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Trends and Opportunities in ESG Research within Sustainability Accounting: A Bibliometric Analysis

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Abstract: *Awareness of environmental issues has been increasing over the past decade. At the international level, this heightened awareness has prompted many countries to focus on sustainability. Along with the growing awareness of sustainability, research on ESG in relation to sustainability accounting has also increased significantly. This study aims to map ESG research in the context of sustainability accounting through bibliometric analysis. From this mapping, we can analyze publication trends, popular research topics, contributions from institutions and researchers, and the interconnections between ESG topics and sustainability accounting. This bibliometric analysis not only helps to understand the development of ESG literature but also provides a clear picture of underexplored or underdeveloped areas that require further research. The study analyzes 151 articles and conference proceedings indexed in Scopus that relate to ESG in the context of sustainability accounting. The findings indicate that research on ESG themes in the context of sustainability accounting remains relevant and promising. Researchers can explore topics such as greenhouse gas emissions and the Global Reporting Initiative, which are underdeveloped yet strongly connected to ESG themes in sustainability accounting. As a result, the research conducted provides novelty in the field.*

Keywords: *ESG, Sustainability Accounting; Bibliometric Analysis, Trend*

Abstrak*— Kesadaran terhadap isu lingkungan semakin meningkat pada dekade terakhir ini. Pada level internasional, peningkatan kesadaran terhadap isu lingkungan telah mendorong berbagai negara untuk menaruh perhatian pada konsep keberlanjutan. Sejalan dengan meningkatnya kesadaran terhadap keberlanjutan, penelitian tentang ESG dalam kaitannya dengan akuntansi keberlanjutan juga terus meningkat. Penelitian ini bertujuan untuk memberikan pemetaan mengenai penelitian ESG dalam konteks akuntansi keberlanjutan melalui analisis bibliometrik. Dari hasil dari pemetaan ini, kita dapat menganalisis tren publikasi, topik penelitian yang populer, kontribusi institusi dan peneliti, serta hubungan antar topik dalam ESG dan akuntansi keberlanjutan. Analisis bibliometrik ini tidak hanya membantu memahami perkembangan literatur ESG tetapi juga menyediakan gambaran yang jelas tentang bidang-bidang yang belum cukup diteliti atau memerlukan pengembangan lebih lanjut. Penelitian ini menganalisis 151 artikel jurnal dan prosiding yang terindeks scopus yang berkaitan dengan ESG dalam konteks akuntansi keberlanjutan. Hasil penelitian menunjukkan bahwa penelitian dengan tema ESG dalam konteks akuntansi*

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keberlanjutan masih relevan dan potensial untuk diteliti. Peneliti dapat memilih topik seputar gas emissions greenhouse gases, dan global reporting initiative yang masih sedikit pengembangannya namun memiliki keterkaitan yang kuat dengan tema ESG dalam konteks akuntansi keberlanjutan. Sehingga hasil penelitian yang dilakukan memberikan kebaruan dalam keilmuan..

Kata Kunci: *ESG; Akuntansi Keberlanjutan; Analisis Bibliometrik, Tren*

1. Introduction

Awareness of environmental issues has been increasing over the past decade (Ellili, 2022). This growing awareness has prompted various countries to focus on sustainability. Sustainability is believed to encompass not only environmental issues but also social dimensions and good governance practices. The Environmental, Social, and Governance (ESG) framework has become an essential approach to assessing how well companies integrate sustainability into their daily business operations. ESG comprises three main dimensions — environmental, social, and governance — designed to incorporate sustainability into corporate strategies.

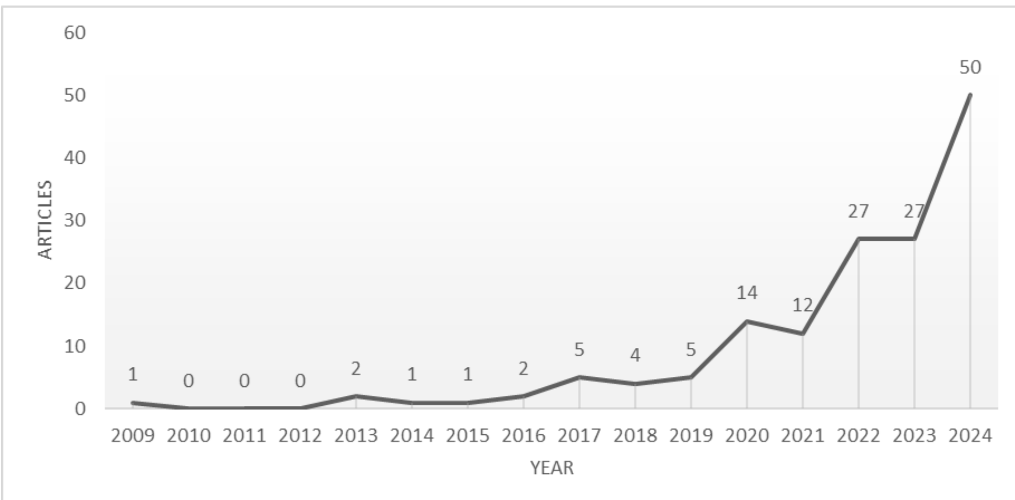
The environmental dimension highlights mitigating climate change impacts, waste management, and energy efficiency. The social dimension focuses on employee treatment, community relations, and contributions to social welfare. Meanwhile, governance emphasizes transparency, business ethics, and accountability in corporate management (Gerged et al., 2021). Many international organizations have developed frameworks, procedures, and standards to assist companies with ESG disclosure, including the Global Reporting Initiative (GRI), the International Integrated Reporting Council (IIRC), the Sustainability Accounting Standards Board (SASB), the Carbon Disclosure Project (CDP), and the United Nations Global Compact (UNGC). Among these organizations, we may note that sustainability initiatives are closely related to how companies operate and report their activities to stakeholders, a topic extensively discussed in sustainability accounting.

Sustainability performance through the ESG approach is closely related to a company's financial performance, and sustainability accounting research plays a dominant role in how to manage and report it. Research indicates that companies with high ESG scores tend to be more stable, successful, andprosperous in the long term. This is primarily due to their ability to manage environmental, social, and governance risks, ultimately protecting them from potential losses or operational disruptions (Kim et al., 2024; Cheng et al., 2023). In the context of sustainability accounting, ESG integrates sustainability-related information into companies' annual reports. Sustainability accounting provides a holistic view of the impact of corporate activities on the environment and society alongside traditional financial performance. Therefore, ESG reporting enables companies to enhance transparency and meet the expectations of stakeholders, including investors, consumers, regulators, and the public (Tamimi & Sebastianelli, 2022; Khan et al., 2023). Integration between financial and non-financial information should be achieved to ensure the long-term survival of the business. Profitability is no longer enough; we need responsibility.

