STANDARDS WITHOUT ACTION? A BIBLIOMETRIC REVIEW OF THE POLITICAL TRUCKS IN GLOBAL GREEN ACCOUNTING

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Abstract:
In response to growing global concerns over environmental degradation and climate change, green accounting has emerged as a crucial approach to incorporate environmental considerations into financial reporting. However, the integration of sustainability principles into accounting standards remains fragmented and often influenced by political and economic factors. This study aims to explore the development and influence of green accounting within the context of global standard-setting through a bibliometric analysis. Using data sourced from Scopus and Dimensions databases, this research maps publication trends, identifies key authors, journals, countries, and thematic clusters related to green accounting and accounting standardization. The findings reveal a significant increase in scholarly attention over the past two decades, with a strong emphasis on environmental disclosure, sustainability reporting, and the role of regulatory frameworks. Additionally, the analysis highlights the complex interplay between environmental priorities and standard-setting institutions such as IASB and FASB. This study contributes to the academic discourse by providing a comprehensive overview of how green accounting is being discussed, challenged, and supported within the literature on accounting standards. The results underscore the urgent need for harmonized, transparent, and enforceable sustainability-related financial reporting standards to address global environmental concerns effectively.
Keywords: Accounting Standards, Bibliometric, Green Accounting

Abstrak
Sebagai respons terhadap meningkatnya kekhawatiran global atas degradasi lingkungan dan perubahan iklim, akuntansi hijau telah muncul sebagai pendekatan penting untuk memasukkan pertimbangan lingkungan ke dalam pelaporan keuangan. Namun, integrasi prinsip keberlanjutan ke dalam standar akuntansi masih terfragmentasi dan sering dipengaruhi oleh faktor politik dan ekonomi. Studi ini bertujuan untuk mengeksplorasi perkembangan dan pengaruh akuntansi hijau dalam konteks penetapan standar global melalui analisis bibliometrik. Dengan menggunakan data yang bersumber dari basis data Scopus dan Dimensions, penelitian ini memetakan tren publikasi, mengidentifikasi penulis, jurnal, negara, dan kelompok tematik utama yang terkait dengan akuntansi hijau dan standardisasi akuntansi. Temuan menunjukkan peningkatan signifikan dalam perhatian akademis selama dua dekade terakhir, dengan penekanan kuat pada pengungkapan lingkungan, pelaporan keberlanjutan, dan peran kerangka kerja regulasi. Selain itu, analisis ini menyoroti interaksi kompleks antara prioritas lingkungan dan lembaga penetapan standar seperti IASB dan FASB. Studi ini berkontribusi pada wacana akademis dengan memberikan gambaran komprehensif tentang bagaimana akuntansi hijau dibahas, ditantang, dan didukung dalam literatur tentang standar akuntansi. Hasil penelitian ini menggarisbawahi kebutuhan mendesak akan standar pelaporan keuangan terkait keberlanjutan yang harmonis, transparan, dan dapat ditegakkan untuk mengatasi masalah lingkungan global secara efektif.
Kata kunci: Standar Akuntansi, Bibliometrik, Akuntansi Hijau

1. Introduction

Global attention to environmental sustainability is increasing along with the increasing awareness of the negative impacts of economic activities on the global ecosystem (Bhattacharya et al., 2014) (Molnár et al., 2024) (T. T. Nguyen, 2023) (Dimmelmeier, 2024). In this context, the concept of green accounting or environmental accounting emerged as a response to incorporate environmental aspects into the financial reporting system and economic decision making (Marlowe & Clarke, 2022) (Adow, 2024) (Yao et al., 2022). Green accounting aims to provide more relevant and transparent

information regarding the costs and environmental impacts of business entities' activities (Ulupui et al., 2020) (Nurrasyidin et al., 2024).

In line with the demand for sustainable business practices, various international organizations such as the International Accounting Standards Board (IASB), the Financial Accounting Standards Board (FASB), and the International Sustainability Standards Board (ISSB) have begun developing sustainability reporting standards (Adow, 2024). However, this standardization process has not always been smooth (Luo & Tang, 2023). There are challenges in aligning sustainability principles with established accounting conceptual frameworks. The standard-setting process is also not free from economic and political interference, which often influence the direction and substance of the resulting standards. (Maione, 2023)

Amidst these dynamics, it is important to understand how green accounting has developed in the academic literature and how it has influenced the formation of global accounting standards. Therefore, this study was conducted using a bibliometric approach to answer two main research focuses:

a) R1 (Research Question 1): What are the trends and developments in green accounting research in the context of global accounting standard-setting?
b) R2 (Research Question 2): What are the main themes and interrelationships between concepts (keywords) that emerge in the literature on green accounting and standard-setting?

By systematically exploring the scientific landscape, this research is expected to provide theoretical and practical contributions to support efforts to harmonize sustainability and financial accounting standards. Academically, this research aims to analyze trends and developments in scientific publications related to green accounting in the context of global accounting standard-setting (R1), and to identify and map the main themes, dominant keywords, and interrelationships between concepts developing in the literature on green accounting and standard-setting through a bibliometric approach (R2). Thus, this research is expected to provide a comprehensive overview of how green accounting contributes to the development of sustainable financial reporting standards.

2. Literature Review

2.1 Green Accounting: Evolution and Significance

Green accounting, or environmental accounting, is an approach that aims to integrate environmental impacts into conventional accounting systems, both quantitatively and qualitatively (Nguyen et al., 2023) and (Molnár et al., 2024). This concept first gained serious attention in the 1990s, along with growing global awareness of sustainability and corporate social responsibility. In practice, green accounting encompasses not only the recording of environmental costs but also reporting on company activities related to natural resource conservation, waste management, and carbon emissions (Bartolomeo et al., 2000) and (Andrian & Pangestu, 2022).

Numerous studies have shown that green accounting plays a crucial role in supporting corporate strategic decisions and increasing transparency to stakeholders (Schaltegger & Burritt, 2010) and (Lee et al., 2020) and (Endiana et al., 2020). Furthermore, the implementation of green accounting is closely related to the trend of sustainability reporting, which is now standard in many industrial sectors. Despite its development, its implementation in various countries still varies widely, depending on regulations, stakeholder pressure, and corporate culture (Adow, 2024).

