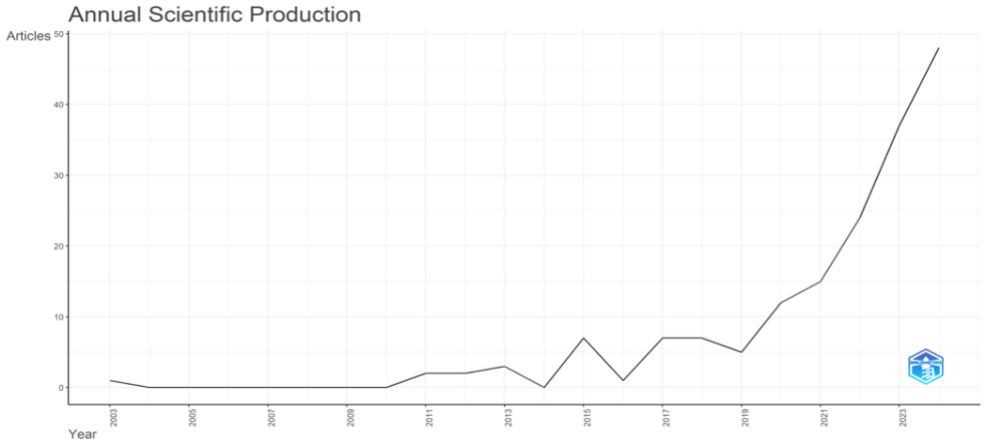

Figure 2. Annual Scientific production / evolution of the scientific production. Source: Biblioshiny

Annual scientific production: Figure 2 illustrates the annual progression in scientific publications over the years. Analyzing the graph reveals that initial interest in the research field was minimal, with almost no publications appearing before the early 2010s. However, starting around 2015, the field experienced a fluctuating yet generally upward trend in academic output. Notably, after 2020, the number of publications surged significantly, with the annual count nearing 50 by 2023. This rapid growth in recent years highlights the development of the field and its increasing appeal within the scientific community.

The progression of research development can be categorized into four distinct phases (Low and Siegel, 2020):

- Precursor stage
- Phase of exponential growth
- Consolidation of the body of knowledge
- Decline in the volume of published articles

Pendse et al., (2023), highlights that greenwashing practices are currently growing exponentially. A notable surge in greenwashing-related research was observed from 2007 to 2020. According to Montero Navarro et al. (2021), the period following 2015 marked a significant rise in the prominence of the greenwashing phenomenon.

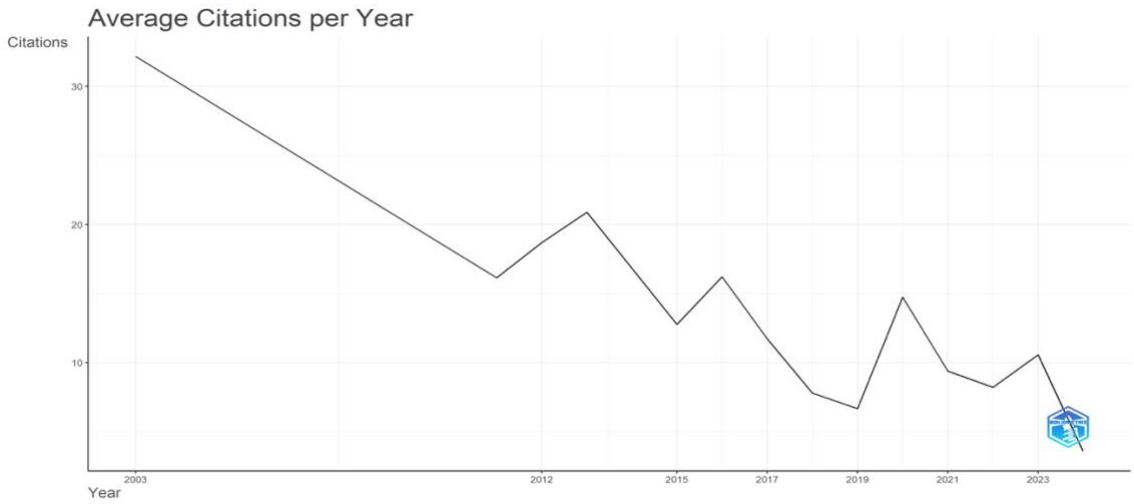

Figure 3. Annual Scientific production / evolution of the scientific production. Source: Biblioshiny

Average citations: In 2003, a single article achieved a significant impact, garnering 708 citations in total and maintaining an annual average citation rate exceeding 30. However, this performance was not sustained in subsequent years. Between 2011 and 2013, the average yearly citations remained relatively stable, ranging from 16 to 20. A notable downward trend began in 2015 and accelerated after 2019, with the average annual citations declining to 6.67 and reaching a low of 3.58 by 2024. This decline could be attributed to several factors, such

as the relatively recent publications not yet fully integrated into the literature, a wider distribution of citations due to the growing number of publications, or a decreased academic interest in the topic.

The initial part of the analysis addressed the first research question by examining publication trends over the years and identifying citation metrics to highlight the most cited publications by year: "RQ1: What are the historical trends and patterns in research on greenwashing and firm value based on publication volume, citations, and key milestones?"

