

Review Article

Environmental Accounting and Corporate Disclosure: Global Research Trends and Conceptual Clusters

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Abstract

This study provides a bibliometric review based on 1,891 Scopus-indexed records to integrate the trends and conceptual framework discussed in environmental accounting and corporate disclosure research. The results show intensive research growth since 2015, mainly led by Chinese, American, and Australian authors. Three categories were generated through thematic analysis: environmental strategies, corporate social responsibility, and accountability modes. Environmental accounting has developed from reporting to a strategic management tool, which is closely related to corporate governance, reputation, and sustainability performance. Additional findings show that the strength of international collaboration networks has increased over time, especially with Chinese and European institutions, reflecting a trend towards increasingly globalized research collaboratives. The keyword co-occurrence map indicates a shift in research priorities, from early attention to environmental cost accounting to the latest emphasis on climate-related disclosure, ESG integration, and low-carbon transition strategies. It also shows an increasing academic focus on regulatory drivers, including IFRS S2, the EU CSRD, and national emission policies. The cross-cluster comparison of differences implies a growing similarity in environmental responsibility accounting, corporate strategy, and stakeholder expectations, which underlines a move towards more consistent and decision-useful sustainability reporting systems.

Keywords: Bibliometric; clean water; ESG; green accounting; sustainability report

1. Introduction

Concerns regarding sustainability and respect for the environment have become increasingly important globally. KPMG (2022) reported that over 96% of the world's largest 250 companies published their sustainability performance and disclosures, reflecting environmental, social, and governance (ESG) as a corporate governance theme. Environmental and sustainability accounting are

powerful means of increasing transparency because they provide companies with information to understand, measure, and report their environmental impact. Sustainability reporting, as an instrument to evaluate corporate environmental performance, has the potential to improve CSR disclosure in both internal and external aspects, enhance companies' reputation through social legitimacy, and create stakeholder trust (Razali et al., 2025). In the context of the growing globalization of the economy and increasing stakeholder pressure, environmental accounting has staked its claim as an integral part of sustainable corporate policy (Omran and Yaaqbeh, 2023).

Research on environmental accounting and corporate reporting suggests that companies incorporate environmental and social dimensions more extensively into their financial statement frameworks. Research has shown considerable evidence that enhanced environmental transparency results in greater firm value and closer relationships between investors and society (Manita et al., 2018; Oncioiu et al., 2020). The literature on the rationales of transparency and disclosure of CSR sustainability practices has been widely addressed by legitimacy theory and stakeholders (Akhter et al., 2023; Bunea, 2018). Notwithstanding the increasing number of publications, research in environmental accounting is fragmented, delivering a range of methodological and theoretical orientations with the emergence of globalized initiatives (CSRD) from Europe. To understand how environmental accounting research has evolved, it is necessary to deliver a more detailed scientific map that encompasses both conceptual and geographical dimensions.

Previous review studies by Bilal et al. (2024) primarily mapped general sustainability accounting trends or focused on narrower themes, such as carbon reporting or ESG disclosure. The current study extends the literature by employing a more comprehensive bibliometric approach that integrates performance analysis, science mapping, and conceptual structure modelling. Unlike prior studies that focused on case studies or basic analyses, the current study uses a bibliometric method to plot the progression of research in environmental accounting and corporate disclosure. The bibliometric approach offers an empirical and objective overview of publication trends, international collaboration networks, and conceptual structures in this area (Bilal et al., 2024). While earlier bibliometric reviews generally examined limited datasets (200–700 documents) or were centered on specific disclosure themes, this study significantly expands the scope by reviewing 1,891 Scopus-indexed publications covering two decades of scholarship (2004–2024). This study represents one of the largest bibliometric studies on environmental accounting to date, as it reviewed 1,891 documents indexed in the Scopus database. Moreover, a full content analysis of ten key articles was conducted to identify emerging themes and research directions. This dual-stage review (bibliometric and qualitative synthesis) also addresses a gap identified by prior scholars, who emphasized the need to connect quantitative mapping with substantive content insights to enhance interpretive depth in environmental accounting reviews. Integrating qualitative and quantitative methods allows for a more holistic examination of how research in sustainability accounting has developed along theoretical, empirical, and policy dimensions.

