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Research trends on environmental, social, and governance in SMEs: A bibliometric analysis

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Abstract

Research aims: This study used a scoping review and bibliometric analysis to analyze all publications on Environmental, Social, and Governance (ESG) study trends, specifically in the context of Small and Medium Enterprises (SMEs).

Design/Methodology/Approach: Ninety-four (94) ESG articles on SMEs indexed in the Scopus database were described through coverage and bibliometric analysis. The articles were analyzed based on the number of publications per year, contributing countries, authors, and cited documents. Furthermore, VOSviewer was used to provide a visual analysis of keyword occurrences.

Research findings: The growing body of research on ESG in SMEs reflects an increasing global awareness of its significance. Notably, publications on this topic have surged year after year, with Asia leading the discourse and Europe following closely. Among individual countries, China and Italy stand out as the most prolific contributors. This upward trend underscores the rising importance of ESG in SMEs, positioning it as a critical area of discussion among international scholars.

Theoretical contribution/ Originality: This paper analyzes ESG research trends in SMEs, mapping key developments and gaps. Synthesizing past studies highlights critical insights and future research directions, positioning ESG in SMEs as a growing global discourse.

Research limitation/Implication: This study is limited to the Scopus database and focuses solely on ESG research in SMEs. It used only one bibliometric analysis tool to evaluate research trends, which may not capture a broader perspective from other databases or analytical approaches.

Keywords: Bibliometric Analysis; ESG; SMEs; VOSviewer

Introduction

The challenges of globalization today have led to changes and increased attention to sustainable development within and outside organizations (OECD, 2021). The impact of organizational activities on the environment, society, and economy is a concern for many parties and cannot be avoided. Since the issue of sustainable development developed, followed by the Sustainable Development Goals (SDGs) more than two decades ago, the study of sustainability has grown very widely.

Environmental, Social, and Governance (ESG) was first proposed in the United Nations—Principles for Responsible Investment Initiative (UN PRI)

report 2007. It is recommended that investors consider ESG to be an important factor in their investment decisions. With the relatively new concept of ESG, research has begun to develop that analyzes the concept of ESG as part of sustainability, in addition to ESG as one of the parameters used in implementing the SDGs (Senadheera et al., 2022). ESG criteria, in particular, are data-driven aspects of desire that emphasize corporate performance in the areas of environment, society, and governance, all of which can be measured.

Extensive research has been conducted on the implementation, disclosure, performance, influencing factors, impact, and evaluation of ESG, reflecting the growing attention of various stakeholders—including investors, companies, and the wider society—toward ESG issues (Kumar et al., 2024; Li et al., 2021). The continuous development of research in this field highlights an increasing awareness and commitment to sustainable business practices, making ESG considerations an integral part of corporate strategy. As businesses strive to align with evolving regulatory frameworks and stakeholder expectations, ongoing research is crucial to evaluating the effectiveness of ESG initiatives and addressing emerging implementation challenges. A deeper understanding of ESG dynamics will enable companies to navigate regulatory complexities, enhance stakeholder engagement, and drive long-term value creation (Faccia et al., 2021; Fatemi et al., 2018; Kaiser, 2020).

One of the interesting things related to ESG issues is how they develop in Small and Medium Enterprises (SMEs). With the characteristics of SMEs, implementing ESG can be a challenge and obstacle for them. Lack of understanding and limited information and resources can make sustainability initiatives “expensive” for SMEs (Ozkan et al., 2023; Yip & Yu, 2023). The next reality is that SMEs are not required to provide sustainability information or self-assess their ESG performance, making them vulnerable to potential losses in obtaining capital and attracting investment (Garrido-Ruso et al., 2024). This condition shows the urgency of research related to ESG issues in SMEs, considering that the challenges faced can hinder their competitiveness in the long term. With sustainability trends increasingly becoming an important factor for investors and other stakeholders, further research is needed to understand how SMEs can adopt ESG effectively and its impact on their reputation, access to capital, and business sustainability.

Academics have widely used bibliometric analysis to explore and identify structures in a research field. This method helps uncover emerging trends in a topic and visualize them based on articles, journals, authors, countries, or research institutions, thus broadening the research horizon (Donthu et al., 2021). In the context of ESG, several studies have applied bibliometric analysis, such as Senadheera et al. (2022), which examined the development of ESG research from 2001 to 2021, and Bosi et al. (2022), which discussed ESG and sustainability reporting from 1998 to 2022. However, previous studies have focused on ESG without paying special attention to SMEs. Literature mapping related to ESG in SMEs has not been carried out systematically, so there is no comprehensive picture of research trends in this field. Therefore, bibliometric analysis of ESG in SMEs needs to be carried out to fill the research gap and provide the latest mapping of the development of studies in this field. In addition, with the growing sustainability discourse, re-mapping

is needed to identify themes that have not been widely researched and determine the direction of more relevant future research.

As a solution to this research gap, the bibliometric analysis in this study aims to provide a comprehensive overview of the ESG research landscape in SMEs. By systematically mapping the available literature, this study can identify key trends, relationships between topics, and contributions from various researchers and institutions in this field. Thus, this study seeks to answer several main questions: What are the trends in ESG-related research publications in SMEs? By answering these questions, this study is expected to provide a more systematic and comprehensive insight into the ESG research landscape in SMEs and identify future research opportunities.