Aligned with the growing awareness of sustainability, research on ESG-related sustainability accounting has also increased. Based on data collected from the Scopus database, ESG research trends in the context of sustainability accounting have generally shown an upward trajectory, with a significant increase observed in recent years. Thus, ESG research in the context of sustainability accounting remains a promising area for scholars to explore in the coming years.

This study aims to map ESG research focused exclusively on sustainability accounting through a bibliometric analysis. The mapping results allow us to analyze publication trends, popular research topics, contributions from institutions and researchers, and the relationships between ESG and sustainability accounting topics. This bibliometric analysis not only helps to understand the development of ESG literature but also provides a clear overview of primary areas of research such as corporate social responsibility (CSR), environmental disclosure, financial performance, and regulations (Lin et al, 2025) while also highlighting under-researched areas or those requiring further exploration (Dumay et al., 2019). This study seeks to answer the following research questions: 1) Which authors and journals have conducted the most research on ESG in the context of sustainability accounting, and which articles are the most cited? 2) What are the main topics studied, which countries contribute the most to scientific production, and what keywords are most used in ESG research in the context of sustainability accounting? 3) What is the conceptual structure, intellectual structure, social structure, and knowledge base of ESG research in the context of sustainability accounting? 4) What are the key research works related to ESG in the context of sustainability accounting from an inductive analysis perspective? The benefit of this study is its theoretical contribution to the direction of ESG research in the context of future sustainability accounting.

Figure 1.
Annual Article Production



Source: Scopus Database Processed (2024)

This study employs a bibliometric analysis to map and evaluate research trends related to Environmental, Social, and Governance (ESG) topics within the context of sustainability accounting. The bibliometric data were retrieved from the Scopus database, encompassing 151 journal articles and conference proceedings published between 2009 and 2024. Data were processed using the Biblioshiny interface of the Bibliometrix package in R version 4.4.1 (Aria & Cuccurullo, 2017). The analysis integrates three main components: performance analysis (to identify prolific authors, countries, and sources), science mapping (to reveal co-authorship and co-citation networks), and thematic analysis (to explore evolving research themes). This approach ensures a systematic, replicable, and comprehensive overview of the intellectual and conceptual landscape of ESG and sustainability accounting research.

The findings reveal a consistent upward trajectory in ESG-related publications, with notable growth after 2015. The most active publication outlets include Sustainability (Switzerland) and the Sustainability Accounting, Management and Policy Journal. The results identify Italy, Poland, and the United States as the most productive countries and highlight “sustainable development,” “sustainability,” and “environmental” as the dominant research themes. Thematic evolution analysis indicates a shift from general sustainability issues to specific environmental and reporting-focused topics, signaling the field's maturation.

This study contributes to the literature by offering a comprehensive mapping of ESG research within sustainability accounting, identifying intellectual structures and underexplored areas. The results provide a foundation for scholars to develop more targeted investigations on topics such as greenhouse gas emissions, ESG reporting, and the Global Reporting Initiative (GRI). Moreover, the bibliometric mapping enriches the understanding of theoretical and methodological developments, positioning this study as a reference for future ESG research design.

In conclusion, this research enhances understanding of how ESG has evolved as a core component of sustainability accounting. Despite its strengths, the study acknowledges limitations, including the restriction to Scopus-indexed and English-language publications, which may exclude relevant regional insights. Future studies are encouraged to expand database coverage and include qualitative or mixed-method analyses to deepen contextual understanding. By addressing these gaps, subsequent research can further refine the theoretical foundations and policy relevance of ESG studies in sustainability accounting.

2. Theoretical Framework

2.1 Sustainability Accounting and ESG

Sustainability accounting has emerged as a crucial field in corporate reporting, addressing the need for businesses to integrate environmental, social, and governance

(ESG) factors into their financial and non-financial disclosures. This discipline plays a significant role in fostering corporate transparency, ensuring accountability, and enhancing decision-making processes by incorporating sustainability considerations. As businesses face increasing pressure from stakeholders, regulators, and investors, sustainability accounting has become essential in aligning corporate strategies with global sustainability goals. This literature review explores the key concepts, frameworks, benefits, and challenges associated with sustainability accounting.

Sustainability accounting refers to the process of measuring, analyzing, and reporting on an organization's sustainability performance. It extends beyond traditional financial accounting by incorporating environmental and social performance metrics. The primary objective of sustainability accounting is to provide a comprehensive view of an organization's overall impact on society and the environment. Key principles of sustainability accounting include transparency, where organizations must clearly and accurately disclose their sustainability-related activities and impacts. Accountability is also a prominent principle of sustainability accounting. Companies are responsible for their environmental and social performance, ensuring they maintain ethical, accountable business practices. Another principle includes stakeholder engagement. Powerful sustainability accounting involves active dialogue with stakeholders, including investors, employees, customers, regulatory bodies, and local communities (Gray, 2006). All these green and social endeavors are to maximize stakeholder values and satisfaction (Tiwari et al., 2024).

Prior studies on the ESG bibliography often note that ESG relates to the heart of sustainability accounting (Khaw et al., 2024). One topic discussed in those studies is how to stabilize both financial and non-financial returns to achieve the company's sustainability (Khan, 2022; Khaw et al., 2024; Mishra et al., 2025; Tan et al., 2025). To achieve a satisfactory ESG performance, companies should have effective governance and organizational excellence, enabling top managers to make informed, concise, and conscientious decisions that consider the interests of all stakeholders (Khan, 2022; Khaw et al., 2024). Without a robust corporate governance framework, achieving excellent ESG performance would be challenging. As accountability and transparency are key principles of sustainability accounting and also a good recipe for effective governance (Mishra et al., 2025; Tan et al., 2025), these studies demonstrate that pronounced ESG performance can be achieved by implementing the principles inherent in sustainability accounting.

Several frameworks guide sustainability accounting practices, ensuring that organizations are comparable in their disclosure of ESG initiatives. These frameworks aim to enhance comparability and credibility, yet their coexistence also creates inconsistencies across industries and countries (Eccles et al., 2012; Cheng et al., 2014). Despite these challenges, empirical research indicates that ESG disclosures are positively associated with improved risk management, stronger financial performance, and greater stakeholder trust (Friede et al., 2015; Ioannou & Serafeim, 2017). Some of the most widely recognized frameworks include:

1) Global Reporting Initiative (GRI): Established as one of the most comprehensive sustainability reporting frameworks, GRI provides detailed guidelines covering economic, environmental, and social performance indicators. The framework promotes standardized sustainability disclosures, enabling organizations to communicate their sustainability impact effectively (GRI, 2021).