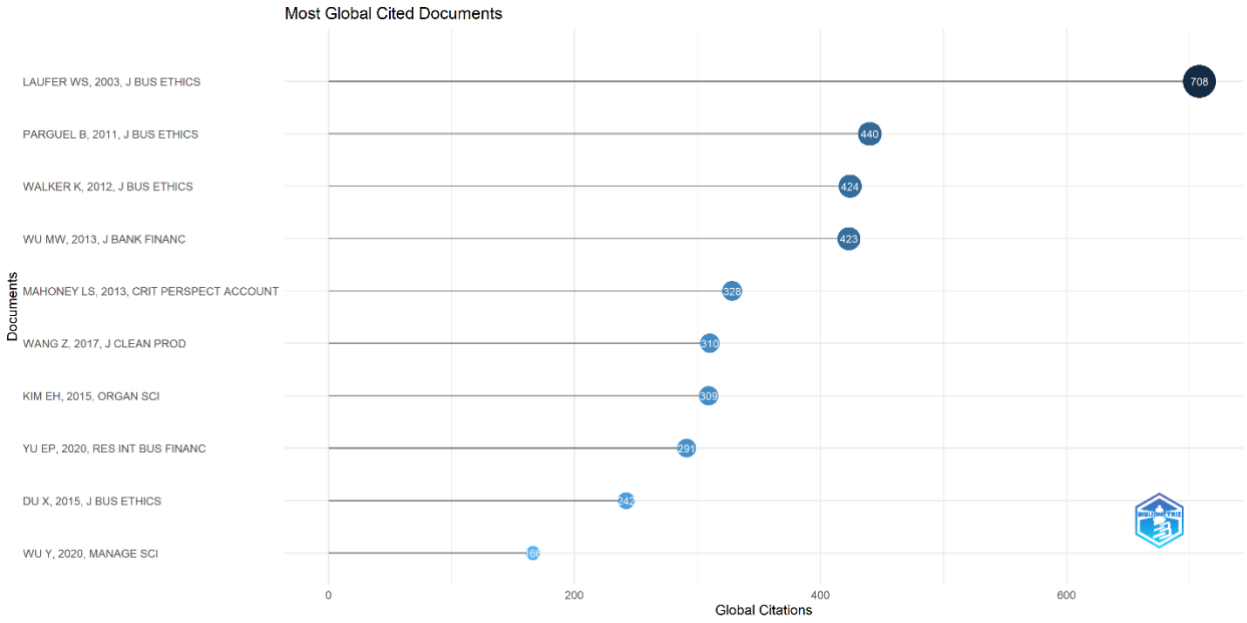

Figure 4. Top 10 most cited articles. Source: Biblioshiny

Most cited articles: The graph illustrates the most cited academic articles based on their total citation counts. Laufer WS's (2003) study published in the Journal of Business Ethics is the most highly cited, with 708 citations. This study is followed by Parguel B's (2011) article, which garnered 440 citations. The remaining articles have comparatively fewer citations, a distinctly visible decline in the graph. At the bottom of the list is Wu Y's (2020) study published in Management Science, with 166 citations, making it the least cited article among those analyzed. By visualizing the citation distribution, the graph highlights these studies' relative impact and significance within their respective fields.

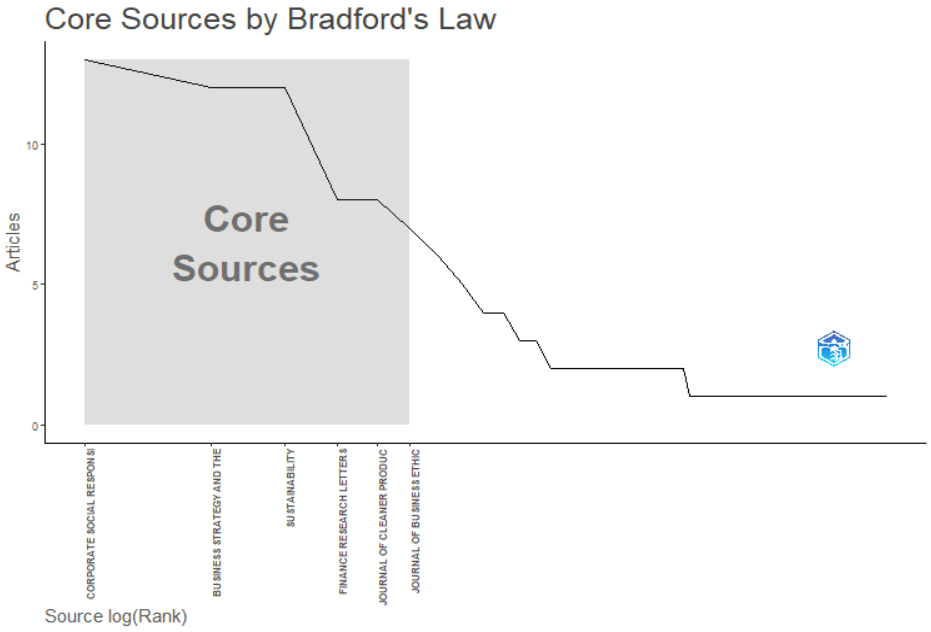

Figure 5. Most Relevant Journals. Source: Biblioshiny

Most relevant sources: The analysis based on Bradford's Law highlights the numerical distribution and influence of key information sources within a specific field. As illustrated in the graph, the "Core Sources" represent the journals that contribute the highest volume of articles and offer the most excellent information density. Notably, journals such as Corporate Social Responsibility and Environmental Management, Business Strategy, and the Environment, and Sustainability emerge as the leading sources, underscoring their significance as primary information hubs for researchers in the field.

The data presented in the graph indicate that Zone 1 (core zone) encompasses the most significant sources in the literature, characterized by the highest number of published articles. The journals within this zone are among the researchers most frequently referenced and cited. Zone 2 consists of journals that, while contributing fewer articles, remain valuable sources of information. This analysis offers a critical perspective for identifying the primary journals utilized in academic research and their standing within the broader literature.

The graph highlights the leading academic sources in the field based on the number of published documents. Corporate Social Responsibility and Environmental Management emerge as the top source, while journals like Business Strategy and the Environment and Sustainability are key research publishers in this domain. Finance Research Letters and the Journal of Cleaner Production hold notable positions in the mid-tier rankings, with the Journal of Business Ethics maintaining its influence. These findings demonstrate that specific journals play a prominent role in sustainability and corporate responsibility literature, serving as primary information sources for academic studies.

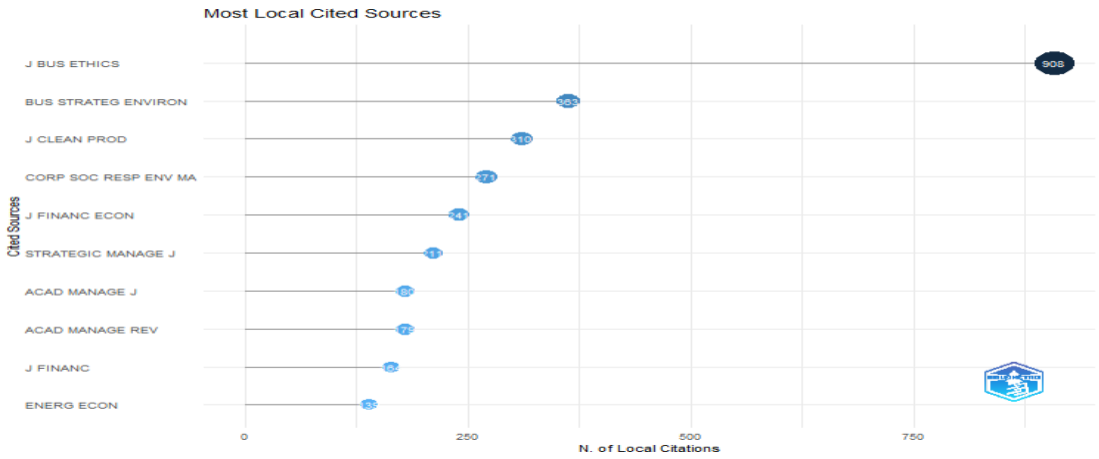

Figure 6. Most Local Cited Sources. Source: Biblioshiny

Most cited sources: The graph highlights the most locally cited academic sources based on citation counts. The Journal of Business Ethics leads significantly with 908 local citations, establishing itself as the primary reference for studies in this field. It is followed by Business Strategy and the Environment, which has 383 citations, and the Journal of Cleaner Production, which has 310 citations, key resources on sustainability and business strategies. Corporate Social Responsibility and Environmental Management and the Journal of Financial Economics contribute meaningfully, albeit with fewer citations. These findings underscore the most frequently referenced sources in academic research on ethics, sustainability, and financial analysis, offering insight into the foundational literature in the field.