The main purpose of this study is to map the scientific literature and research trends in environmental accounting, sustainability accounting, and the interrelation between corporate reporting and financial performance. More precisely, this research attempts to: (1) identify a temporal, geographic, and thematic evolution of publications within these domains; (2) classify previous studies into three main conceptual clusters (environmental management, green cluster; corporate social responsibility, blue cluster; and accountability strategies, red cluster); and (3) propose future research directions based on a synthesis of the gaps and opportunities discovered through this study. Thus, the results of this research are expected to contribute to a theoretical understanding and practical implications for the advancement of sustainability accounting literature and for practitioners to design more transparent and sustainability-oriented reporting systems.

2. Methods

This research conducted on studies is bibliometric, which is applied in a typical research method in management and accountancy studies to identify new academic arenas (Chen et al., 2016; Hou and Wang, 2021; Tan et al., 2021). This approach allows academics to determine the intellectual framework and thematic organization that exist for specific subject areas. The study is guided by a strict methodological framework, commencing with conversations among researchers to determine screening criteria and research boundaries, advancing to independent replication and transparency regarding the research (Polanin et al., 2019; Wansink and Ittersum, 2016). The bibliographic information for the study was obtained from the Scopus database, one of the foremost databases of management and accounting research publications. The Scopus database ensures that users do not select articles from only a few specific journals, which can potentially result in bias and data deletion. The initial data collection occurred on November 1, 2025, by recording all publications that were available, focusing on environmental accounting and corporate reporting. The literature search employed a combination of keywords categorized into three main groups: (a) main keywords, (b) context keywords, and (c) scope keywords, as suggested by Grames et al. (2019). The primary search string included: “environmental accounting” OR “green accounting” OR “sustainability accounting” OR “environmental management accounting” AND “corporate reporting” OR “disclosure” OR “financial performance.”

The choice of keywords in this study followed the recommendations of Tarquinio and Posadas (2020), and the determination of specific keywords follows the practice of adopting a diversity of terminologies with regard to the sustainability accounting literature. We did not impose any barriers to other research fields of knowledge or publication sources and restricted the language to English to preserve a consistent and homogeneous representation in the sampled literature. The first filter yielded a total of 4,829 documents that were considered, which were then refined into a dataset comprising 1,891 articles that met the inclusion criteria. The analyses of all documents were conducted using Bibliometrix (R) and VOSviewer, two main tools commonly used in bibliometric research (Akbari et al., 2020; Kemeç & Altınay, 2023). The capabilities of such tools facilitate multidimensional analyses by incorporating data regarding a number of bibliometric performance measures, including annual publication trends, author collaboration networks, citation mapping, and keyword co-occurrence testing. Such an approach provides greater analytic insight into the conceptual and intellectual configuration of the research enterprise (Bogers et al., 2017). A quantitative analysis was performed, and a qualitative sectional analysis was conducted on ten influential articles to gain insight into the conceptual trends and thematic backgrounds of those clusters. This combination of quantitative and qualitative analytical approaches forms a broad picture of the trajectory of research in the area of environmental accounting and sustainability reporting. An extensive research strategy was developed with respect to keywords, sources, and the volume of publications evaluated. To define the conceptual clusters, this study adopted a structured interpretative procedure that combined algorithmic output and qualitative validation. First, VOSviewer generated keyword co-occurrence networks using the association-strength normalization method, which grouped frequently co-occurring terms into distinct color-coded clusters. Second, for each cluster, the authors examined the most central and frequently occurring keywords (typically the top 10–15 terms by total link strength) to identify the dominant conceptual theme. Third, cluster names were assigned based on the shared semantic patterns and thematic coherence of these keywords, supported by cross-checking with influential publications associated with each cluster. For instance, clusters characterized by terms such as “accountability,” “governance,” “standards,” and “regulation” were labeled as Accountability Strategies (red cluster); clusters dominated by “environmental impact,” “management,” “sustainability practices,” and “regulatory compliance” were labeled as Environmental Management (green cluster); while clusters with keywords including “CSR,” “stakeholder theory,” “emissions,” and “social responsibility” were defined as Corporate Social Responsibility (blue cluster). This combined data-driven and interpretative method ensured transparency, conceptual accuracy, and methodological rigor in assigning cluster names.