2) Sustainability Accounting Standards Board (SASB): SASB develops industry-specific standards that help organizations report financially material sustainability information. These standards ensure that sustainability data is relevant to investors and integrated into financial reporting (SASB, 2018).

3) Integrated Reporting (IR): Developed by the International Integrated Reporting Council (IIRC), this framework promotes a holistic approach to corporate reporting. It aims to connect financial and non-financial information, emphasizing how sustainability factors contribute to long-term value creation (IIRC, 2013).

4) Task Force on Climate-related Financial Disclosures (TCFD): TCFD provides recommendations on how organizations should disclose climate-related risks and opportunities. Financial institutions and corporations widely adopt this framework to assess the financial impact of climate change on their business operations (TCFD, 2017).

5) Carbon Disclosure Project (CDP): CDP is a global disclosure system that enables organizations to report on their environmental impact, particularly carbon emissions, water security, and deforestation. By participating in CDP reporting, companies can demonstrate their commitment to addressing climate change and improving sustainability practices (CDP, 2021).

6) United Nations Global Compact (UNGC): The UNGC is a voluntary initiative that encourages businesses to adopt sustainable and socially responsible policies. It is based on ten universal principles covering human rights, labor rights, environmental protection, and anti-corruption. Companies that adhere to UNGC principles integrate sustainability into their core business strategies, promoting ethical corporate behavior on a global scale (UNGC, 2021).

Implementing sustainability accounting provides numerous benefits for organizations, stakeholders, and society. These benefits include enhanced corporate transparency. Sustainability accounting extends the boundaries of traditional accounting by integrating environmental, social, and governance (ESG) dimensions into corporate reporting, thereby strengthening transparency, accountability, and long-term decision-making (Gray, 2006), and hence supporting the corporation to achieve sustainable development (Tiwari et al., 2024; Wati et al., 2024). ESG factors have become central to evaluating corporate resilience, as they capture risks and opportunities beyond financial metrics (Khan, 2022; Khaw et al., 2024). Effective ESG implementation requires sound governance structures and adherence to sustainability principles, particularly those emphasizing transparency, materiality, and stakeholder engagement (Mishra et al., 2025; Tan et al., 2025). This method enables organizations to disclose critical ESG data, improving trust among stakeholders. Transparent reporting helps investors, customers, and regulatory bodies assess a company's sustainability performance and long-term viability (Eccles et al., 2012). Other than that, management can better manage risks by identifying and mitigating environmental, social, and governance risks more effectively. By integrating sustainability considerations into corporate decision-making, companies can anticipate regulatory changes, manage resource constraints, and address reputational risks (Clark et al., 2015).

Regarding financial performance, research has long demonstrated a positive correlation between sustainability practices and economic performance. Companies that adopt strong sustainability practices often experience increased operational efficiency, enhanced brand reputation, and higher investor confidence, leading to long-term profitability (Friede et al., 2015). This increase in financial performance is also supported by improved stakeholder engagement and a more decisive competitive advantage. Sustainability accounting facilitates the development of better relationships with stakeholders, enabling the understanding and addressing of their concerns regarding ESG issues, while aligning business objectives with societal expectations (Ioannou & Serafeim, 2017).

Despite its benefits, sustainability accounting faces several challenges that organizations must overcome to implement effective sustainability reporting, including a lack of standardization. The existence of multiple sustainability accounting frameworks and standards can create inconsistencies in reporting. Companies often struggle to select the most suitable framework or to comply with various reporting requirements, leading to variations in data presentation (Cheng et al., 2014).

Moreover, data collection and measurement issues also pose a challenge. This novel method requires accurate and reliable data on environmental and social performance. However, organizations may face difficulties in collecting, verifying, and analyzing this data due to the lack of standardized measurement tools and methodologies (Stubbs & Higgins, 2014), resulting in high implementation costs. This challenge may specifically hinder Small and Medium Enterprises (SMEs) from implementing sustainability accounting practices. The costs associated with sustainability reporting software, data management, and external assurance can be substantial, making it challenging for smaller organizations to comply with reporting standards (Adams & Frost, 2008).

Regarding the integration of financial decision-making, many companies still perceive sustainability accounting as a separate reporting function rather than an integral part of their economic decision-making processes. Integrating sustainability data into corporate strategy and performance evaluation requires a cultural shift within organizations, requiring leadership commitment and employee engagement.

2.2. Environmental, Social, and Governance (ESG)

Environmental, Social, and Governance (ESG) factors have become increasingly important in corporate decision-making and investment strategies. ESG criteria help investors and stakeholders evaluate a company's sustainability practices and ethical impact beyond traditional financial metrics. ESG integration aims to promote long-term value creation by addressing environmental risks, social responsibility, and strong governance structures. This literature review explores key ESG components, frameworks, benefits, and challenges in contemporary corporate practices.

ESG represents three critical dimensions of corporate sustainability: 1) Environmental: Focuses on a company's environmental impact, including carbon emissions, resource use, waste management, and climate change mitigation strategies (Benn et al., 2018). 2) Social: Encompasses labor practices, human rights, workplace diversity, community engagement, and corporate social responsibility (Matten & Moon, 2020). 3) Governance: Involves corporate ethics, board diversity, executive compensation, shareholder rights, and anti-corruption policies (Gond et al., 2019).

Similar to implementing sustainability accounting, adopting ESG principles offers multiple benefits for organizations and investors, such as risk mitigation (Clark et al., 2015), enhanced financial performance (Friede et al., 2015), investor attraction (Giese et al., 2019), stakeholder trust (Eccles et al., 2020), and market efficiency (Potharla & Turubilli, 2024)

However, integrating business operations into ESG must also address several challenges. For example, a lack of standardization due to different ESG rating systems and frameworks creates inconsistencies in reporting (Cheng et al., 2014), data quality issues due to a lack of reliability measurement approaches (Berg et al., 2021), high compliance costs as the impact of the demand of significant financial and human resources (Ioannou & Serafeim, 2017), and greenwashing risks (Delmas & Burbano, 2011).

2.3. ESG Bibliometrics and Thematic Evolution in Accounting

The rapid expansion of ESG-related publications underscores the increasing recognition of sustainability within accounting research. Bibliometric analysis provides a systematic means to capture this development by mapping research trends, identifying influential authors and sources, and detecting emerging thematic clusters (Donthu et al., 2021). Prior studies show that although ESG has become an established research topic, scholarship in accounting remains fragmented across theoretical approaches and methodological traditions (García-Sánchez & Raimo, 2022; Velte, 2022).

Bibliometric methods are therefore essential in consolidating and evaluating the intellectual structure of ESG scholarship. They allow researchers to trace the evolution of sustainability accounting, assess its maturity, and highlight its contribution to the broader field of corporate reporting. By situating ESG research within accounting through bibliometric mapping, scholars can better understand how sustainability considerations are shaping governance practices and the future trajectory of financial and non-financial reporting.