The second part that includes the analysis of most cited articles, most relevant sources and most cited sources addresses the second research question: "RQ2: Which journals are most frequently chosen for publishing research on greenwashing and firm value, and what are their key characteristics (e.g., disciplines covered)"

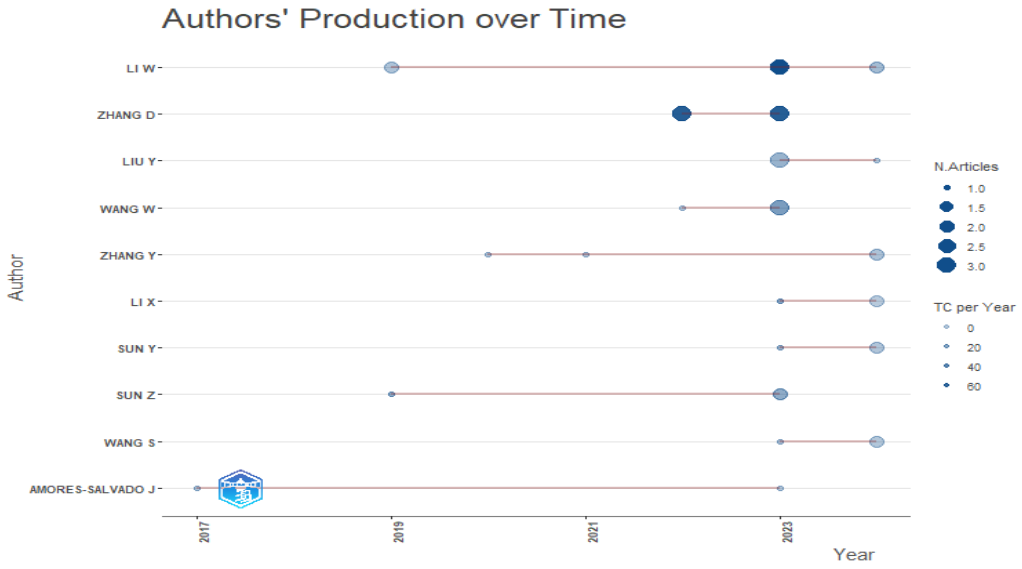

Figure 7. Authors' Production over Time. Source: Biblioshiny

Most relevant authors: The graph analyzes specific authors' academic productivity and annual citation performance over time. Li W and Zhang D emerge as the most productive authors, with yearly high citation rates. Li W demonstrated significant academic productivity starting in 2021, and his articles received substantial citations. Similarly, Zhang D stands out for his productivity and citation performance, particularly in recent years. The size of the bubbles reflects the number of papers each author published. At the same time, the color intensity indicates the average annual citation, highlighting the substantial impact of Li W's and Zhang D's work. Other authors published in certain years but showed lower productivity and citation performance. These findings illustrate the contributions of key authors to the literature and the intensity of their academic activity over time.

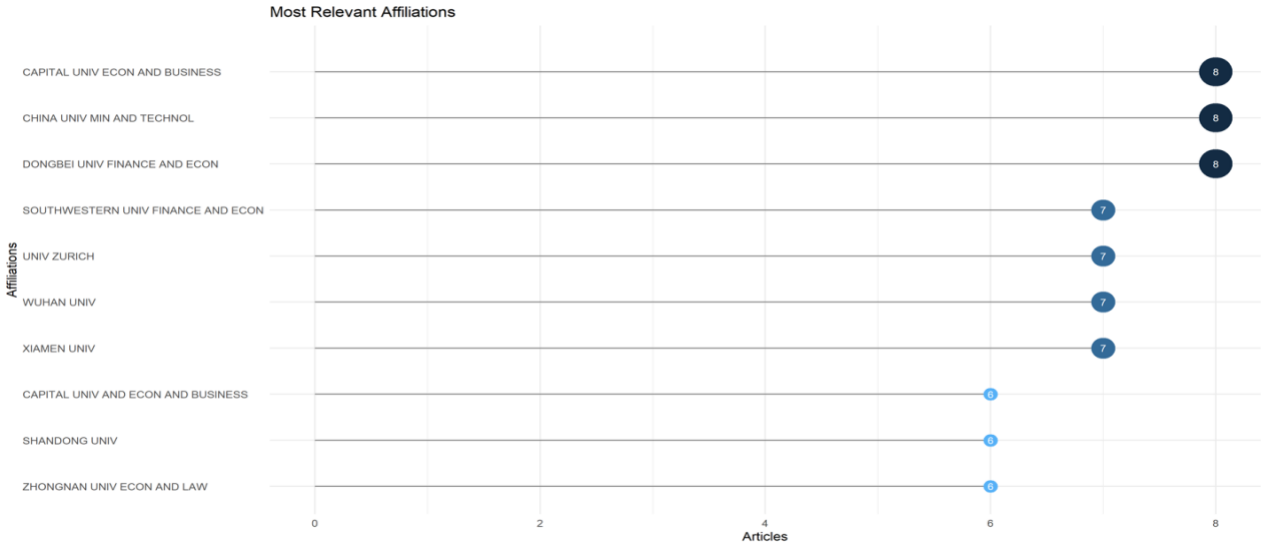

Figure 8. Most Relevant Affiliations. Source: Biblioshiny

Most relevant affiliations: According to the graph, the top institutions publishing the most articles are the Capital University of Economics and Business, China University of Mining and Technology, and Dongbei University of Finance and Economics, each contributing eight articles. They are followed by Southwestern University of Finance and Economics, University of Zurich, Wuhan University, and Xiamen University, each with seven articles. Other notable institutions include the Capital University of Economics and Business, Shandong University, and Zhongnan University of Economics and Law, each with six articles. This distribution highlights that Chinese universities lead in research productivity, making significant academic contributions, particularly in economics, finance, and business management. The University of Zurich in

Switzerland also emerges as a key contributor outside China. The academic culture, funding sources, or governmental priorities may be the drivers behind the high productivity of Chinese institutions.