2.2 Standard Setting in Accounting: Dynamics and Complexity

The accounting standard-setting process is a crucial part of establishing a transparent and internationally comparable financial reporting framework (Adow, 2024). Standard setting is not only technical but also fraught with political and economic interests, as explained by Scott (2020) in his discussion of "standard-setting: political and economic issues" (Luo & Tang, 2023). In this context, various actors, such as standard-setting bodies (e.g., IASB, FASB), regulators, industry players, and environmental advocacy groups, have significant influence on the substance of the resulting standards. (Ashby et al., 2015)

There are inherent challenges in this process: balancing the principles of objectivity, decision-usefulness, and the realities of business practices, which often face resource constraints and resistance to change (Luo & Tang, 2023). As sustainability issues begin to enter the accounting realm, the question of how and to what extent green accounting principles can be incorporated into formal standards has become a significant debate (Maione, 2023).

2.3 Conceptual Intersection: Green Accounting and Standard Setting

Figure 1 Conceptual Intersection

Based on the figure above, the intersection between green accounting and standard setting arises from the need to transform sustainability principles into measurable, auditable, and widely applicable accounting standards. Sustainability reporting has now become a meeting point between the two, as evidenced by the IFRS Sustainability Disclosure Standards initiative and the GRI (Global Reporting Initiative) framework. This is where bibliometric studies become crucial: to understand the extent to which green accounting has influenced the discourse on global accounting standard-setting and how these two areas have developed in the academic literature.

Several studies indicate that the push to adopt green accounting into accounting standards often faces obstacles in the form of political pressure and concerns about economic impacts, such as implementation costs or investor concerns (Deegan, 2017). However, the development of the ESG (Environmental, Social, and Governance) system and the demand for transparency from global investors have actually strengthened green accounting's position on the standard-setting agenda.

Thus, the link between green accounting and standard-setting is not only theoretically relevant but also practically and strategically important in addressing the sustainability challenges of the business world. Exploring this relationship through a bibliometric approach can help map conceptual evolution, identify research gaps, and clarify the respective contributions to the development of a more socially and environmentally responsible global accounting system.

3. Research Methods

This study employed a bibliometric approach with the Systematic Literature Review (SLR) method, structured based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework, as described in Figure 1. The purpose of this approach was to map trends, key themes, and scientific networks related to green accounting in the context of global accounting standard-setting (Ascani et al., 2021). Data sources were obtained from the Scopus database using the keyword combination: "Green accounting" OR "Environmental accounting" OR "Sustainability accounting" AND "Accounting standards" OR "Standard setting." The search was conducted on articles published between 2010 and 2025. The inclusion criteria included: documents in the form of scientific journal articles, in English, final publication, and open access.

The literature selection process was carried out systematically through four PRISMA stages: identification, screening, feasibility assessment, and inclusiveness. During the identification stage, 437 articles were identified from the initial search in Scopus. Next, they were filtered based on relevant scientific areas: Business, Management, and Accounting; Economics, Econometrics, and Finance; and Social Sciences. After assessing their suitability based on the inclusion criteria, 112 eligible articles were identified and used for bibliometric analysis.

The bibliometric analysis was conducted using VOSviewer and Biblioshiny software. VOSviewer was used to visualize keyword co-occurrence networks, co-authorship, and co-citations, while Biblioshiny was used for thematic mapping analysis, publication trends, and the distribution of authors and the most active journals. This analysis provides a comprehensive overview of green accounting's position in the accounting standard-setting discourse and identifies thematic relationships within the literature. While this approach offers strengths in quantifying and visualizing scientific literature, this study has limitations: it uses only one database (Scopus), is limited to open access articles, and is restricted to English-language literature within a specific time period.