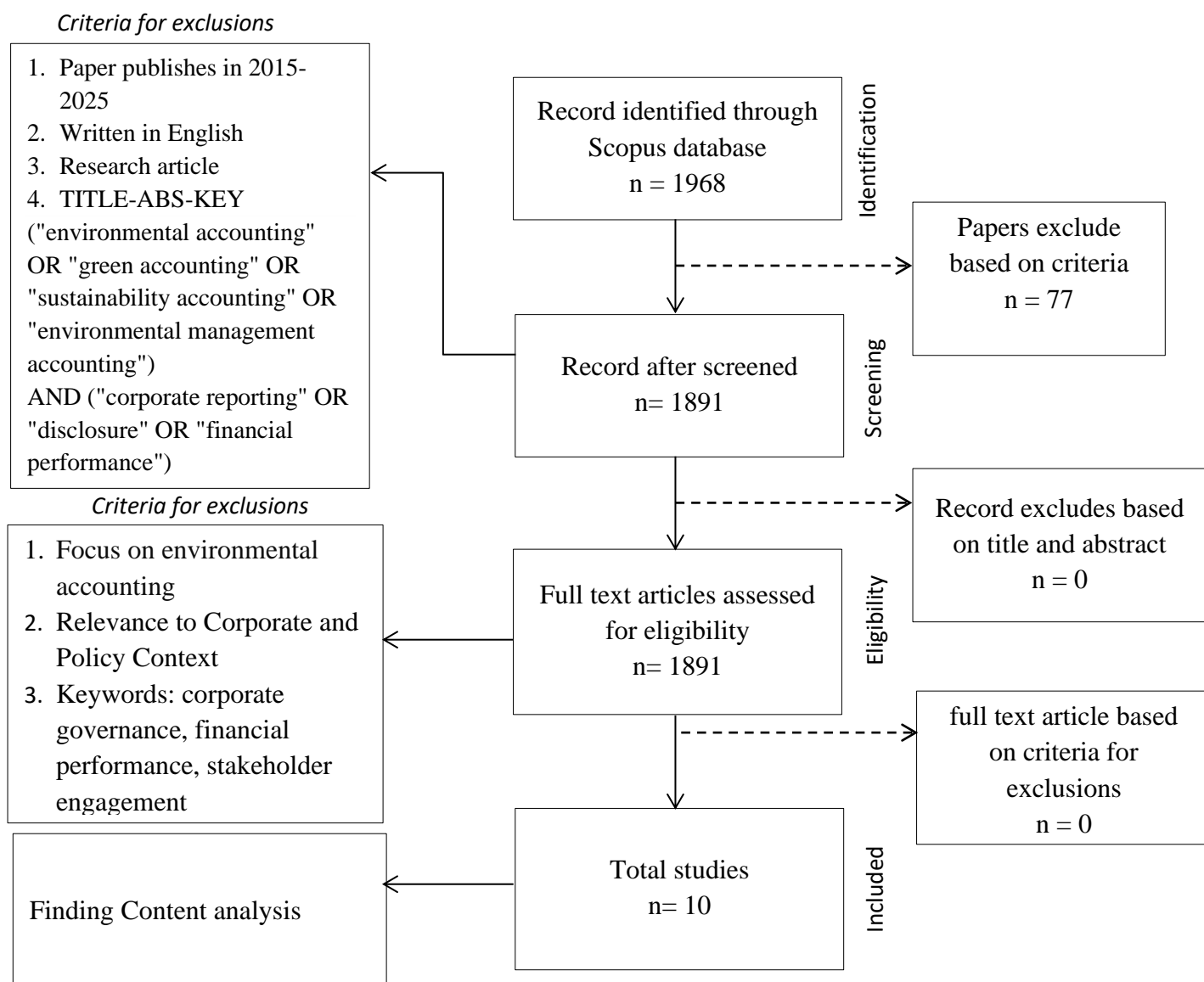


Figure 1. Research data

3. Result

3.1. Bibliometric Analysis

The results demonstrate a phenomenal leap in research in the field of environmental accounting and corporate transparency in the past two decades. The first research papers in this area were published in the early 2000s but significantly increased after 2015, coinciding with the adoption of the Sustainable Development Goals (SDGs) and greater global attention to environmental, social, and governance (ESG) disclosures. The consistent upward trend of annual publication tendencies suggests that environmental accounting has emerged as a key component of the mechanism for sustainability reporting and corporate environmental governance. The distribution of publications by the countries of the corresponding authors is illustrated in Figure 2. China is the largest contributor to these findings, followed by the USA and Australia. The prevalence of these three countries among SCPs and MCPs is indicative of the significance of their roles as central stakeholders in national and global collaborations.