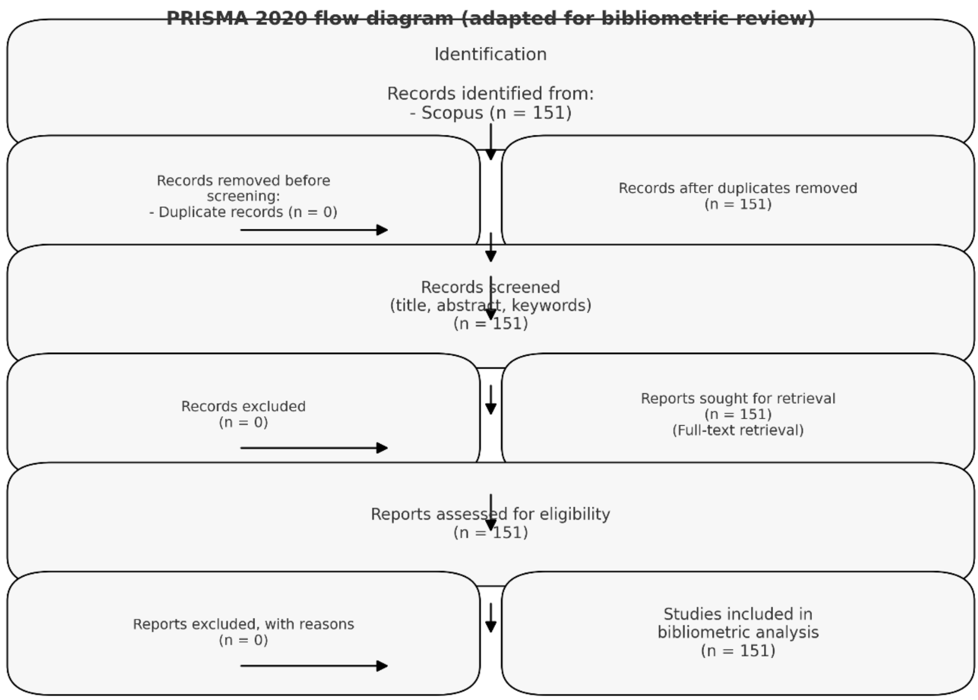
Early research in the field of social and environmental reporting largely focused on Corporate Social Responsibility (CSR) disclosures, emphasizing corporate legitimacy, accountability, and transparency (Gallego-Álvarez et al., 2018). Over time, the thematic focus shifted toward sustainability accounting, which integrates the triple bottom line (economic, social, and environmental dimensions), and, more recently, toward Environmental, Social, and Governance (ESG) disclosures, which are considered more quantifiable and decision-useful for investors. Recent bibliometric studies highlight this thematic evolution and provide systematic insights into the development of ESG research within accounting. For instance, García-Sánchez and Raimo (2022) conducted a bibliometric review that revealed a sharp increase in ESG-related publications after 2015, particularly examining the links between ESG, financial performance, sustainability disclosure quality, and stakeholder engagement. Similarly, Velte (2022) conducted a structured literature review combining bibliometric and meta-analytical approaches, demonstrating that ESG research in accounting remains fragmented across theoretical frameworks such as stakeholder theory, legitimacy theory, and agency theory. He also identified emerging themes related to integrated reporting, ESG assurance, and market valuation implications. These works collectively demonstrate the growing complexity and fragmentation of ESG research, underscoring the need for further bibliometric reviews that systematically map trends, collaborations, and thematic clusters in sustainability accounting. By adopting a structured bibliometric approach, the present study extends this line of inquiry and contributes updated evidence on the intellectual and thematic evolution of ESG-sustainability accounting research.

3. Research Method

This study is a literature review using bibliometric analysis. Bibliometric analysis maps the scientific literature to identify patterns, trends, and impacts using bibliographic data (Aria & Cuccurullo, 2017). The bibliometric data were collected from the Scopus database, which is widely recognized for its broad coverage of peer-reviewed journals and conference proceedings in social sciences and business research (Falagas et al., 2008; Mongeon & Paul-Hus, 2016). The search strategy used the following string: TITLE-ABS-KEY ("Environmental, Social, and Governance" OR "ESG") AND TITLE-ABS-KEY ("Sustainability Accounting" OR "Social Accounting" OR "Social and Environmental Accounting" OR "Corporate Social Reporting" OR "Corporate Social Responsibility Reporting" OR "Non-Financial Reporting") AND (LIMIT-TO(DOCTYPE, "ar") OR LIMIT-TO(DOCTYPE, "cp")) AND (LIMIT-TO(LANGUAGE, "English")).

The inclusion criteria for this study were limited to peer-reviewed journal articles and conference proceedings written in English and directly related to Environmental, Social, and Governance (ESG) and sustainability accounting. The choice of English-only publications was made to ensure consistency in analysis and to reflect the dominance of English in international scientific communication (Egger et al., 1997; van Weijen, 2012). Conversely, several exclusion criteria were applied. Non-English publications were excluded to avoid translation bias and inconsistency in interpretation. Book chapters, dissertations, editorials, and reviews were also excluded to maintain the comparability and quality of selected sources, as peer-reviewed journal articles and conference proceedings generally provide the most reliable and standardized bibliometric data (Mongeon & Paul-Hus, 2016). In addition, documents falling outside the ESG-sustainability accounting scope were removed during the screening stage to ensure the dataset reflected the specific research focus of this review. The initial search yielded 151 documents. The process followed the PRISMA 2020 guidelines (Page et al., 2021) adapted for bibliometric reviews. The PRISMA-style flow diagram of identification, screening, eligibility, and inclusion steps is shown in Figure 2.

Figure 2.
PRISMA Flow Diagram



3.1. Data Extraction

The bibliographic data were exported in BibTeX (.bib) format, which included citation details (authors, title, journal, Year, DOI), publication metadata (authors, title, journal, Year, DOI), abstracts, and author keywords. During data cleaning, several steps were taken to ensure quality and consistency. First, duplicate removal was performed. Although Scopus automatically excludes most duplicates, the dataset was manually checked to confirm uniqueness, and no records were removed. Second, keyword standardization was applied to merge variations and synonyms, thereby improving accuracy in co-word analysis. For example, "greenhouse gas emissions" was merged with "GHG emissions," and "corporate social responsibility" was standardized as "CSR." This normalization step minimized fragmentation in thematic mapping and improved the robustness of the results. Reliability in the data preparation process was ensured through systematic, transparent cleaning procedures rather than inter-coder validation, since bibliometric analysis primarily relies on bibliographic metadata and automated software tools. The Scopus export was checked for completeness and consistency, and the keyword harmonization process combined both manual review and the use of bibliometric software functions in Biblioshiny (Aria & Cucurullo, 2017). These steps minimized potential bias in keyword analysis and enhanced the validity of subsequent performance, co-word, and thematic analyses (Donthu et al., 2021).