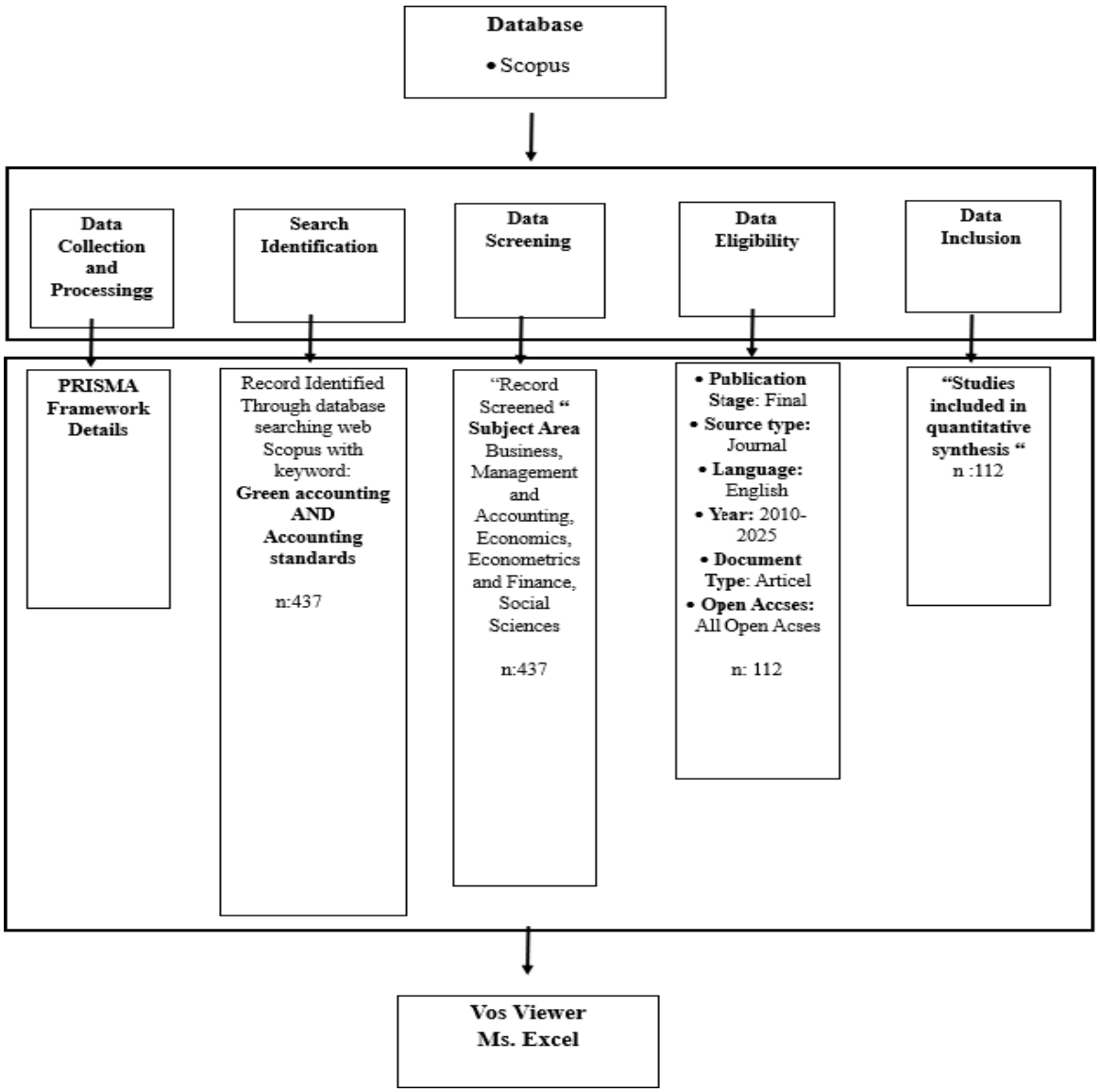

Figure 2.
PRISMA Framework

4. Results and Discussion

4.1 Publication Trends

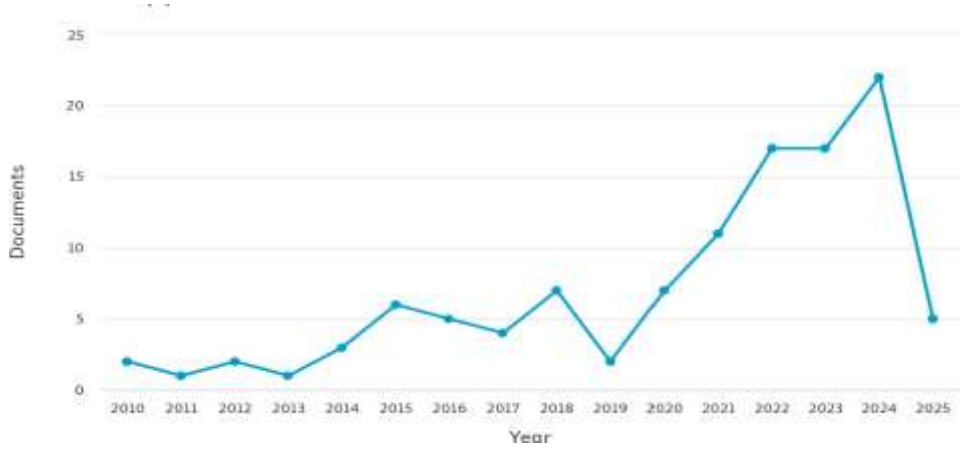

Figure 3 Development of Research Trennd

Figure 3 shows the distribution of the number of scientific papers published annually between 2010 and 2025, based on a literature search of the Scopus database using the keywords "green accounting" and "accounting standards." Overall, this graph illustrates a significant upward trend in the number of publications over the past decade. In the initial period (2010–2014), publication volume was relatively low and fluctuating, with an average of less than three articles per year. This reflects that green accounting and accounting standardization were not yet a major focus in the global academic landscape. However, there has been a gradual increase since 2015, likely influenced by the growing popularity of sustainability campaigns and the development of international non-financial reporting regulations, such as the GRI Standards and the initial IFRS Sustainability Standards initiative.

The most significant increase was seen in the period 2020–2024, indicating exponential growth. 2024 saw the highest number of publications, with over 22 papers, reflecting a peak in academic attention to the link between sustainability and financial reporting. This trend aligns with previous findings that suggest the topic of sustainability accounting is gaining strength in the context of international accounting standard-setting, particularly since the establishment of the International Sustainability Standards Board (ISSB) in 2021 (IFRS Foundation, 2021).

The sharp decline in 2025 can be explained methodologically as a result of the limited publications available at the time of the study, given that most articles for the current year had not yet been fully published (publication lag). Therefore, the 2025 data does not yet reflect the actual trend and cannot be used as an indicator of a true decline in interest.

Overall, this trend indicates that the study of green accounting and standard-setting has experienced consistent growth and has even become a major focus of the contemporary research agenda in sustainability accounting and reporting. This supports the assertion of Schaltegger & Zvezdov (2015), who stated that the integration of environmental information and formal reporting frameworks is a strategic necessity in promoting sustainability accountability in the corporate sector.