Other European countries, such as the UK, Italy, and Germany, also play an important role in the development of sustainability accounting literature. Meanwhile, developing economies such as Indonesia, India, and Malaysia have become increasingly engaged in cross-country cooperation. Therefore, research in environmental accounting is not so much in a regional direction but rather has risen from a regional one and evolved on the academic ladder worldwide. The number of documents from the corresponding authors from each country is shown with turquoise bars corresponding to SCPs and pink bars corresponding to MCP publications in Figure 2.

The analysis of the top authors, as shown in Table 1, shows Heather Keith as being the most productive and having the largest citation impact, followed by Charl de Villiers, David B. Lindenmayer, and Ralph O. Dubayah. Most scholars come from research institutions in Australia and the United States, confirming that these countries are leaders in shaping sustainability reporting research. In addition, the co-citation analysis shows that Adams (UK), Carol (USA), and Brown (UK) are the most commonly co-cited authors, which further corroborates their theoretical prowess in the field. Table 1 shows that the top ten authors together deliver between 2% and 16% of the total publications studied.

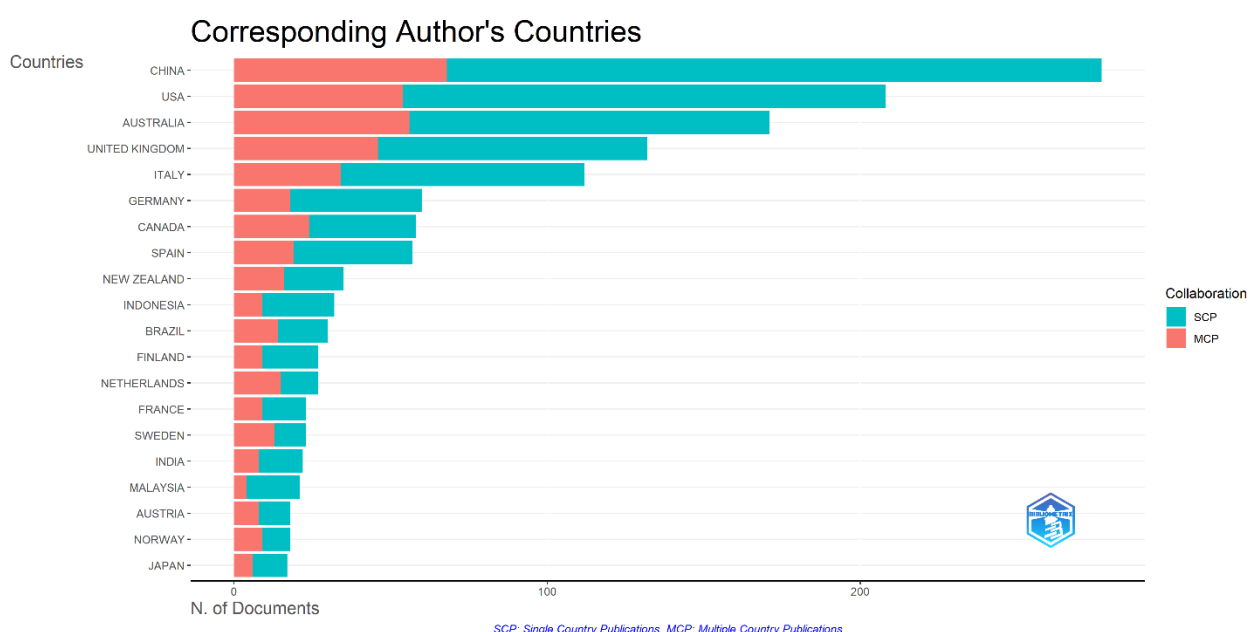


Figure 2. Distribution of the countries of origin of correspondents in environmental accounting research

Table 1. Top 10 authors and co-cited authors in environmental accounting research (n%).