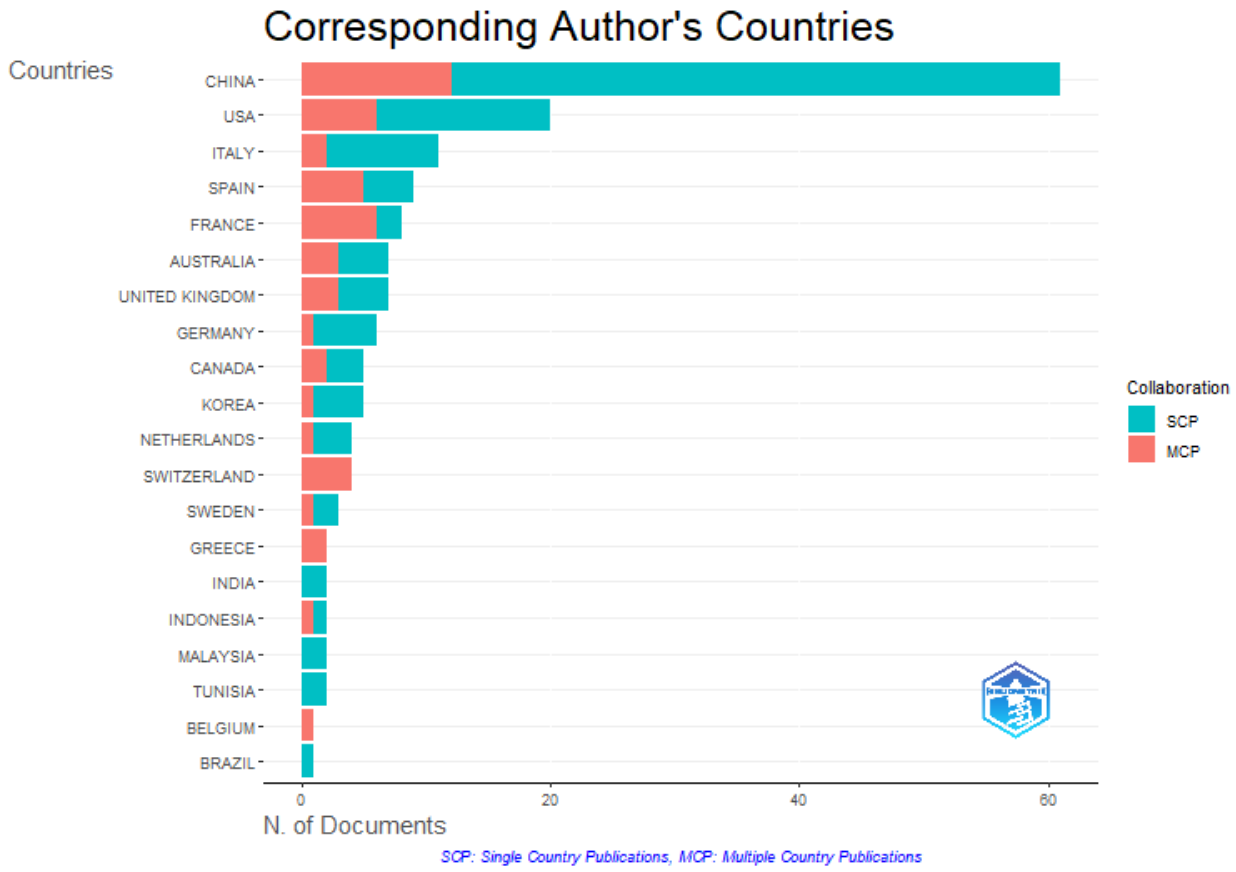

Figure 9. Top 20 countries of publication based on SCP and MCP. Source: Biblioshiny.

Country publications: The graphical data shows that China has the highest contribution among the countries contributing to research articles, with 35.67 percent and 61 articles. The USA follows China with 20 papers, Italy and Spain with 11.69% and 6.43%, respectively, and 5.26% of the total contribution. France has a high multi-author collaboration rate of 75%, while Spain and Canada stand out in multi-authored articles with 55.56% and 40%, respectively. While China and the USA stand out in single-authored articles, the high rates of multi-authored collaborations in countries such as Spain, France, and Canada indicate that these countries adopt a collaborative approach to research. In summary, while China and the USA are the leaders in individual contributions, multi-authored collaborations are more prominent in many European countries and Canada.

According to the graphical data, among the countries that contributed to the research articles, China made the highest contribution with a rate of 35.67% and 61 articles. Most of China's 49 articles were carried out as single-country cooperation, while only 12 were carried out as multi-country cooperation. The USA ranks second with 20 articles, and 30 percent of its articles are multi-country collaborations. Italy (11 articles), Spain (9 articles), and France (8 articles), which are among the other notable countries, contribute less compared to China and the USA, but 75% (6 articles) of France's articles stand out as multi-country cooperation (MCP). Spain (55.56 percent) and Canada (40 percent) are noteworthy for their multi-country collaboration articles, while countries such as Australia, the UK, and Korea also have MCP rates. These data show that China and the USA stand out in studies based on single-country cooperation, whereas countries like Spain, France, and Canada prefer multi-country collaborations more.

The third part of the descriptive analysis that includes the authors, affiliations and countries addresses the third research question: "RQ3: Which regions or countries contribute most to research on greenwashing and firm value?"

2.3.2. Network analysis

Bibliometric networks can be graphically visualized or modeled, utilizing various methodologies depending on the unit of analysis, such as sources, authors, and keywords. These networks are composed of nodes connected by links, and statistical analysis is performed on the generated maps to highlight different network metrics (Aria and Cuccurullo, 2017).

Network analysis identifies three types of structures: conceptual, intellectual, and social. These structures are derived through scientific mapping enabled by network analysis (Pendse et al., 2023). The intellectual structure focuses on uncovering the knowledge base of a topic or research field, the conceptual structure examines the research front of a topic or field, and the social structure maps the social network of a specific scientific community (Aria and Cuccurullo, 2017). This component of bibliometric analysis seeks to illustrate the structure and dynamics of scientific fields (Aparicio et al., 2019).

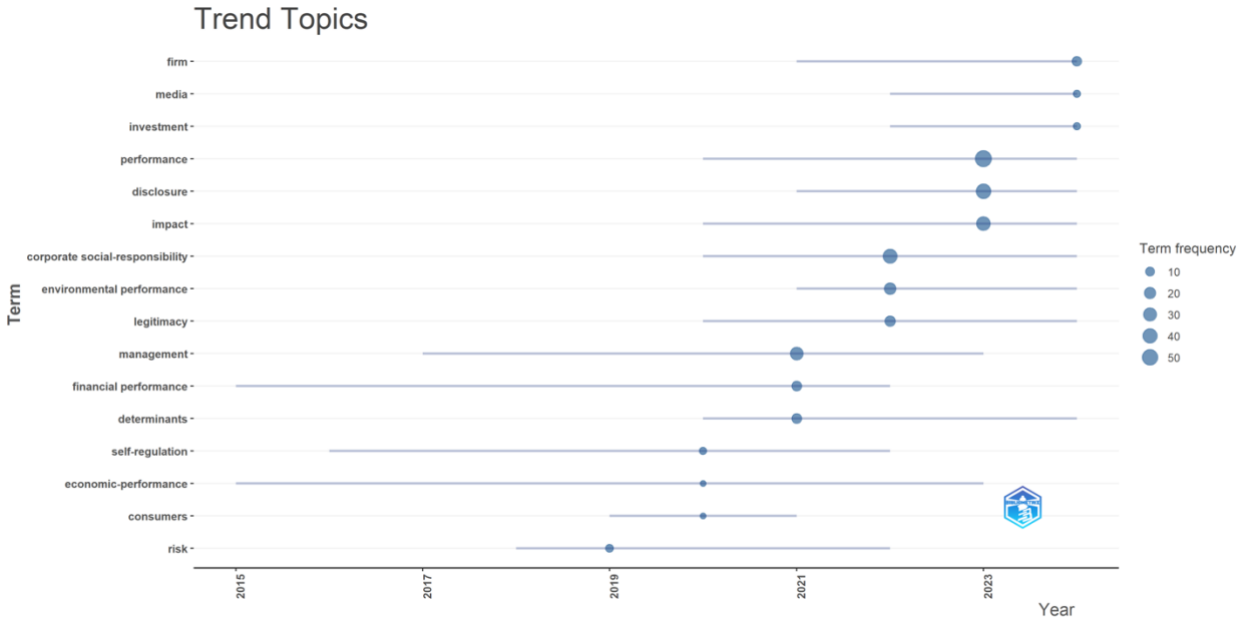

Figure 10. Trend Topics. Source: Biblioshiny.