4.1.2 Development of Documents by Country

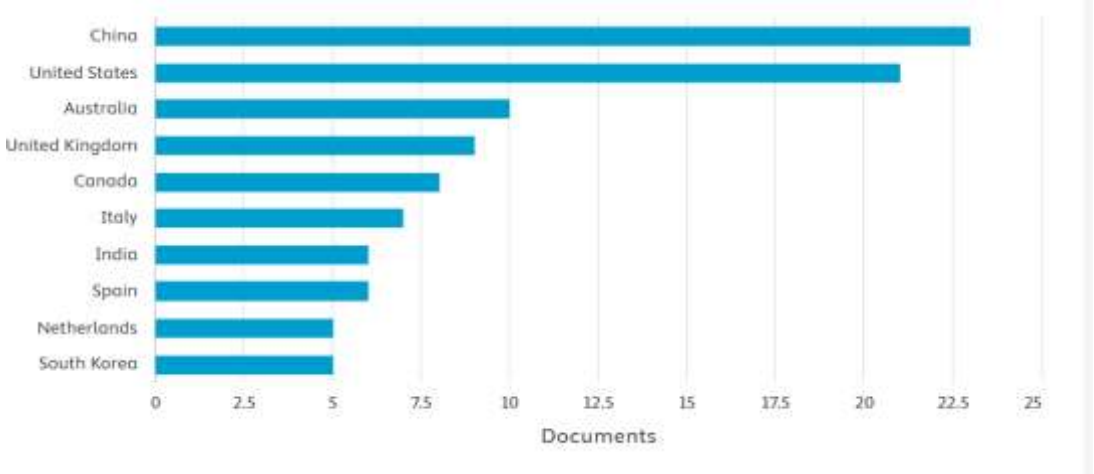

Figure 4.
Development of Documents by Country

Figure 3 shows the distribution of documents by country or region contributing to scientific publications in the field of green accounting and standard setting. The graph shows that China is the country with the highest number of publications, followed by the United States, Australia, the United Kingdom, and Canada (Adow, 2024). These countries play a significant role in the academic discourse on sustainability accounting, not only because of their high number of publications but also because of their position as centers for environmental policy development and global accounting standard setting.

The dominant contribution of these countries can be explained by several factors. First, countries such as the United States, the United Kingdom, Australia, and the European Union have implemented stringent environmental regulations and sustainability reporting, both mandatory and voluntary. For example, the European Union has implemented the Corporate Sustainability Reporting Directive (CSRD) and the EU Green Taxonomy, while the United States has a strong ESG disclosure initiative through the Securities and Exchange Commission (SEC). These regulations drive the need for research linking accounting practices to environmental dimensions, thus enriching the green accounting literature (Luo & Tang, 2023).

Second, several countries play a direct role in the development of international standards. The United Kingdom, as the home of the International Accounting Standards Board (IASB) and the

International Sustainability Standards Board (ISSB), and the United States with its Financial Accounting Standards Board (FASB), are centers of influence in the standard-setting process. This makes research on the relationship between sustainability and financial reporting highly relevant and rapidly developing in these countries.

Third, support for academic infrastructure and research investment are also key driving factors. Universities and research institutions in countries such as the United States, the United Kingdom, and Australia have a long tradition of accounting research, as well as the facilities to support high-quality publications. Furthermore, countries like China rank among the top not only due to rapid economic growth but also due to increasing global pressure for environmental transparency, which encourages companies and academic institutions to produce research related to green finance and environmental accounting (Molnár et al., 2024).

The dominance of these countries in publications is also closely related to the level of ESG integration in capital markets and business practices. Global investors are increasingly demanding transparency on climate risk and sustainability performance, which is driving companies to implement ESG-based reporting. This, in turn, creates a need for academic literature supporting the development and evaluation of green reporting standards (Luo & Tang, 2023).

Overall, as illustrated in Figure 4, the pattern of contributions across countries in publications indicates that green accounting and the harmonization of sustainability reporting standards have become a global agenda, with a strong focus on countries that are institutionally and regulatory leaders in the transition to a green economy. This finding aligns with Tilt's (2018) study, which states that global influence on sustainability reporting is increasing and driving cross-country involvement in the development of green accounting standards and practices.

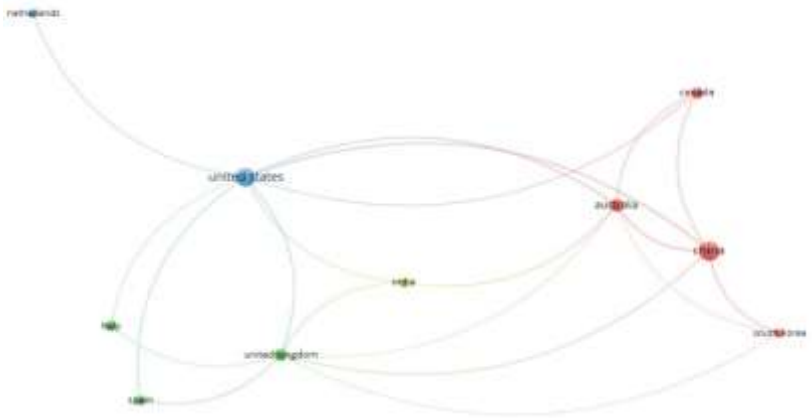

Figure 5.
Development of Documents by Country

4.1.3 Number of Documents per Year by Journal

Table 1 shows the distribution of publications by source journal containing articles related to the topics of green accounting and accounting standard setting. Based on this data, the top 10 journals that contribute the most to the dissemination of literature in this field can be identified. Among these journals, Sustainability Switzerland is the most dominant journal, with a total of 8 documents published, making it a primary source of scientific literature on this topic.

Sustainability Switzerland, published by MDPI, is a reputable multidisciplinary journal that specifically focuses on sustainability issues in various sectors, including economics, the environment, agriculture, and public policy. This journal's dominance aligns with its green accounting topic orientation, which is closely related to sustainability measurement and reporting across various entities. Furthermore, this journal is also known for its high level of open access, expanding its reach and academic contributions globally.

Other journals, such as Buildings, Science of the Total Environment, and Agriculture and Forestry, although not directly accounting-based, publish numerous articles linking sector-specific sustainability practices (such as green construction, general environmental studies, and agriculture) to aspects of environmentally-based financial reporting or evaluation. This demonstrates that green accounting is not confined to the purely accounting discipline but is also developing in an interdisciplinary context, particularly when linked to the ecological responsibility of strategic sectors.

Interestingly, there are also journals with very specific focuses, such as Advances in Nutrition,

Ambio, Water Switzerland, and even the American Journal of Potato Research. Although these journals have only one publication, their presence reflects the widespread adoption and applicability of green accounting principles in various contexts, including food systems, water management, and sustainable agriculture.

Overall, these findings indicate that the topic of green accounting and the harmonization of sustainability reporting standards has entered an interdisciplinary phase, where contributions to theory and practice come not only from formal accounting journals but also from the environmental, engineering, and agribusiness fields. This supports the statement (Buric et al., 2022) by Burritt and Schaltegger (2010), who stated that the success of sustainability accounting depends heavily on cross-sector and cross-disciplinary collaboration.