3.2. Data Analysis

Data were analyzed using the Biblioshiny interface of the bibliometrix package in R version 4.4.1 (Aria & Cuccurullo, 2017). The analysis consisted of three main components. First, a performance analysis was conducted to examine annual publication trends and identify the most productive authors, sources, and countries in the field. Second, a science-mapping analysis was carried out, including co-authorship networks, co-citation analysis, and keyword co-occurrence, to visualize patterns of collaboration and intellectual structure within the research domain. Third, a thematic analysis was conducted to identify emerging and declining research themes using keyword clustering and thematic mapping. This structured, multidimensional process ensured that the bibliometric review of ESG and sustainability accounting research was transparent, systematic, and replicable.

4. Results and Discussion

The output of the bibliometric analysis using the biblioshiny package in R includes mappings for key information, sources, authors, documents, clustering, conceptual structure, and social structure. Key bibliometric data for the analyzed documents is shown in Table 1.

Table 1
Key Bibliometric Data Information

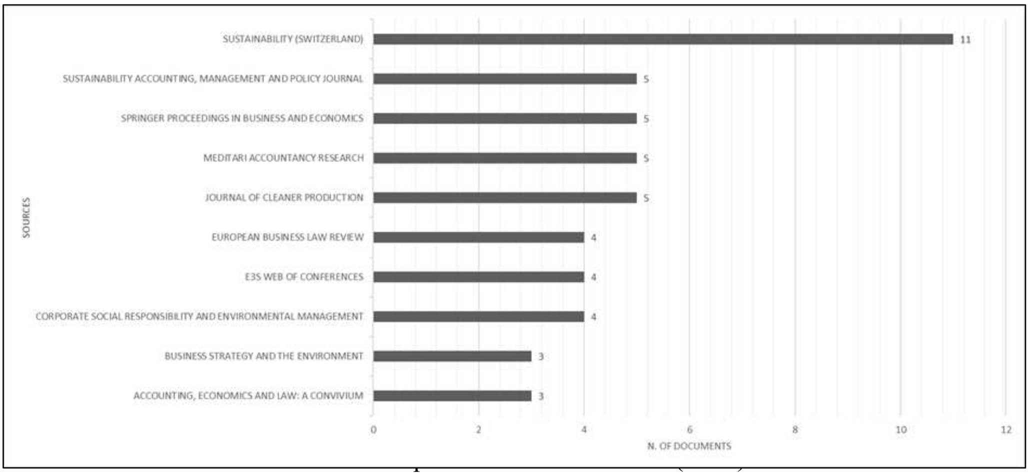
Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2009:2024
Sources (Journals, Books, etc.)	92
Documents	151
Annual Growth Rate %	29,8
Document Average Age	2,18
Average citations per doc	21,03
References	0
DOCUMENT CONTENTS	
Keywords Plus (ID)	387
Author's Keywords (DE)	461
AUTHORS	
Authors	394
Authors of single-authored docs	23
AUTHORS COLLABORATION	
Single-authored docs	25
Co-Authors per Doc	2,77
International co-authorships %	25,83
DOCUMENT TYPES	
article	123
article article	1
conference paper	27

Source: Scopus Database Processed (2024)

Based on the key document information presented in the table above, there are 151 published articles, averaging over 21 citations per article. This indicates that ESG research in the context of sustainability accounting is a promising area of study. Furthermore, based on the most relevant sources, 92 journals and proceedings are indexed that relate to ESG in the context of sustainability accounting. The most dominant sources include: 1) Sustainability (Switzerland), 2) Sustainability

Accounting, Management and Policy Journal, 3) Springer Proceedings in Business and Economics, 4) Meditari Accountancy Research, and 5) Journal of Cleaner Production.

Figure 3.
Most Relevant Sources



Sustainability (Switzerland) emerged as the most relevant source with 11 articles, followed by Sustainability Accounting, Management and Policy Journal, Springer Proceedings in Business and Economics, Meditari Accountancy Research, and Journal of Cleaner Production, each with five articles. The dominant keywords used in these journals and proceedings include "sustainable development", "sustainability", "environmental", and "financial reporting". Among other authors, Camilleri MA, Consolandi C, and Eccles RG were the most prolific contributors to ESG articles on sustainability accounting.

This study also analyzed the impact of local sources and Bradford's Law. The local source impact was measured based on the h-index of authors in the ESG context within sustainability accounting. The analysis revealed that three journals had the highest h-index: 1) Sustainability (Switzerland) with eight articles; 2) Sustainability Accounting, Management and Policy Journal with five articles; and 3) Journal of Cleaner Production and Meditari Accountancy Research with four articles each. On the other hand, Bradford's Law analysis identified 11 dominant sources with articles related to ESG in the context of sustainability accounting. These 11 journals and proceedings are listed in Table 2.

Table 2.
Bradford's Law Analysis

SO	Rank	Freq	cumFreq	Zone
Sustainability (Switzerland)	1	11	11	Zone 1
Journal of Cleaner Production	2	5	16	Zone 1
Meditari Accountancy Research	3	5	21	Zone 1
Springer Proceedings in Business and Economics	4	5	26	Zone 1
Sustainability Accounting, Management and Policy Journal	5	5	31	Zone 1
Corporate Social Responsibility and Environmental Management	6	4	35	Zone 1
E3S Web of Conferences	7	4	39	Zone 1
European Business Law Review	8	4	43	Zone 1
Accounting, Economics, and Law: A Convivium	9	3	46	Zone 1
Business Strategy and The Environment	10	3	49	Zone 1
Economics and Environment	11	3	52	Zone 1

Source: Scopus Database Processed (2024)

From the perspective of contributing countries, Italy is the leading producer of ESG articles on sustainability accounting, with 16, followed by Poland with 11 and the United States with 8. In terms of citations, Italy leads with 643, followed by Germany with 267 and Canada with 215.

Countries in the European Union (EU) predominantly study this field because of their well-established commitment to sustainability. They are pioneers in implementing the sustainability reporting standard, even before the IFRS S3 and the ISSB were issued. They have specific EU policy and sustainability mandates that drive their interest in this topic. Italia, specifically, ranks as the most prolific country for publishing scientific papers due to its fashion and luxury brands, and because the energy sector is under global scrutiny regarding ESG issues. Meanwhile, America has focused more on financial materiality; thus, ESG initiatives are often judged by whether they can lead to higher economic performance rather than solely on sustainability or ethical issues. On the other hand, Asia tends to follow international standards already established and adopted in its domestic context; hence, its articles are fewer than those produced by different regions.