Trend topics: Figure 10 highlights that terms like "performance," "disclosure," and "impact" were among the most frequently used in 2023, showing a consistent rise in usage since 2019. Similarly, "corporate social responsibility" and "environmental performance" have recently gained prominence, becoming key topics in the literature. The size of the bubbles reflects the frequency of term usage, while the horizontal lines depict their temporal spread. Additionally, terms like "management," "legitimacy," and "financial performance" have risen in significance over specific periods, securing a notable place in academic discussions. These findings suggest that sustainability, performance evaluation, and transparency have garnered substantial attention and emerged as trends in recent scholarly work.

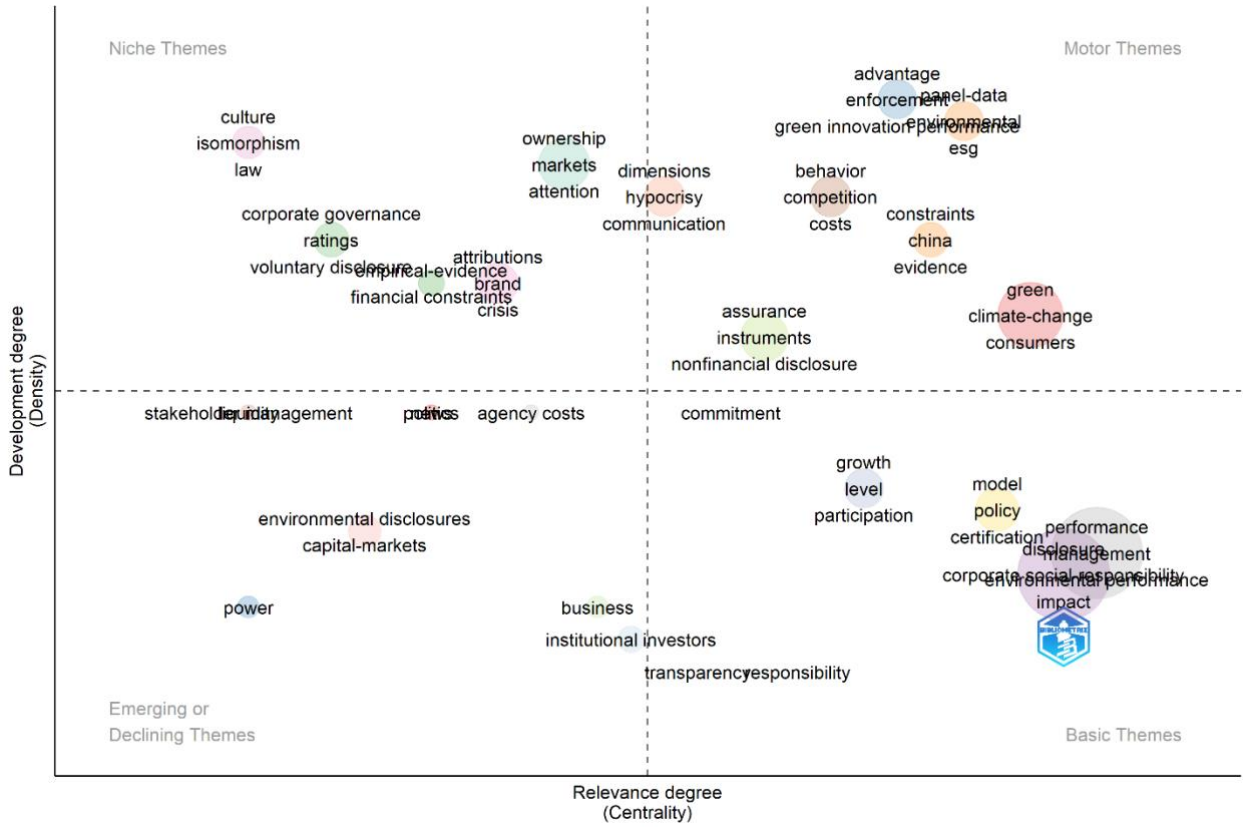

Figure 11. Representative Strategic Diagram. Source: Biblioshiny.

Thematic evolution: Thematic evolution provides a comprehensive overview of how a field develops over time by dividing the entire timeframe into distinct periods. The centrality and density of keywords, along with the core themes of the field, play a crucial role in shaping the progression of the research area (Pendse et al., 2023).

Figure 11 shows a strategic diagram in which themes are divided into four main categories according to their relevance and development degrees. Motor Themes, top right, have high centrality and sophistication and are the main driving force in studies; for example, topics such as "green innovation," "performance," and "ESG" have an essential and strong presence in the literature. Niche Themes, top left, include themes with high sophistication but low centrality and are necessary for more specific and in-depth research; for example, "corporate governance" and "voluntary disclosure" are in this category. Basic Themes on the bottom right are high centrality but low sophistication and form the basic building blocks of the literature; "corporate social responsibility," "policy," and "impact" are in this group. Emerging or Declining Themes on the lower left include themes with low centrality, low sophistication, and either emerging or declining importance; topics such as "environmental disclosures" and "stakeholders" are in this group. This graph is an essential tool for analyzing the significance and developmental stages of themes in the academic literature.

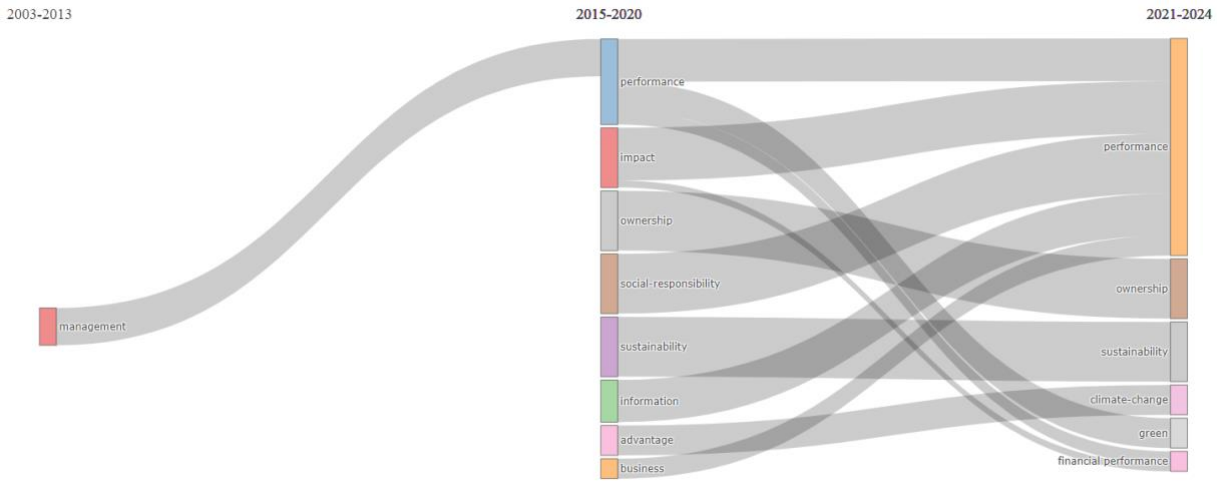

Figure 12. Thematic Evolution. Source: Biblioshiny.