Table 1. Most Popular Journals on the Topic of Green Accounting and Standard Setting

No.	Nama Jurnal	Jumlah Dokumen
1	Sustainability Switzerland	8 dokumen
2	Buildings	3 dokumen
3	Science of the Total Environment	1 dokumen
4	Advances in Nutrition	1 dokumen
5	Agriculture and Forestry	1 dokumen
6	Ambio	1 dokumen
7	Geophysical Journal International	1 dokumen
8	American Journal of Potato Research	1 dokumen
9	Water Switzerland	1 dokumen
10	Agronomy	1 dokumen

4.1.4 Top Funding Sponsors in Green Accounting and Standard Setting

Table 2 shows the distribution of documents by funding agency (funding sponsor) supporting publications on the topic of green accounting and accounting standard setting. The results indicate that the largest funding comes from international and national public institutions, particularly from Europe, the United States, and China. The Horizon 2020 Framework Programme holds the top spot, with funding for seven scientific papers. This program is one of the European Union's largest initiatives funding cross-disciplinary research and innovation, including in the fields of sustainability, accounting, and public policy. In second place, the European Commission funded six papers, demonstrating Europe's strong regional support for promoting the integration of sustainability principles into accounting practices and reporting.

From the Asian perspective, the National Natural Science Foundation of China (NSFC) and the National Key Research and Development Program of China each funded several articles, reflecting the Chinese government's growing attention to green finance, sustainability reporting, and low-carbon economic development. This is consistent with their national policies encouraging the adoption of ESG and environmental reporting by business entities. In the United States, the National Science Foundation (NSF) plays a significant role in funding interdisciplinary research linking sustainability, technology, and regulation, including green accounting reporting practices. Furthermore, institutions from countries such as Norway (Norges Forskningsråd) and the United Kingdom (EPSRC and UKRI) have also made significant contributions, reflecting the commitment of Northern European countries to research based on energy transitions, environmental sustainability, and corporate governance.

Interestingly, the involvement of institutions such as the National Office for Philosophy and Social Sciences of China indicates that sustainability aspects in accounting are being studied not only from a technical perspective, but also from a social and public policy perspective. Even local governments, such as the ACT Government in Australia, are involved in funding this research.

Overall, these findings indicate that the issue of green accounting and the standardization of sustainability reporting is not only an academic focus but also a strategic agenda for policymakers and international funding agencies (Dwianika et al., 2024). Consistent financial support from these institutions strengthens the topic's position as part of the global transformation towards more transparent, accountable, and sustainable development-aligned reporting practices (Teh & Khan, 2024) (Alrowwad et al., 2022).

Table 2. Top Funding Sponsors in the Topic of Green Accounting and Standard Setting

No.	Nama Lembaga Pendanaan	Jumlah Dokumen
1	Horizon 2020 Framework Programme	7
2	European Commission	6
3	National Natural Science Foundation of China (NSFC)	5
4	National Science Foundation (USA)	5
5	Norges Forskningsråd (Norwegian Research Council)	3
6	Engineering and Physical Sciences Research Council (UK)	2
7	National Key Research and Development Program of China	2
8	National Office for Philosophy and Social Sciences (China)	2
9	UK Research and Innovation	2
10	ACT Government (Australia)	1

4.1.5 Institutional Collaboration in Research

The visualization of the inter-institutional collaboration network shown in Figure 5 shows the structure of collaborative relationships in scientific publications relevant to the topics of green accounting and accounting standard setting. Each node in the graph represents an institution or research center, while the lines (edges) connecting the nodes represent collaboration in the writing or publication of scientific articles. This display demonstrates that the relationships between institutions form a dense and interconnected network, indicating a high level of interconnection and cross-institutional collaboration in research in this field.

Several institutions appear to occupy central positions or high centrality, such as the Center for Research on Inner C, the Department of Family Medicine, the Institute for Clinical Evaluation, and the Center for Health Services and Policy. Their positions in the network indicate important roles as prime movers and liaisons between other institutions. According to Borgatti et al. (2009), actors with strategic positions in academic collaboration networks typically have significant influence in setting the direction of research, expanding thematic coverage, and increasing the visibility of research results. In this context, the existence of this central institution indicates that the topic of green accounting has received attention in interdisciplinary studies involving the fields of accounting, public health, public policy, and social service management.

Furthermore, this dense network structure also indicates that research on green accounting and sustainability reporting standardization tends to involve multiple institutions in a collaborative, rather than individualistic, manner. This aligns with the view of Glänzel and Schubert (2005), who stated that applied and multidisciplinary fields generally produce complex and dense collaborative structures. Such collaboration not only improves the quality and reach of publications but also accelerates knowledge transfer and harmonization between research approaches.

Overall, these results confirm that the development of the green accounting literature is inseparable from the strong influence of institutional collaboration (Chen et al., 2024). This topic has developed not only among accountants or economists but also involves institutions focused on social issues, public health, and environmental policy. This reflects that green accounting is part of a global discourse that requires an interdisciplinary and interorganizational approach to address sustainability challenges.

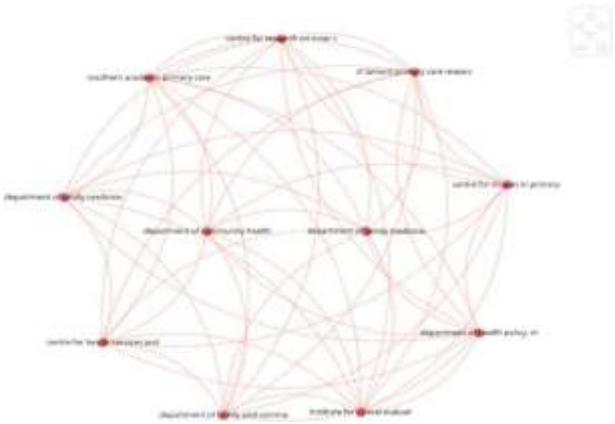

Figure 6. Institutional Collaboration in Research

4.1.6 Co-Authorship Network Analysis

Figure 6 depicts the collaborative network among authors active in research on green accounting and accounting standard setting. Each node represents an author, and connecting lines indicate collaborative relationships in scientific publications—namely, co-authored articles. This network is structured based on the principles of bibliometric co-authorship analysis, which is a method for evaluating the extent to which authors collaborate with each other in producing scientific work.