The most cited document is the work by Lori Holder Webb, published in 2009, titled "The Supply of Corporate Social Responsibility Disclosures Among U.S. Firms. "This article has been cited 375 times, averaging 23.44 citations per Year. The article discusses CSR (Corporate Social Responsibility) disclosures from 50 U.S. companies (Webb, Cohen, & Nath, 2009).

In Figure 4, the most frequent words in ESG articles on sustainability accounting are "sustainable development," "sustainability," "environmental," "financial reporting," and "economic and social effects." Based on the Words' Frequency graph, the terms first developed in 2014 are "sustainable development" and "economic and social effects." The term that has shown a significant increase throughout the observation period is sustainable development.

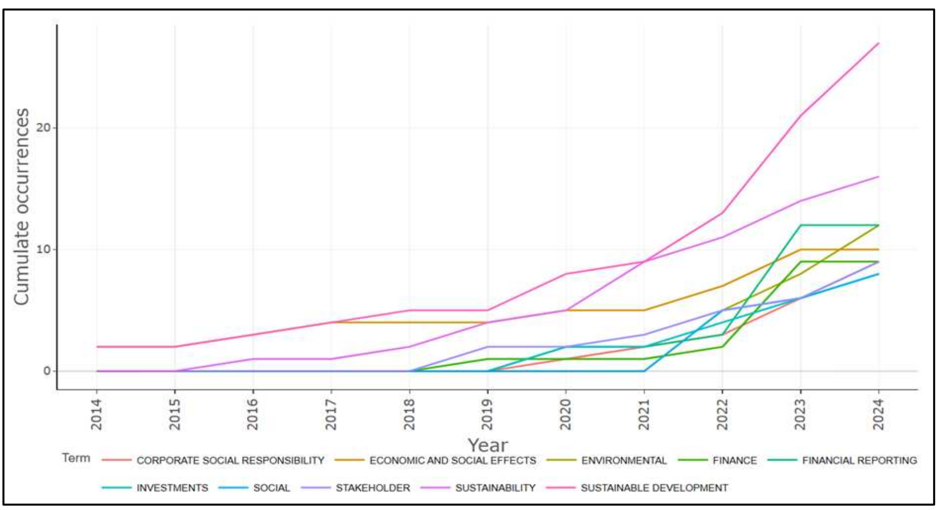
This study's bibliometric analysis also examines the conceptual structure of research on ESG within the context of sustainability accounting. The conceptual structure identifies important themes and sub-themes from the research and visualizes them in a two-dimensional matrix. The conceptual structure serves to map the scope of research by illustrating the relationships among keywords, authors, sources, titles, abstracts, and affiliations. In the matrix, the circle sizes represent citation frequency. Color similarity indicates the closeness of the thematic clusters, and the distance between the circles shows the degree of connection between the relationship patterns.

Moreover, based on the output visualized in Figure 6, there are 8 clusters of co-occurrence relationships using the "keywords plus" method. The first cluster, marked with a red circle, has dominant keywords such as sustainable development, financial reporting, and finance. The second cluster, marked with a blue circle, has dominant keywords such as sustainability, stakeholder, and investment. The third cluster, marked with a green circle, has the dominant keyword, 'governance'. The fourth cluster, marked with a purple circle, includes dominant keywords such as environmental, decision-making, and investments. The fifth cluster, marked with a yellow/orange circle, has dominant keywords such as 'gas emissions' and 'greenhouse gases'. The sixth cluster, marked with a brown circle, includes energy efficiency and utilization. The seventh cluster, marked in pink, focuses on ESG reporting. Finally, the eighth cluster, marked with a gray circle, has the dominant keyword automotives. Through co-occurrence relationships, the three primary keywords that play a central role in ESG research in sustainability accounting are sustainable development, sustainability, and environmental.

Figure 4.
WordCloud

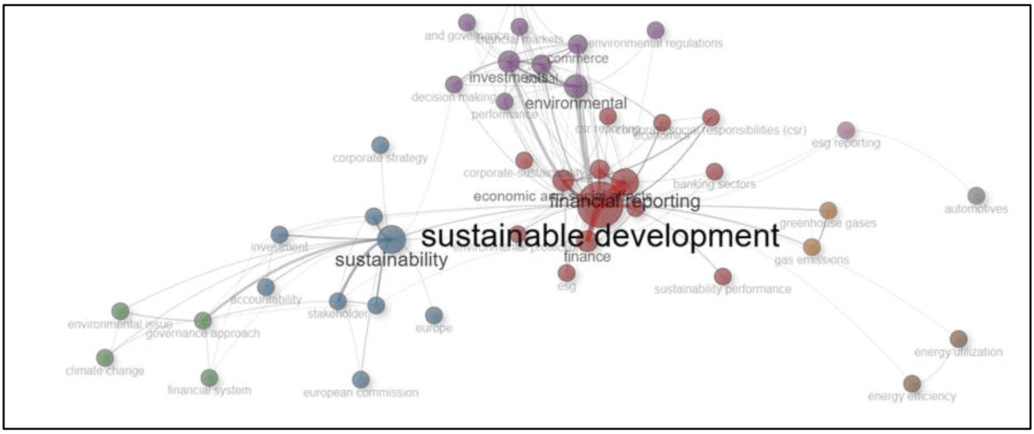
Source: Scopus Database Processed (2024)

Figure 5.
Words' Frequency



Source: Scopus Database Processed (2024)

Figure 6.
Co-occurrence Network Keywords Plus

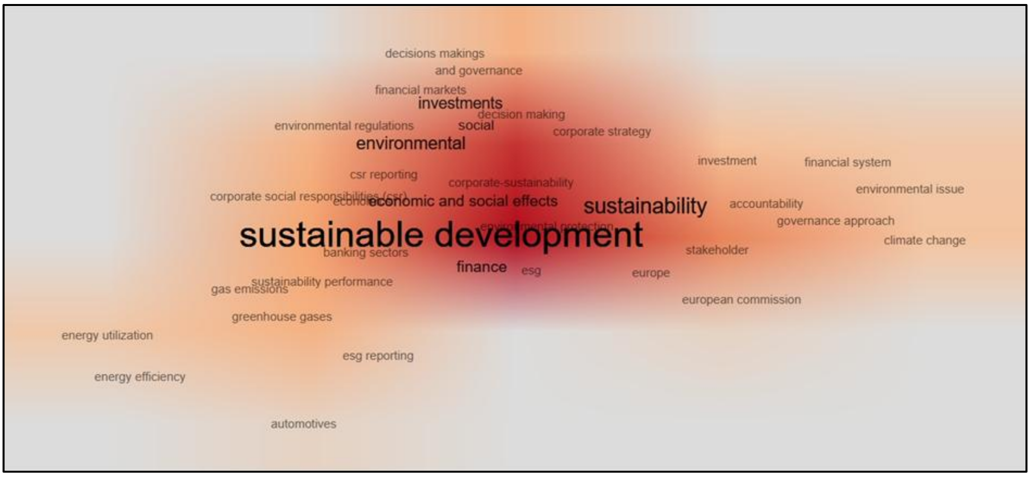


Source: Scopus Database Processed (2024)