Thematic evolution- Three field plot: Figure 12 illustrates the evolution of prominent themes in academic literature over three distinct periods: 2003–2013, 2015–2020, and 2021–2024. During 2003–2013, "management" emerged as the most dominant theme, linked to topics like "performance," "impact," and "social responsibility" in subsequent periods. Between 2015 and 2020, themes such as "performance" and "sustainability" gained prominence, marking a shift in focus within the literature. In the 2021–2024 period, while "performance" remains a strong theme, increased attention is directed toward topics such as "sustainability," "climate change," and "financial performance." This progression highlights a transition in academic studies, moving from a primary focus on management toward themes of performance and sustainability, with a growing emphasis on climate change and financial performance in recent years. It underscores how the literature's focal points have evolved.

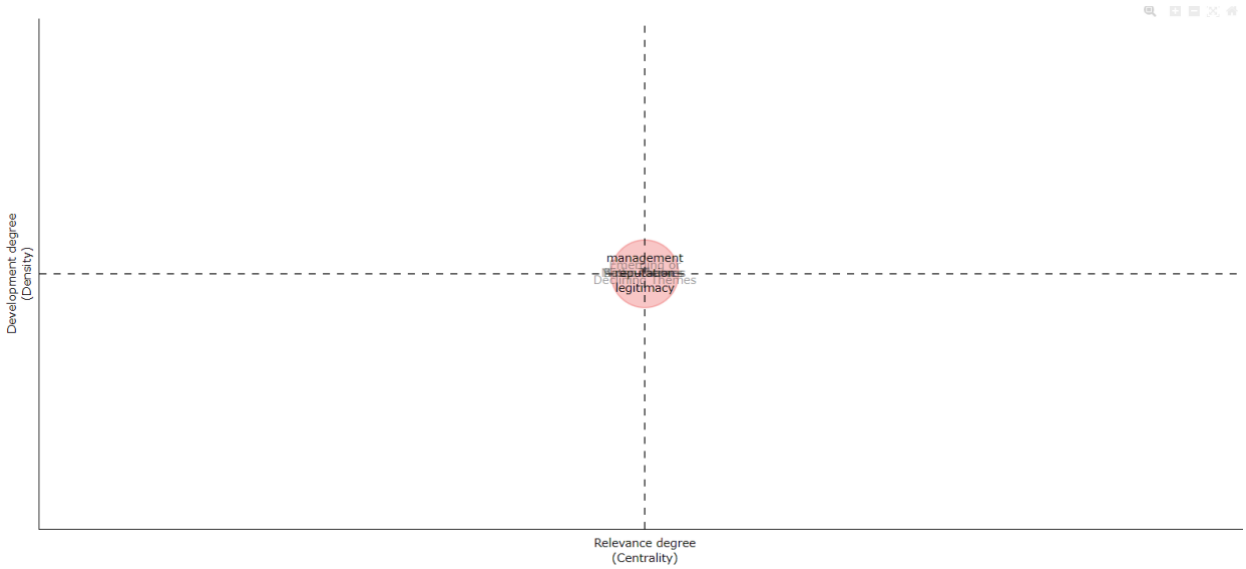

Figure 13. Representative Strategic Diagram (2003-2013). Source: Biblioshiny.

The first period's graph illustrates a thematic structure based on relevance and development, with most themes positioned at a moderate level. During this period, "reputation," "management," and "legitimacy" emerged as focal points, displaying average levels of both centrality and development. Even though these topics began to gain significance in the literature, they had not yet evolved into fully established main themes.

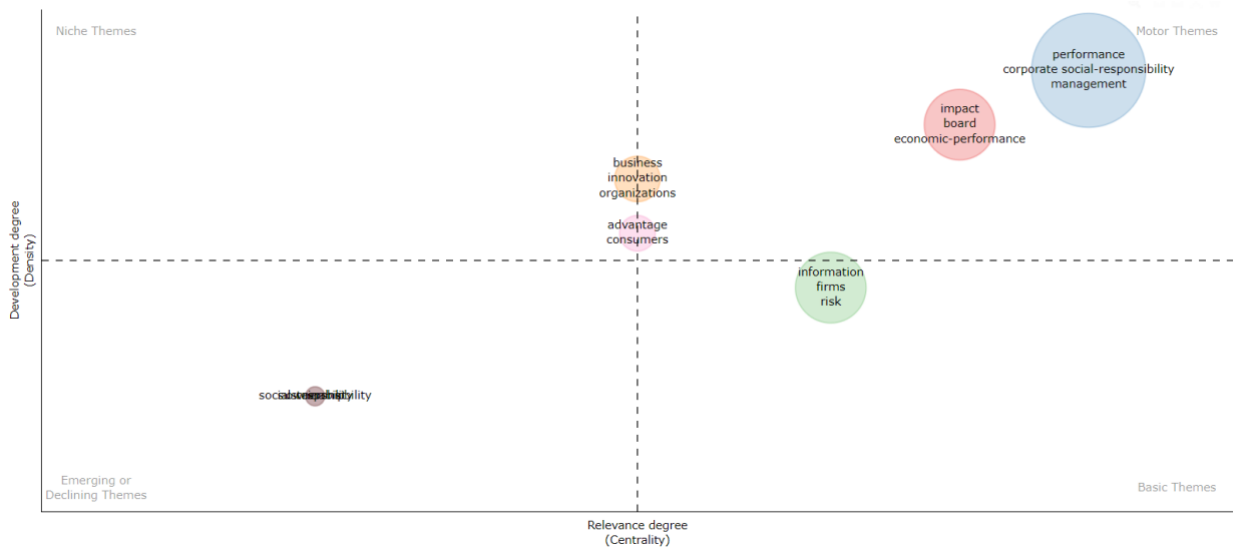

Figure 14. Representative Strategic Diagram (2015-2020). Source: Biblioshiny.

During the second period, themes such as "performance," "corporate social responsibility," and "management" emerged as dominant motor themes, characterized by high levels of centrality and development. These topics gained significant prominence in academic literature during this period, serving as key research drivers. While "social responsibility" appears to have declined or diminished in importance, themes like "business" and "innovation" are categorized as moderately developed niche themes.

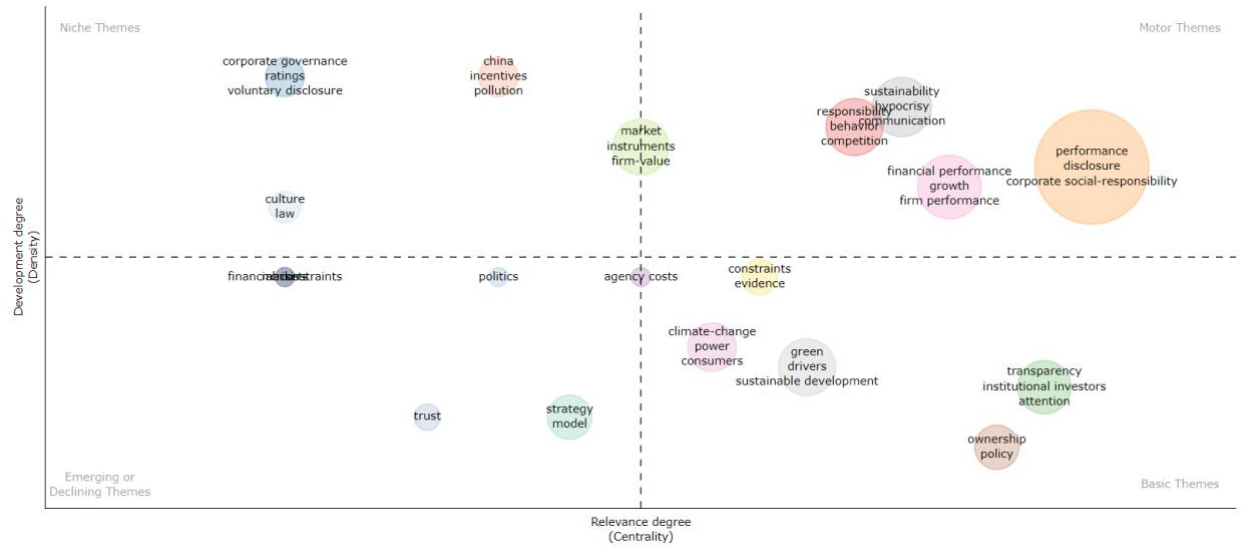

Figure 14. .Representative Strategic Diagram(2020-2024). Source: Biblioshiny.