From this visualization, it appears that the author group forms a highly consolidated structure, with almost all authors connected directly or through short links. This indicates the existence of a coherent research group or consortium of researchers consistently collaborating on the same project or research agenda. Names such as Zhao Dongchang, Lu Linfeng, Sun Xin, Zhang Hongjie, Qian Bing, and Lei Zhenlu appear to be central authors with high connectivity, indicating their dominant role in the publication ecosystem on this topic (Zhao et al., 2023) (Darsono et al., 2024).

In the context of network analysis, authors with the most connections are said to have high degree centrality, meaning they hold strategic positions in the dissemination of ideas and the coordination of scientific collaborations (Newman, 2001). Authors like Sun Xin and Lei Zhenlu, who are centrally located and have numerous connections to other authors, likely served as principal investigators or research team coordinators on the projects underlying these publications.

Interestingly, all authors in this network appear to be from the same affiliation or geographically close proximity, most likely from research institutions in China. This aligns with previous findings that China contributes the most publications on the topic of green accounting, which is also supported by major funding agencies such as the National Natural Science Foundation of China (NSFC). As noted by Glänzel & Schubert (2004), intensive collaboration within a single country or institution often creates strong collaborative clusters, which can improve research efficiency and thematic consistency.

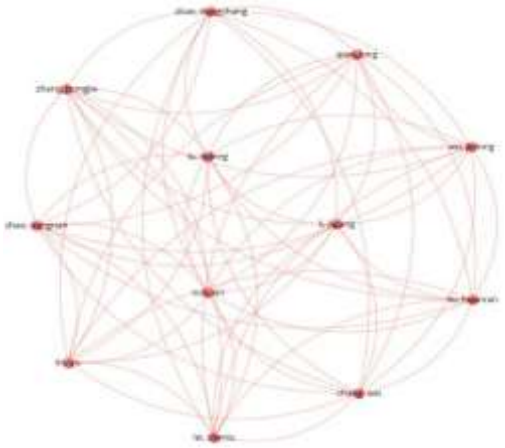

Figure 7.
Co-Authorship Network Analysis

4.1.7 Keyword Network Analysis (Keyword Co-Occurrence)

Figure 8 depicts the keyword co-occurrence network in the literature related to green accounting and standard setting, analyzed bibliometrically. Each node represents a keyword, while the connecting lines indicate the frequency of co-occurrence of the word within a single document or group of documents. The colors in the network indicate the formation of distinct thematic clusters based on semantic associations between terms. This analysis provides a comprehensive overview of the conceptual structure and main research directions in the topic under study.

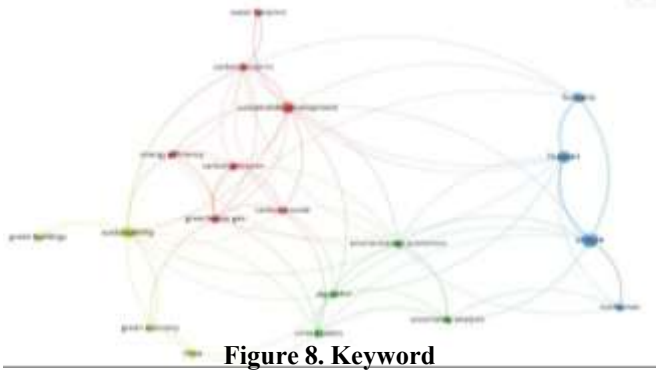

Figure 8. Keyword

4.1.8 Co-Occurrence Red Cluster – Emissions and Carbon Footprint Issues

The red cluster represents a group of keywords closely related to issues of sustainable development, carbon footprint, carbon emissions, greenhouse gases, carbon dioxide, and energy efficiency. This cluster indicates that much research focuses on how economic activity, sustainable development, and energy production contribute to carbon emissions and climate change. The link between sustainable development and carbon accounting reflects the urgency of integrating environmental information into accounting reporting, as explained by Burritt & Schaltegger (2010), who emphasized the importance of measuring environmental impact as part of a sustainable management accounting system.

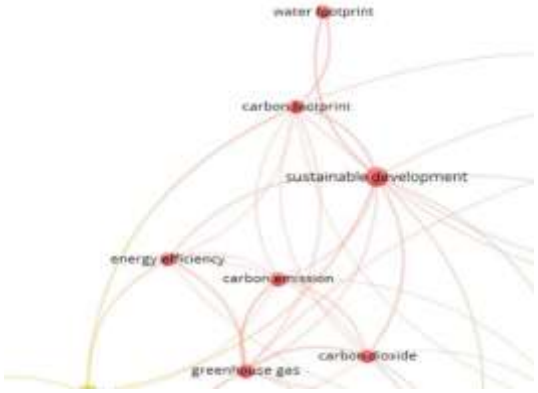

Figure 9.
Red Keyword Cluster

4.1.9 Green Cluster – Environmental Economics and Policy

The green keyword cluster, such as environmental economics, green economy, china, united states, algorithm, and uncertainty analysis, indicates a more policy-based approach and analytical models. The keyword "environmental economics" indicates the study of the impact of environmental externality costs, the efficiency of resource allocation, and data-driven environmental policy evaluation. The presence of the terms "algorithm" and "uncertainty analysis" indicates a trend toward using quantitative approaches and technology (such as machine learning) to model environmental impacts and analyze ESG reporting. This aligns with a study by Gray & Laughlin (2012) (Darsono et al., 2024), which states that green accounting is increasingly evolving toward integrating environmental economics and measurement technology.