Examining the density visualization in Figure 7, we can identify keywords that may present future research opportunities. A less intense red color indicates keywords that are less frequently researched. These keywords include corporate social responsibility (CSR), environmental protection, ESG, sustainability performance, banking sectors, corporate sustainability, CSR reporting, accountability, corporate strategy, Europe, European Commission, climate change, environmental issues, financial markets, governance, decision making, environmental regulations, gas emissions, greenhouse gases, energy efficiency, energy utilization, and automotives. These keywords may represent areas of potential research in the field of ESG and sustainability accounting moving forward.

The following analysis is the thematic map output. According to Yu & Muñoz-Justicia (2020), a thematic map is a form of centralization or focus that considers interconnected groups within a particular framework and flow. Visually, the thematic map is divided into four (4) quadrants. The top-left quadrant (niche) has minimal connections to the theme, but its external connections are ignored when identifying the theme. The bottom left quadrant (emerging or declining) shows low connectivity. The top-right quadrant (motor) represents the central theme, which serves as the core for theme development. The bottom-right quadrant (basic) shows a high degree of connection but little development. The output of the thematic map is illustrated in the following figure.

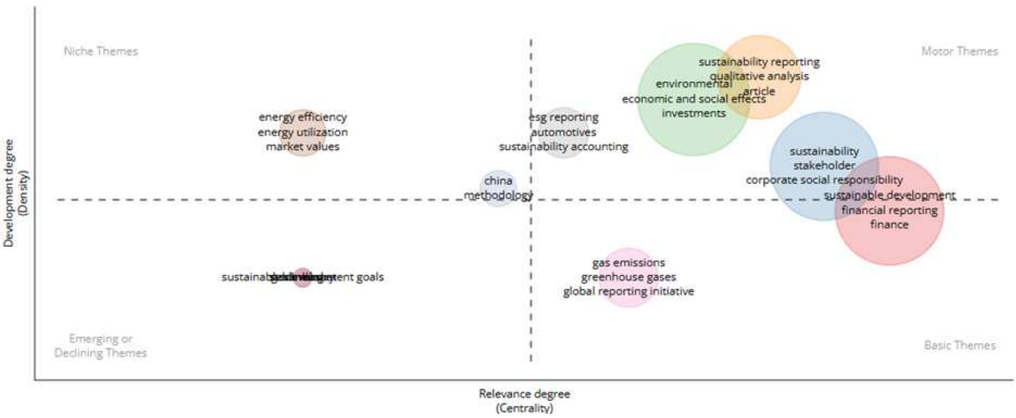
Figure 7.
Co-occurrence Network Keywords Plus (Density)



Source: Scopus Database Processed (2024)

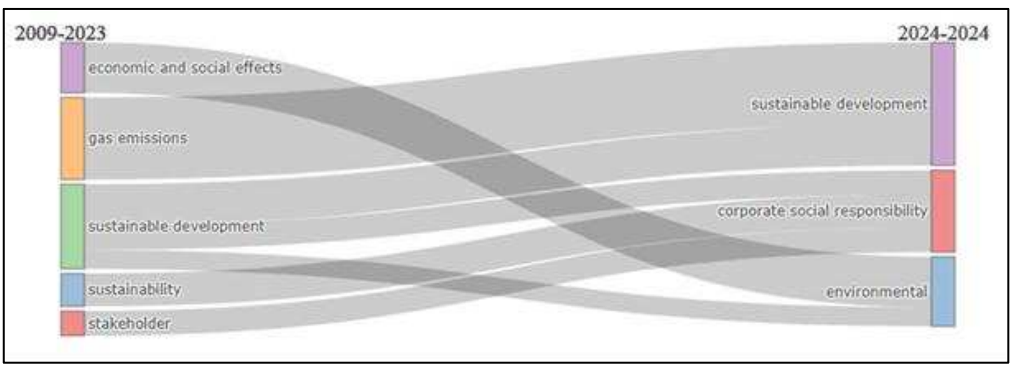
Figures 7 and 8 illustrate the use of keywords in studies on sustainability accounting within the ESG theme. The keywords "sustainable development," "sustainability," "environmental," and "sustainability reporting" are the main keywords for future ESG research in the context of sustainability accounting. Meanwhile, the keywords "gas emissions," "greenhouse gases," and "Global Reporting Initiative" are not the core theme because they are specific or highly relevant in practice but not in the researchers' keywords. Scholars prefer to use more general keywords such as "sustainability" or "sustainable development" in their articles. Still, they are emerging topics that are worth discussing. Therefore, these keywords are potential areas for future research. However, as shown in Figure 7, the Sustainable Development Goals (SDGs) are increasingly being overlooked due to the overwhelming number of studies evaluating them, making them less interesting. Scholars begin to find new novelty that is more specific rather than merely jargon. Besides, the goals that are expected to be achieved in the year 2030 make scholars and practitioners leave, since we are now only four to five years away from the target year. On the contrary, keywords like "sustainability reporting," corporate social responsibility," and "investments" are stable and well developed through the years within the sustainability accounting topic.

Figure 8.
Thematic Map: Keywords Plus



Source: Scopus Database Processed (2024)

Figure 9.
Thematic Evolution



Source: Scopus Database Processed (2024)

The final output of the bibliometric analysis conducted in this study is the thematic evolution. Thematic evolution results from data analysis in Biblioshiny, which illustrates shifts in keyword groups across periods (Hernandez-Cruz, 2021). The thematic evolution is depicted as consisting of two parts: the left side represents early development, and the right side represents subsequent development.

The thematic evolution in this study uses 2023 as the cutting year due to a significant increase in ESG-related research articles within the context of sustainability accounting. The number of articles rose from 27 in 2023 to 50 in 2024 (data as of November 2024). This phenomenon is used in articles on ESG themes within sustainability accounting. As visualized in Figure 8, several notable shifts in keywords were observed. The keyword "economic and social effects" was replaced by "environmental." The keyword "gas emissions" was replaced with "sustainable development." The keyword "sustainable development" branched into three key areas: "sustainable development," "corporate social responsibility" (CSR), and "environmental." Similarly, "sustainability" evolved to focus on CSR, while "stakeholder" also came to focus on CSR. Figure 8 clearly shows how studies on sustainability accounting in the ESG context have shifted their focus from general and conceptual issues, such as economic-social effects, stakeholders, and emissions, to more practical, concrete, and specific problems, such as the business's responsibility towards environmental issues. The thematic evolution figure also shows a shift from the broader jargon "sustainability" to "environmental," which is the main issue discussed recently, indicating scholars' growing focus on environmental problems arising from business operations.