In the third period, "performance," "disclosure," and "corporate social responsibility" emerged as the most prominent motor themes, reflecting their central role and intense focus in academic studies during this phase. Themes like "corporate governance" and "voluntary disclosure" ranked highly in the niche themes category, indicating they were the subject of specialized, in-depth research. Meanwhile, core themes such as "transparency" and "institutional investors" demonstrated low levels of development but high centrality, suggesting these topics hold significant potential for future exploration and advancement.

Thematic map, thematic evolution, three field plot analysis addresses the fourth research question “RQ4: What are the key themes and topics emerging in research on greenwashing and firm value, as identified through keyword analysis?”

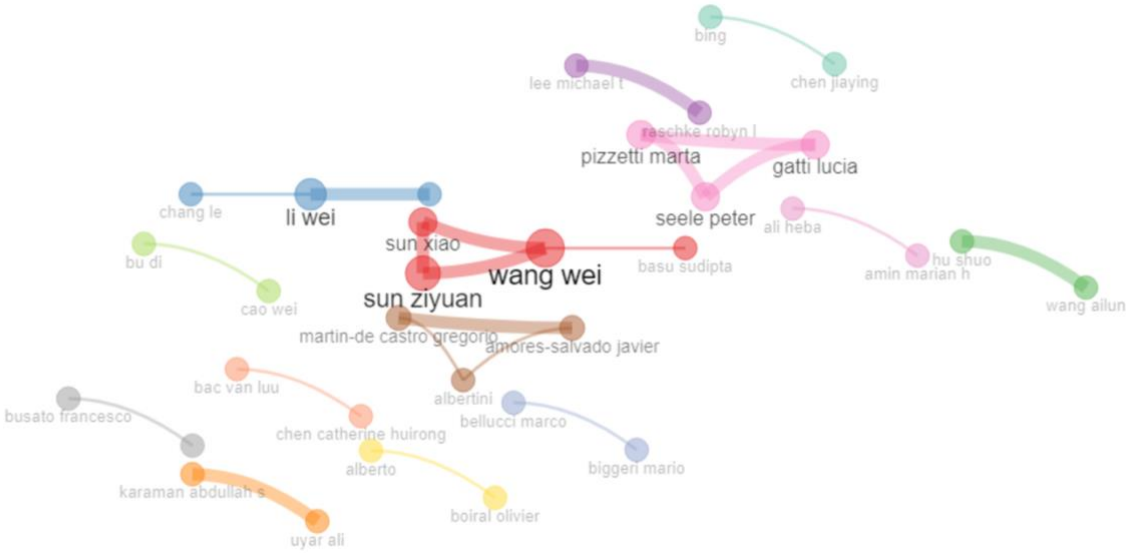

Figure 15. Co-authorship network. Source: Biblioshiny.

Co-authorship network: The graph depicts the dynamics of author collaboration within the network. "Wang Wei" and "Sun Ziyuan" emerge as the central figures, showing high centrality and an extensive network of collaborations. The colored subgroups represent different research fields, illustrating a collaboration structure that reflects the author's areas of expertise. The limited connections between these subgroups suggest weak interdisciplinary interactions, implying that much scientific work remains within specific research groups. However, the central authors act as bridges between these groups, promoting the flow of information and scientific exchange. These findings are essential for understanding the impact of network structure on scientific productivity and enhancing collaboration strategies.

Research collaboration seems to be especially notable when co-authors are separated boundaries, e.g., disciplinary, economic, institutional, generational, gender, national, ethnic, academic and also rank (Ponomariov, 2016). As previously noted in the study, while greenwashing is commonly associated with marketing, it is also closely linked to economics, finance, reporting, and law. Hence, interdisciplinary research in this area is crucial.

The analysis of the intellectual structure of papers related to greenwashing and firm value addresses the final research question. “RQ5: What are the common authorship patterns and collaborative research networks in studies addressing greenwashing and firm value?”

3. Conclusion

This article uses descriptive and network analysis to explore the evolution of research on greenwashing and firm value from 2003 to 2024. It makes a valuable contribution by synthesizing fragmented literature and identifying key studies, foundational sources, and influential authors. The analysis was conducted using Biblioshiny, a component of the Bibliometrix R package, chosen for its flexibility and ease of use. The articles analyzed were drawn from the Web of Science database, a structured and compatible source that supports high-quality research with the Bibliometrix software.

The annual output of publications in greenwashing and firm value related research remained negligible before the early 2010s but grew steadily around 2015. A notable surge occurred after 2020, with the yearly publication count nearing 50 by 2023, reflecting the field's increasing relevance and academic interest. In 2003, a single study achieved remarkable impact with 708 total citations, but average annual citations have declined since, dropping to just 3.58 by 2024. This trend could be due to the increased volume of recent publications spreading

citations across a broader base. The current study will stimulate the studies on greenwashing, firm value, firm performance and corporate social responsibility practices.

Laufer WS's (2003) article leads with 708 citations, followed by Parguel B's (2011) study with 440 citations. Key journals include Corporate Social Responsibility and Environmental Management, Business Strategy and the Environment, and Sustainability, which are central knowledge hubs. These sources are instrumental for researchers seeking insights into ethics, sustainability, and business strategies. The Journal of Business Ethics is the most referenced source with 908 citations, followed by Business Strategy and the Environment (383 citations) and Journal of Cleaner Production (310 citations).

Chinese universities dominate research output, with institutions like the Capital University of Economics and Business leading the field. European universities, such as the University of Zurich, also contribute significantly, suggesting regional variances in research priorities and collaborations. China leads with 35.67% of the total articles, followed by the USA and European countries like Italy and Spain. While China and the USA dominate individual contributions, European nations show strong multi-author collaborations, reflecting diverse approaches to academic research. Frequent terms like "performance," "disclosure," and "impact" have risen in importance since 2019.

Emerging topics such as "corporate social responsibility" and "environmental performance" highlight the field's evolving focus on sustainability and transparency. Themes are categorized into motor, niche, basic, and emerging/declining groups. Recent years have seen a shift toward sustainability and climate change, with "green innovation" and "ESG" driving much of the literature, indicating a transition in research priorities. Key authors like Wang Wei and Sun Ziyuan act as central figures in collaboration networks, bridging subgroups and promoting information exchange. However, limited connections between these groups highlight opportunities for enhancing interdisciplinary collaboration.