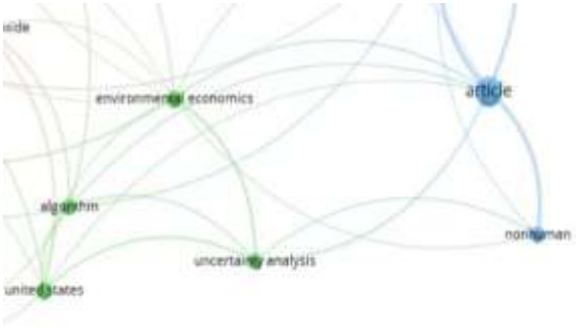

Figure 10. Green Keyword Cluster

4.1.10 Yellow Cluster – Green Infrastructure and Buildings

Keywords such as sustainability, green buildings, and green economy form a subcluster connected to the implementation of sustainable practices in the infrastructure and construction sectors. This highlights the attention to the impact of physical development on the environment and the importance of accounting reports that reflect energy efficiency and the long-term impact of development investments. This connection reflects the practice of life-cycle accounting in sustainable development (Bebbington & Gray, 2001).

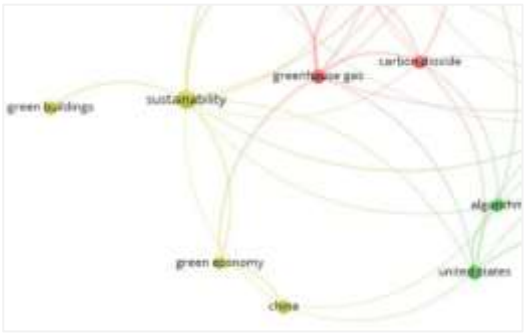

Figure 11. Yellow Keyword Cluster

4.1.11 Blue Cluster – Generic Keywords (Human and Article)

The blue cluster appears to consist of systematic keywords or indexing attributes such as humans, nonhuman, and article, which do not provide specific semantic value to the topic but frequently appear in article metadata. Although not directly thematic, this cluster nevertheless emerged because the analysis drew data from abstracts and metadata provided by indexing engines (such as Scopus or Dimensions).

Therefore, the keyword analysis indicates that the literature on green accounting and sustainability reporting standardization has a broad yet interconnected focus. There are two main trends:

(1) a focus on measuring and mitigating environmental impacts (carbon emissions and ecological footprint), and (2) an econometric and policy approach to developing accountable reporting systems. This network also demonstrates that green accounting is not simply a technical issue in accounting, but has become an interdisciplinary field that integrates the environment, technology, and economics.

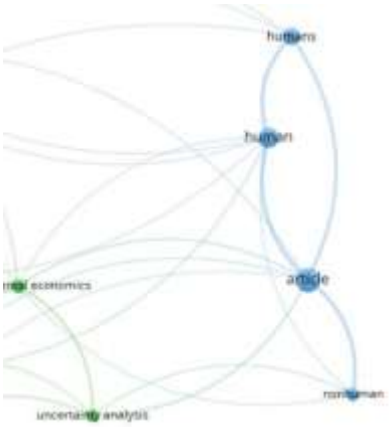

Figure 12. Blue Cluster Keyword

4.1.12 Citation Analysis

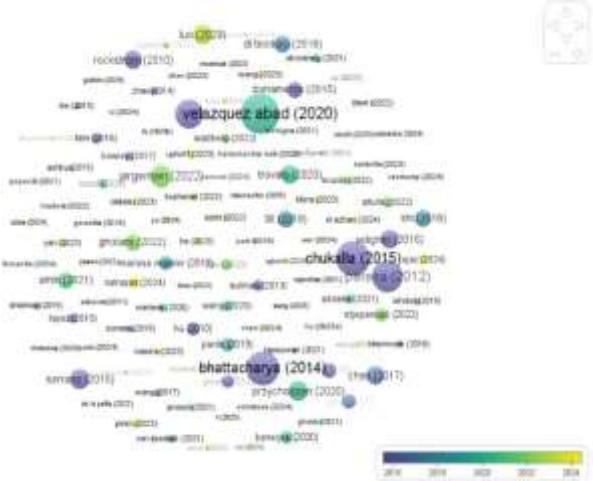

Figure 13. Citation Analysis

A visual analysis of the citation map in Figure 8 provides in-depth insight into the most influential authors in the development of the literature related to green accounting and standard setting. Larger author names indicate high citation frequency, while the color gradient from purple to yellow indicates chronological order by publication year, with purple representing earlier years and yellow indicating more recent publication years. In this visualization, authors such as Velázquez Abad & Dodds, 2020, Chukalla et al., 2015, and Pereira et al., 2012 dominate the central positions with large labels, indicating that their works have become primary references in various subsequent studies.

These highly cited works have made significant contributions to shaping the conceptual and methodological foundations of green accounting. For example, Velázquez Abad & Dodds (2020) provide important insights into the characterization and standards of green hydrogen, which, although originating in the energy domain, have significantly influenced the environmental reporting frameworks now incorporated into sustainability accounting practices. Meanwhile, studies by Chukalla et al. (2015) and Pereira (2012) provide insights into the ecological impacts of economic activities, such as water footprints and the impact of green spaces on health, which align with the environmental dimension of sustainability accounting. Kibria et al. (2023) are known for their application of the balanced scorecard in green supply chains, broadening the evaluative approach to sustainability reporting.

Interestingly, new authors such as Luo (2023), Gholami (2022), and Kim (2023) are gaining prominence despite their work having only been published in the last two to three years. This phenomenon demonstrates the dynamic nature of the green accounting literature, with new contributions replacing or enriching established discourse. This supports Small's (1973) theory of literature turning points, which states that highly cited articles can signal a paradigm shift in a field of study.

The citation map above is also applied in Table 3, showing the highest citations, which also shows that influential works originate not only from accounting but also from environmental, energy, and development economics, confirming that green accounting is an interdisciplinary domain. As Gray and Laughlin (2012) emphasize, the success of sustainability accounting is impossible without holistically integrating social, ecological, and economic approaches. Thus, this citation analysis not only identifies key intellectual actors in the literature but also reveals the scientific evolution and strategic direction for the development of more sustainable future accounting standards.