Rank	Author	Country	N (%)	Co-cited Author	Country	Citations
1	Heather Keith	Australia	13.95%	Adams, C.A.	UK	338
2	Charl de Villiers	New Zealand	11.63%	Carol, A.	US	337
3	David B. Lindenmayer	Australia	16.28%	Brown, J.	UK	309
4	Ralph O. Dubayah	United States	16.28%	Mark, T.	US	300
5	Brendan G. Mackey	Australia	9.30%	Baker, R.	US	291
6	Carl Gordon Obst	Australia	9.30%	Anderson, M.	US	272
7	Michael J. Vardon	Australian National University, Australia	11.63%	Judy, A.	Canada	261
8	James W. Boyd	Resources for the Future,	4.65%	Gregory P.	US	258

Figure 3. Keyword co-occurrence treemap of environmental accounting literature

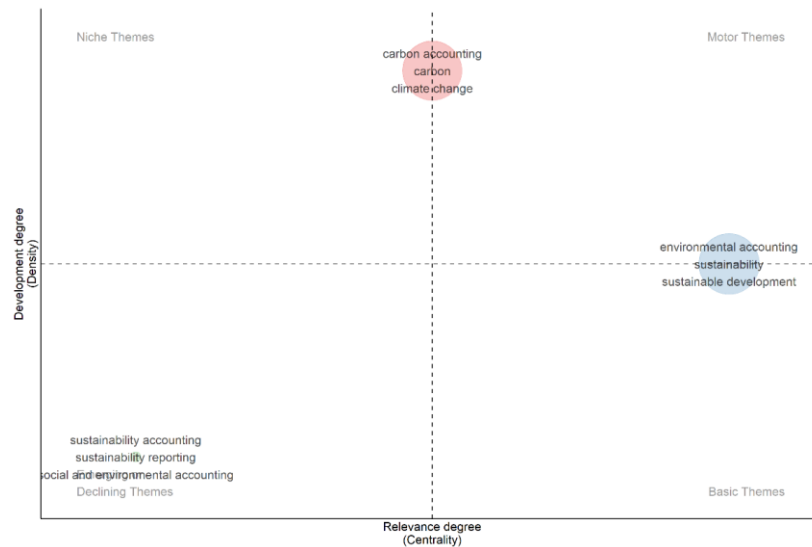


Figure 4. Thematic map of environmental accounting and corporate disclosure research

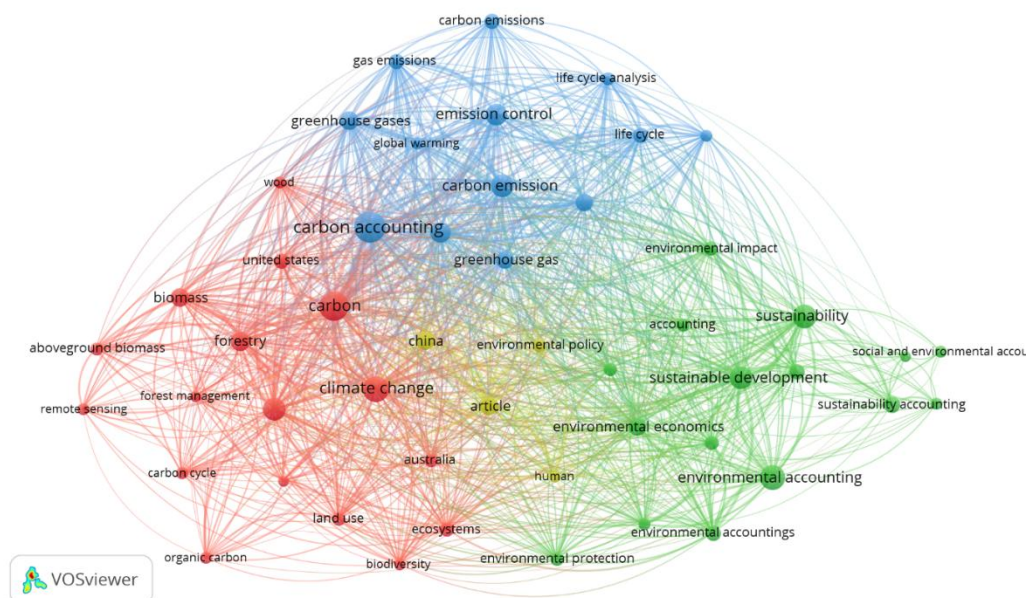


Figure 5. Co-occurrence analysis

From the thematic map (see Figure 4), the concern of the literature in environmental accounting has shifted away from environmental impacts and towards accountability mechanisms and sustainability reporting in general. The principles and topics of environmental accounting, sustainability, and sustainable development are central, topical, and form the basis of the environmental accounting literature. In contrast, carbon accounting and climate change (i.e., both are in the niche themes quadrant) are, at present, more specific to carbon measurement, emission disclosure, and climate change mitigation. Conversely, sustainability accounting and sustainability reporting exist in the declining themes cluster, which implies that this study's research has shifted from an agenda-driven sustainability reporting to an analytical and quantitative framework. The results support global trends emphasizing the increasing utilization of international sustainability reporting standards, particularly the Global Reporting Initiative (GRI) and the IFRS Sustainability Disclosure Standards. Moreover, as illustrated in the co-occurrence analysis (Figure 5), there are three thematic clusters that are inter-