Further analysis highlights three articles with the highest citations, focusing on CSR, Integrated Reporting (IR), and ESG reporting. The first article, authored by Lori Holder-Webb and colleagues in 2009, titled "The Supply of Corporate Social Responsibility Disclosures Among U.S. Firms," examines CSR disclosures in 50 U.S. public companies based on their 2004 public information. The study found that most companies disclosed CSR activities, focusing on community issues, health and safety, diversity, and environmental programs. It also noted significant variations in disclosure practices across different industries and company sizes.

The second article, by Gaia Melloni, Ariela Caglio, and Paolo Perego in 2017, titled Saying More with Less? Disclosure Concise, Completeness, and Balance in Integrated Reports investigates factors affecting the conciseness, completeness, and balance of Integrated Reporting (IR). The findings reveal that companies with weak financial performance tend to produce longer, less readable (less concise), and overly optimistic (less balanced) reports. Additionally, firms with poorer social performance provided less concise and incomplete sustainability information.

The third article, authored by Mervelskemper and Streit in 2016, titled Enhancing Market Valuation of ESG Performance: Is Integrated Reporting Keeping Its Promise? Analyzes the market valuation of ESG performance based on corporate ESG reporting strategies. The study demonstrates that investors value ESG performance more positively when companies publish ESG reports, regardless of whether they are standalone or integrated.

5. Conclusion, Implication, and Limitation

5.1. Conclusion

This study analyzes 151 journal articles and conference proceedings indexed in Scopus related to ESG in the context of sustainability accounting. Regarding academic development, journals and/or proceedings such as Sustainability (Switzerland), Sustainability Accounting, Management and Policy Journal, Springer Proceedings in Business and Economics, Meditari Accountancy Research, and Journal of Cleaner Production have emerged as the most relevant sources. In addition, Camilleri, MA, Consolandi, C, and Eccles, RG have been the most prolific contributors to ESG articles in sustainability accounting. Italy is the leading country in producing articles on ESG within sustainability accounting, with 16 articles, followed by Poland with 11 and the United States with 8.

Between 2009 and 2024, the dominant keywords in articles related to ESG within sustainability accounting include "sustainable development," "sustainability," "environmental," "financial reporting," and "economic and social effects." The thematic evolution analysis shows a shift in keywords over the last Year. The keyword "economic and social effects" shifted to "environmental"; "gas emissions" shifted to "sustainable development"; "sustainable development" shifted to three keywords—"sustainable development," "corporate social responsibility," and "environmental." In contrast, "sustainability" shifted to "corporate social responsibility," and "stakeholder" shifted to "corporate social responsibility."

The thematic map analysis indicates that the primary keywords for developing ESG research in the context of sustainability accounting are "sustainable development," "sustainability," "environmental," and "sustainability reporting." Meanwhile, keywords such as "gas emissions," "greenhouse gases," and "Global Reporting Initiative" still have limited development in ESG research within sustainability accounting.

Based on the previous analysis, it can be concluded that research on ESG within sustainability accounting remains relevant and has excellent potential for further exploration. Researchers may consider focusing on topics such as "gas emissions," "greenhouse gases," and the "Global Reporting Initiative," which are still underdeveloped but closely related to ESG within the context of sustainability accounting. From a policy perspective, the lack of studies and discussion on these topics will make it difficult for boards to develop frameworks or regulations for climate recession. From an academic perspective, we still need more studies to discuss the challenges of emission measurement and how effective management of it can impact financial and ESG returns. Refining and testing existing theories, such as stakeholder theory and the resource-based view, will help scholars advance academic discourse. Therefore, future research in this area could yield new insights into ESG in sustainability accounting.

5.2. Implication and Limitation

This bibliometric study on ESG and sustainability accounting offers several important implications, both theoretical and practical. First, the study provides a comprehensive overview of the evolution of academic discourse surrounding ESG and sustainability accounting. We identify dominant themes, including environmental disclosures, ESG performance measurement, and integrated reporting. These findings provide a solid foundation for scholars to develop theoretical frameworks and generate new insights in this emerging field. Practically, numerous recommendations can be translated into actionable steps for scholars, practitioners, and regulators. For scholars, the study highlights key authors and journals that have consistently made significant contributions to ESG discourse, helping academics select impactful publication venues. It identifies areas that are still underdeveloped but require attention, such as corporate strategy, non-financial reporting, financial markets, and many more. These are emerging topics since the ESG area has gained mainstream discussion. This study also notes that qualitative analysis methodology remains relatively rare in ESG research, thereby creating gaps worth exploring for scholars. For practitioners, especially corporate sustainability managers, this research sheds light on what stakeholders consider most important in ESG — sustainability, financial reporting, and corporate social responsibility — helping them make more informed decisions and develop reporting strategies aligned with sustainable initiatives. Lastly, the study provides valuable insights for regulators and standard-setting bodies by giving the trajectory of ESG-related academic work, which can help them shape the design and implementation of regulations and standards. Regulators may start to pay attention to harmonizing existing standards across jurisdictions, as this study shows that the European Union is the dominant driver of regulation, which may not always be the best fit for other regions. Emerging markets, for example, should establish their own standards that align with their market characteristics while also maintaining a delicate balance with those of different areas. This research also highlights the importance of integrating ESG data, which is often presented in non-financial terms, with financial metrics.

Regarding future research, this study notes that practitioners and scholars are no longer discussing the general and conceptual issues of ESG, but more specific and practical matters of what businesses can do to drive their activities towards practical sustainability. Real contributions are expected from the company to reduce the environmental impact of its business activities while also meeting stakeholders' expectations.

Despite its contributions, this study has several limitations. First, the analysis was limited to publications indexed in Scopus, potentially excluding relevant studies available in other databases or in grey literature. This could result in a narrower representation of the research landscape, thereby limiting the analysis of studies indexed outside Scopus and potentially leading to biased findings. Our recommendation for future research is that scholars include articles from other databases to broaden the bibliography. Moreover, while compiling significant studies, we only considered

English-language publications, potentially overlooking important regional or local insights published in languages other than English. This should be given more attention as active ESG initiatives are usually a locally attuned strategy. This method also leads to the absence of alternative terms or region-specific nomenclature related to ESG and sustainability accounting, which can hinder in-depth analysis and biased findings. Future research can involve authors from multiple countries collaborating to analyze articles written in languages other than English, thereby enabling readers to gain a broader perspective beyond English-language articles.

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