Table 3. 10 Highest Citation Rates (Citation Analysis)

No.	Judul Artikel	Penulis	Jurnal	Tahun	Jumlah Sitasi
1	Green hydrogen characterisation initiatives: Definitions, standards, guarantees of origin, and challenges	Velazquez Abad, A., Dodds, P.E.	Energy Policy	2020	323
2	Green and blue water footprint reduction in irrigated agriculture: Effect of irrigation techniques, strategies and mulching	Chukalla, A.D., Krol, M.S., Hoekstra, A.Y.	Hydrology and Earth System Sciences	2015	237
3	Green supply chain performance measurement using fuzzy ANP-based balanced scorecard	Bhattacharya, A., Mohapatra, P., Kumar, V., Tiwari, M.K., Nudurupati, S.S.	Production Planning and Control	2014	227
4	The association between neighborhood greenness and cardiovascular disease	Pereira, G., Foster, S., Martin, K., Knuiman, M., Giles-Corti, B.	BMC Public Health	2012	199
5	Design and Implementation of Color-Shift Keying for Visible Light Communications	Monteiro, E., Hranilovic, S.	Journal of Lightwave Technology	2014	170

6	Sustainability reporting and approaches to materiality: Tensions and potential resolutions	Jørgensen, S., Mjøs, A., Pedersen, L.J.T.	Sustainability Accounting Management and Policy Journal	2022	98
7	First-mover advantages in green innovation—Opportunities and threats for financial performance	Przychodzen, W., Leyva-de la Hiz, D.I., Przychodzen, J.	Corporate Social Responsibility and Environmental Management	2020	83
8	Virtual Water Flows in the EU27: A Consumption-based Approach	Serrano, A., Guan, D., Duarte, R., Paavola, J.	Journal of Industrial Ecology	2016	83
9	The real effects of ESG reporting and GRI standards on carbon mitigation: International evidence	Luo, L., Tang, Q.	Business Strategy and the Environment	2023	79
10	Life-cycle assessment and monetary measurements for the carbon footprint reduction of public buildings	Trovato, M.R., Nocera, F., Giuffrida, S.	Sustainability Switzerland	2020	71

4.2 Conceptual and Strategic Implications for Companies

The results of this bibliometric study indicate that green accounting has emerged as a crucial foundation for developing new global accounting standards. Through analysis of keywords, citations, and author and institutional networks, a consistent trend in the literature emphasizes the importance of measuring and reporting environmental impact as an integral part of corporate accounting. Influential authors such as Velázquez Abad (2020), Bhattacharya (2014), and Chukalla (2015) have made substantial contributions to integrating sustainability issues—such as carbon footprint, energy efficiency, and greenhouse gas emissions—into systematic reporting practices. This suggests that companies can no longer separate financial reporting from social and environmental responsibilities but need to formulate a holistic and standardized reporting approach.

From these findings, it can be concluded that companies need to take strategic steps by integrating green accounting systems into their internal and external reporting processes. This integration encompasses three main dimensions: (1) environmental aspects through measuring the ecological impact of operations, such as emissions and water footprints; (2) economic aspects through the application of life-cycle costing, green budgeting, and resource efficiency evaluation; and (3) social and governance aspects through increased ESG transparency and stakeholder engagement. The findings also indicate that the adoption of global sustainability standards—such as ISSB or GRI—has become a strong trend in the literature, and therefore companies need to respond by establishing sustainability reporting units and strengthening the capacity of accounting human resources.

Furthermore, strengthening green accounting systems serves not only as a tool for regulatory compliance but also as a means to build investor confidence, improve operational efficiency, and strengthen the company's position in a market that increasingly demands environmental accountability. Therefore, companies that are able to systematically adopt this approach will gain a long-term competitive advantage. As stated by Gray and Laughlin (2012), the success of sustainability reporting lies in the multidisciplinary integration of financial and non-financial information that more fully reflects the company's socio-ecological reality. Therefore, the results of this study not only enrich the academic discourse on sustainability harmonization and accounting standardization but also provide a practical basis for transforming corporate reporting policies toward a more responsible and sustainability-oriented model.

5. Conclusion

This study presents a bibliometric review of the development of green accounting literature in the context of global accounting standards formation. The analysis shows that attention to sustainability and environmental reporting has increased significantly, particularly in the last decade. This is evidenced by

the increasing number of publications, the expansion of institutional collaborations, and the dominance of topics such as carbon footprint, sustainable development, and ESG reporting.

Highly cited authors, such as Velázquez Abad (2020), Bhattacharya (2014), and Chukalla (2015), have been influential in directing the research agenda toward integrating accounting with environmental and social issues. These findings demonstrate that green accounting is not only developing as an academic discourse but is also beginning to shape a reporting standards framework that is more inclusive and oriented toward long-term sustainability.

For business practice, this research emphasizes the importance of adopting a reporting system that focuses not only on conventional financial information but also encompasses a company's environmental and social impacts. Within the conceptual framework developed, green accounting lies at the intersection of three main pillars: environmental, economic, and governance dimensions. These three aspects mutually support each other in shaping reporting practices that are transparent, accountable, and aligned with the demands of sustainable development.

6. Limitations

While this study contributes to comprehensively mapping the development of green accounting literature, several limitations are worth noting. First, the bibliometric data was only drawn from the Scopus database, so there may be relevant articles in other databases, such as Web of Science or Google Scholar, that were not captured in the analysis. Second, although the bibliometric approach is capable of showing quantitative trends, this analysis does not directly assess the quality of the content or theoretical depth of each publication. Third, the visualization approaches used, such as co-authorship, keyword co-occurrence, and citation mapping, are descriptive in nature and do not fully capture the conceptual nuances or differences in regional contexts that may influence the development of green accounting.

For future research, it is recommended to combine bibliometrics with systematic analysis or meta-analysis of content, resulting in a deeper synthesis, both conceptually and practically. Furthermore, further exploration of the context of developing countries including Indonesia could make an important contribution to understanding the challenges of green accounting implementation outside the countries dominant in the global literature.

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