related to environmental accounting literature. A cluster on environmental accounting and sustainability. A cluster on carbon accounting and emission measurement; a cluster on climate change and natural resource management. Collectively, the clusters underscore the fundamental shift in the paradigm from classical environmental disclosure to a more strategic and holistic view of the links among economic performance, social accountability, and ecological sustainability as part of larger sustainable development.

3.3. Green cluster: Environmental management

Research on green clusters relevant to sustainability accounting and environmental management. This cluster endorses the environmental roots of corporate responsibility, despite being confronted by mounting external demands from stakeholders and regulators, particularly companies with substantial ecological footprints. Therefore, environmental accounting is recognized as a critical tool for facilitating the transition toward global sustainability (Chang et al., 2016). In this regard, corporate environmental disclosures have been widely researched in terms of their association with business strategies towards sustainability and organizational legitimacy. For instance, Silva-Gao (2012) found that voluntary environmental capital expenditure disclosures of U.S. electric utility companies are determined by regulatory pressures and firms strategic responses to achieve social and market legitimacy. This clustering suggests that environmental accounting involves more than just reporting; it is an end resource implicated by and highlights the way in which these elements of corporate options and regulators are located within a broader narrative of sustainable development. In addition to the narrow view point of environmental accounting, a few studies of the Green Cluster have also show some strategic effects from corporate environmental disclosures. He et al. (2019) argue that external pressures to comply with sustainability targets, combined with the availability of funding markets, motivate firms to signal how they can operate more sustainably and openly in terms of the environment. Clay et al. (2021), study the influence of environmental regulation (Control Air Act, CAA) on disclosure framework by the corporates during reporting framework. After having reviewed the role of accounting as a critical practice they consider the challenges and benefits of transition in CAA P1 and P2. In a follow-up to the 10-K disclosures of public companies, Larson and Singer (1992) suggest that required disclosure is essential for environmental transparency. Indeed, Kraft (2018) argues that both the regulatory burden and market competition contribute to the environment reporting ratio and its nature among utility firms as well. In total, the cluster between them also supports as well that the release of environmental information should be interpreted as a management (instead of purely administrative) practice in order to prevent external pressure or competitive pressures on a company and protect a company against competition, improve and promote the reputation of this latter and sustainable value over time. Accordingly, the study in question deserves to be carried out with especial reference to shareholders, stakeholders and regulatory bodies (Clay et al., 2021; He et al., 2019; Kraft, 2018; Silva-Gao, 2012)

3.4. Red cluster: Accountability strategies

Red Cluster researches most notably researching in relation to accountability and governance dimensions of sustainability report. This cluster features research on how organizations develop and adopt reporting frameworks and accountability standards to make their ESG performance visible. It largely focuses on firms' responses to pressure from regulatory authors, investors, and society at large, resulting in formally renowned reporting frameworks (e.g., Global Reporting Initiative (GRI), IFRS Sustainability Disclosure Standards) (Igneau et al., 2023). In analyses of the cluster, evidentiality reporting is not only a communication tool but also an instrument for coating and controth be a nature of the managerial role in creating a company's strategic position with stakeholders. Consequently, ESG reporting is increasingly viewed as a corporate governance tool focused on long-term accountability and public trust, not just regulation. Studies in this category largely rely on neo-institutional theory, which