4. Limitations and Future Research Directions

Limits, gaps and future directions related to this field will be detailed in this section. The current study extracted data from web of science database in May 2024. The other databases like Scopus could be used to expand and detail the research. Just the articles were included to the study. The content may be extended by involving books or proceedings.

Greenwashing is most associated with marketing, where it is extensively studied within the marketing literature. However, greenwashing extends far beyond the scope of marketing alone. This study's strength lies in its ability to raise awareness about the broader implications of greenwashing. In future research, discussions linking greenwashing to topics such as corporate governance, reporting, finance, environmental accounting, ethics, and shareholder value are expected to become more prevalent. Additionally, greenwashing holds significant potential for frequent exploration in the context of both financial and non-financial reporting.

References

Amir, M., Azhar, Z., Kishan, A., & Krishnen, L. (2024). From the implementation of environmental management accounting to organizational sustainability: Does stakeholder integration strengthen it?. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *18*(4), 1065-1089.

Andreoli, T. P., Crespo, A., & Minciotti, S. (2017). What has been (short) written about greenwashing: A bibliometric research and a critical analysis of the articles found regarding this theme. *Revista de Gestão Social e Ambiental (RGSA), 11*(2), 54–72.

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959–975.

Chen, P., & Dagestani, A. A. (2023). Greenwashing behavior and firm value: From the perspective of board characteristics. *Corporate Social Responsibility and Environmental Management, 30*(5), 2330–2343.

Clarkson, P. M., Li, Y., Richardson, G. D., & Vasvari, F. P. (2008). Revisiting the relation between environmental performance and environmental disclosure: An empirical analysis. *Accounting, Organizations and Society, 33*(4–5), 303–327. https://doi.org/10.1016/j.aos.2007.05.003

Ferron-Vílchez, V., Valero-Gil, J., & Suárez-Perales, I. (2021). How does greenwashing influence managers' decision-making? An experimental approach under stakeholder view. *Corporate Social Responsibility and Environmental Management, 28*(2), 860–880.

Fu, H., Jiang, Q., Cifuentes-Faura, J., & Chen, Q. (2024). Corporate environmental governance and firm value: beyond greenwashing for sustainable development. *Environment, Development and Sustainability*, 1-18.

Goyal, S., Sondhi, H., & Goyal, P. (2023). A Bibliometric Review of Greenwashing Research by Using Co-occurrence Analysis and Bibliographic Coupling. *Handbook of Evidence Based Management Practices in Business*, 315-323.

Laufer, W. S. (2003). Social accountability and corporate greenwashing. *Journal of Business Ethics, 43*, 253–261.

Li, W., Li, W., Seppänen, V., & Koivumäki, T. (2023). Effects of greenwashing on financial performance: Moderation through local environmental regulation and media coverage. *Business Strategy and the Environment, 32*(1), 820-841.

Lin, Y., Choo, W. C., & Ng, K. Y. (2024). The evolution of SDGs rival: A bibliometric analysis of greenwashing over 30 years. *Journal of Lifestyle and SDGs Review, 5*(2), e03270. https://doi.org/10.47172/2965-730X.SDGsReview.v5.n02

Lyon, T. P., & Maxwell, J. W. (2011). Greenwash: Corporate environmental disclosure under threat of audit. *Journal of economics & management strategy*, *20*(1), 3-41.

Marquis, C., Toffel, M. W., & Zhou, Y. (2016). Scrutiny, norms, and selective disclosure: A global study of greenwashing. *Organization Science, 27*(2), 483–504.

Montero-Navarro, A., González-Torres, T., Rodríguez-Sánchez, J.-L., & Gallego-Losada, R. (2021). A bibliometric analysis of greenwashing research: A closer look at agriculture, food industry and food retail. *British Food Journal, 123*(13), 547–560. https://doi.org/10.1108/BFJ-06-2021-0708

Nagy-Kercsó, K., & Kontor, E. (2024). How scholars think about greenwashing over the last two decades: An overview through a bibliometric analysis. *Journal of Environmental Management and Tourism, 15*(2), 272–292.

Parguel, B., Benoît-Moreau, F., & Larceneux, F. (2011). How sustainability ratings might deter 'greenwashing': A closer look at ethical corporate communication. *Journal of Business Ethics, 102*, 15–28.

Pendse, M. K., Nerlekar, V. S., & Darda, P. (2023). A comprehensive look at greenwashing from 1996 to 2021: A bibliometric analysis. *Journal of Indian Business Research, 15*(1), 157–186. https://doi.org/10.1108/JIBR-04-2022-0115

Pritchard, A. (1969). Statistical bibliography or bibliometrics? *Journal of Documentation, 25*(4), 348–349.

Purnamasari, P., & Umiyati, I. (2024). Greenwashing and financial performance of firms: The moderating role of internal audit quality and digital technologies. *Cogent Business & Management, 11*(1). https://doi.org/10.1080/23311975.2024.2404236

Sneideriene, A., & Legenzova, R. (2024). Greenwashing prevention in Environmental, Social, and Governance (ESG) disclosures: A bibliometric analysis. *Research in International Business and Finance, 102*, 102720. https://doi.org/10.1016/j.ribaf.2024.102720

Sundarasen, S., Rajagopalan, U., & Alsmady, A. A. (2024). Environmental accounting and sustainability: A meta-synthesis. *Sustainability, 16*(21), 9341.

Testa, F., Miroshnychenko, I., Barontini, R., & Frey, M. (2018). Does it pay to be a greenwasher or a brownwasher? *Business Strategy and the Environment, 27*(7), 1104–1116.

Testa, F., Boiral, O., & Iraldo, F. (2018b). Internalization of environmental practices and institutional complexity: Can stakeholders pressures encourage greenwashing? *Journal of Business Ethics, 147*, 287–307.

Teti, E., Etro, L. L., & Pausini, L. (2024). Does greenwashing affect company's stock price? Evidence from Europe. *International Review of Financial Analysis, 93*, 103195.

Velte, P. (2017). Does ESG performance have an impact on financial performance? Evidence from Germany. *Journal of Global Responsibility*, *8*(2), 169-178.

Vilchez, V. F., Darnall, N., & Correa, J. A. A. (2017). Stakeholder influences on the design of firms' environmental practices. *Journal of Cleaner Production, 142*, 3370–3381.

Wolniak, R. (2016). Relations between corporate social responsibility reporting and the concept of greenwashing. *Zeszyty Naukowe*.

Wu, Y., Zhang, K., & Xie, J. (2020). Bad greenwashing, good greenwashing: Corporate social responsibility and information transparency. *Management Science, 66*(7), 3095–3112.

Zhi, H., Chi, Y., Peng, R., & Gao, K. (2024). Does investor attention affect corporate greenwashing? Evidence from China. *Advances in Management and Applied Economics, 14*(4), 1–6.

Ziabina, Y., Lyulov, O., Pimonenko, T., & Kwilinski, A. (2024). Countries' brand and greenwashing: A bibliometric analysis. *AIP Conference Proceedings, 3033*(1), 020023. https://doi.org/10.1063/5.0188563