argues that the acceptance of sustainability disclosure practices results from coercive and normative pressures by agencies (Yusoff et al., 2019). In this context, ESG reporting is a strategic behavior for companies to obtain legitimacy by complying with prevailing institutional standards and disclosure channels. Additionally, Al-Amosh and Mansor (2020) claim that ownership structure is treated as a single, highly significant factor that moderates environmental disclosures, regardless of its level and design. While private companies are more self-dependent in disclosing E&S information to investors and the pending legal environment, state-owned firms prefer to adhere. In general, these findings illustrate the influence of institutional pressure and corporate ownership structures on sustainability reporting. In addition, the red cluster reflects that sustainability reporting is related to governance effectiveness and internal accountability mechanisms. The accountability of corporations has been explored by Kaur and Lodhia (2018) and Abeysekera How to cite this paper: (2022), who found it is an intrinsic component of whether sustainability reporting arrangements are effective in embedding strategic planning for the development towards sustainability. So, ESG reporting is seen not just as a mechanism for external disclosure but also as an unrelated part of the system of performance management. In summary, the red cluster describes a shift from compliance-based to governance-based strategic accountability accounting where such trust is established and enhanced in the longer term (Cruz Dallagnol et al., 2023; Flammer et al., 2019; Kuruppu et al., 2024).

3.5. Blue cluster: corporate social responsibility

The Blue Cluster is related to CSR research on sustainability reporting. This cluster reflects a paradigm shift in the enterprise, from being financially oriented conflicts to balancing three different performance levels (accession towards the economy, society, and environment). From the network visualization shown in Figure 5, we find that “carbon accounting,” “carbon emission,” gas emissions,” and control arthe main terminologies. The findings suggest that the corporate social responsibility has shifted from a broad-based function to an interest in reducing climate change and managing carbon emissions (Jakučionytė-Skodienė & Liobikienė, 2021). The studies of this cluster are very legitimacy theory/ stakeholder theory-driven as legitimacy and stakeholders perceptions put a lot of emphases on the relationship between CSR reporting and society trust. Yu et al. (2018) and Alsayegh et al. The latter (2020) argue that firms are induced to reporting their environmental and social records more transparently because of increasing pressures from investors, customers, as well as international finance bodies. Arevalo and Aravind (2017) also claim that CSR reporting is a combined device for the companies to add value to their reputation, as well as stock performance through the quantitative data on operational emissions and energy. In the Blue Cluster we can observe that CSR has moved from being philanthropy to be accountability a part of strategy and governance. As Aslaksen et al. (2021), CSR has been increasingly recognized as a value-added factor for achieving long-run sustainability, and mitigating the risk of reputational loss. In addition, by bringing CSR together with environmental reporting, global standards like the Task Force on Climate-related Financial Disclosures (TCFD) and IFRS S2: Climate-related Disclosures may also be incorporated to expand even further the future-oriented development of social reporting as a strategic tool for corporate planning and public policy. Thus, the blue cluster signals a transformation from CSR as symbolic or moral gesture to CSR as strategic accounting of pathway to low carbon economy. (Baranova and Meadows, 2017; Fu et al., 2024; Yuan et al., 2022).

4. Discussion

This bibliometric study seeks to aid knowledge and help to define the state of research in environmental accounting and sustainability reporting, thereby providing evidence for the evolution of the relevant literature. This chapter offers an initial snapshot of current research trends, especially regarding the implementation of accountability mechanisms and sustainability reporting practices in different sectors of industry. This is becoming increasingly important with the emergence of more

global initiatives being initiated by international policy institutions and the increasing acceptance of sustainability reporting frameworks. The first reflection stresses the importance of a management element, the managerial aspect, in the field of sustainability reporting. This means that companies, especially in the environmental and energy sectors, face intense external pressure from the public and regulators. At the same time, ESG reporting is not just an instrument of disclosure but a management method for controlling a company's reputation and enhancing its social legitimacy. These results validate previous research, illustrating the vital role of stakeholder engagement in sustainability reporting and its relevance for organizational transparency and accountability (Camilleri, 2015; Silva-Gao, 2012).

Second reflection, the second underlines the importance of link between sustainability reporting and corporate governance. The proliferation of accountability mechanisms demonstrates the growing pressure for additional research exploring how elements of ESG reporting can influence managerial decision-making processes. Prior empirically studies have demonstrated that ESG reports serve as a means for external communication and information resources internally with more favourable mechanisms to also increase the effectiveness of decision-making (Hsieh, 2024; In et al., 2019). The final reflection focuses on the place of accountability processes in corporate business models. The recent history is, that the academic and practising communities also recognized that sustainability reports are (quasi) turning into more than an external communications instrument, as they are strategic sources of information for evaluating how a company's business activities impact on the environment and society. Accordingly, the future studies will examine how much ESG reporting affects the corporate strategy for value creation in the long-run. It helps to extend sustainability as not just a part of corporate efficiency, but also a process towards business model innovation that enables firms for relocation into green economy (Luo and Cheng, 2023; Söderholm, 2020). While the field changes quickly and quite concrete due to a strong activity in recent years with its concentration around medical image analysis. The presence of these three clusters also means that, still it is evolving fast we have some fragmentation and we need to develop stronger integration - perhaps by thinking about solutions that are more integrative per se (based on a variety of disciplinary approach). The Nomological Net of Sustainability Research A literature stream is also promising methodological orientations, sectoral settings and reporting context to contribute with the semblance of a divergence in sustainability research and implying for theoretical unification (de Villiers et al., 2022; Dumay et al., 2023). Thus, rather than a study the theory of this article also develops a future pragmatic research that seeks how accounting can facilitate for and activate or led to result change over to sustainable development. Future work on such research should thus tap into notions of governance environmental management and corporate responsibility to build more integrated sustainability accounting systems and to investigate how the reporting of ESG is contributing to deep long-term strategic transformation towards a green and resilient economy (Khan et al., 2023; Boiral & Heras-Saizarbitoria, 2020).

Table 2. Future research directions

Green Cluster: Environmental Management	Blue Cluster: Corporate Social Responsibility	Red Cluster: Accountability Strategies
Exploring environmental performance indicators used by companies with high emission levels (Silva-Gao, 2012)	Evaluating the role of practitioners in strengthening sustainability reporting practices (Pérez-López et al., 2015)	This highlights the specific accountability mechanisms implemented by public companies (Stafford & Stapleton, 2017).

Green Cluster: Environmental Management	Blue Cluster: Corporate Social Responsibility	Red Cluster: Accountability Strategies
Examining the relationship between sustainability reporting and ESG indicators across industries (Buallay, 2020)	Assessing the relationship between climate change mitigation strategies and carbon reporting (Long et al., 2018)	Evaluating the impact of implementing reporting standards, such as the GRI, on public utility companies (Mamun, 2023)
Expanding scientific research on the relationship between stakeholder engagement and sustainability reporting (Kaur and Lodhia, 2018)	Assessing the effectiveness of social and environmental disclosures on corporate reputation and market value (Ghuslan et al., 2021)	Assessing differences in accountability practices between private and public companies (Cooley, 2020)

5. Conclusions

Sustainability reporting has been a key focus in contemporary studies of accounting and management in terms of contemporary issues. This paper illustrates the main role of environmental accounting in the integration of economic, social, and ecological aspects of corporate performance. In line with the research objectives, this study provides a comprehensive mapping of scientific developments in environmental accounting and sustainability reporting and identifies the dominant conceptual structures driving the evolution of the field. Through a bibliometric framework, this study maps empirical trends in the scientific evolution of environmental accounting knowledge and offers new avenues for investigation in the context of environmental management, corporate social responsibility, and corporate accountability systems as emerging areas of research. Subsequently, the measure is that based on how the practice is done is a good beginning to address this and that data sets, data sets can be a good base to make improvement on and for the process improvements of reporting and accountability which organizations can use to their advantage. Structured environmental data enhance transparency, reputation, and build trust regarding sustainable practices with the community, employees, and investors. These observations highlight the increasing importance of standardized, comparable sustainability information, which aligns with the aim of identifying emerging trends and future research opportunities. There is value in scholars, practitioners, and policymakers coming together to respond to the future issues of generating a common reporting standard that reflects changes in global and individual domestic situations. However, specific limitations of the data and analyses are addressed in this study. This study suggests further research to broaden its sectoral and geographic coverage and to develop an extensive set of quantitative and qualitative data.

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Declaration of Generative AI and AI-assisted technologies in the writing process

The author(s) used Chat GPT-3.0 to improve readability and language understanding during the preparation of this work. After utilizing this AI technology, the author(s) meticulously reviewed and amended the content as required to ensure its accuracy and completeness. The author(s) assumes complete accountability for the content of the publication.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Ethnic Statement

The authors of this article did not perform any studies with human participants.

CRediT Author Statement

Ericke Fridatien: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, resources, software; **Annisa Sila Puspita:** Writing Review and Editing, Formal Analysis, Project Administration, Resources, Supervision; **Marah Ammar:** Project Administration, Resources.

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