In addition to analyzing research trends, this study serves as a basic reference for researchers, policymakers, and SME stakeholders. This study offers a comprehensive understanding of ESG and its application in SMEs. The findings of this study can help further research fill the existing gaps, refine the theoretical framework, and open up new research opportunities. Furthermore, this study is also useful for SME practitioners in designing more effective sustainability strategies based on empirical evidence from previous studies. By highlighting influential works and dominant research themes or topics, this study deepens the understanding of the role of ESG in driving sustainability, corporate governance, and long-term business performance in the SME sector.

Literature Review

Environmental, Social, and Governance (ESG)

ESG encourages long-term development, investment, or activity by focusing on three main pillars or criteria: environmental, social and governance (Fatemi et al., 2018). According to The International Federation of Accountants, "Environmental, social and governance measures describe the environmental, social and governance issues that influence corporate behavior in their investment decisions". Companies focus not only on the economic impact of their operations but also on the social and environmental impacts (Tarmuji et al., 2016). Adopting the principles of good corporate governance and maintaining strong relationships with the community and environment can help companies to succeed and gain appreciation from investors (Velte, 2017; Yawika & Handayani, 2019; Yoon et al., 2018)

Along with the development of the SDGs concept, the concept of ESG was also developed. Based on tracing the history of the SDGs concept by the United Nations, it is deemed necessary for the role of companies and investors to realize the SDG goals jointly. The ESG concept was first proposed in the UN PRI report, which recommends that investors consider ESG a key factor in their investment decisions. Today, the ESG concept has been developed as one parameter for implementing SDGs (Plastun et al., 2020).

UN PRI consists of 6 principles that provide a framework for incorporating ESG issues into investment decision-making by companies and investors (PRI, 2021). The six UN PRI principles emphasize the importance of incorporating ESG issues into investment analysis and decision-making processes, being an active owner by integrating ESG into ownership policies and practices and seeking appropriate disclosure of ESG issues by entities targeted for investment. In addition, the principles also encourage the acceptance and adoption of ESG in the investment industry, encourage collaboration to improve implementation effectiveness, and require all parties to report on activities and progress in implementing the principles. By applying these principles, investors and companies are encouraged to better align their investment activities with the goal of a better society and environment.

Over the last few decades, there has been a significant increase in companies reporting performance information and company activities related to non-financial (social and environmental) aspects in their annual reports or separate reports, namely the sustainability report (Herzig & Schaltegger, 2006). Based on a report published by PwC (2023) on sustainability reporting in Asia Pacific, there has been considerable progress in the sustainability landscape in 2023. PwC's (2023) report shows significant progress in sustainability reporting in Asia Pacific, with increased climate risk disclosure (88%), Scope 1 and 2 emissions reporting (80%), and more companies obtaining external insurance for their ESG reporting (49%). However, gaps remain, particularly in setting verified net-zero targets (only 16% are SBTi verified), Scope 3 emissions reporting (50%), and sustainability training for management (36%). This finding highlights the need for further efforts to improve transparency, accountability, and leadership capacity in sustainability.

International organizations play a role in determining standards and procedures that stakeholders can use to compile and evaluate sustainability reporting data. In 1997, the principles of the Global Reporting Initiative (GRI) pioneered sustainability reporting (GRI, 2021). GRI developed and delivered best practices for organizations to communicate and demonstrate accountability for their impacts on the environment, economy, and people. GRI provides the world's most widely used sustainability reporting standard. This reporting standard informs stakeholders about an organization's impact and contribution to sustainable development. Until now, almost 81% of companies worldwide have adopted the GRI as a sustainability reporting standard (PwC, 2023). Specifically, the GRI indicators relate to the dimensions of ESG, which are 32 environmental indicators (GRI 300), 40 social indicators (GRI 400), and 22 governance indicators (GRI 102). Thus, a total of 94 indicators were used.

In line with current sustainability reporting developments, an organization that oversees international accounting standards (International Financial Reporting Standard/IFRS) announced the establishment of the International Sustainability Standard Board (ISSB) in 2021 to develop a sustainable reporting standard called the IFRS Sustainability Disclosure Standard. This standard will cover the topic of sustainability, namely ESG, and it is hoped that the IISB will be able to launch a sustainability reporting standard in the second semester of 2023 (PwC, 2023).

ESG in Small and Medium Enterprises (SMEs)

SMEs play a vital role in the global economy, significantly contributing to economic growth, job creation and innovation. In many countries, SMEs account for over 90% of businesses and provide around 60–70% of employment (OECD, 2021). Their main advantage lies in their flexibility and ability to adapt to market changes (Yip & Yu, 2023). However, they also face significant challenges, such as limited access to finance, technology and global markets, which can hinder their growth and competitiveness (Yip & Yu, 2023).

In recent years, applying ESG principles in SMEs has received increasing attention, especially due to the increasing demands from consumers, investors and regulators for sustainable business practices (Garrido-Ruso et al., 2024). Studies show that SMEs implementing ESG practices can gain various benefits, such as increased operational efficiency, reduced environmental risks, and increased access to green funding and investment sources (Ozkan et al., 2023). In addition, ESG adoption also contributes to long-term competitiveness by enhancing business reputation and strengthening relationships with customers and other stakeholders (Yip & Yu, 2023).

However, although SMEs understand the importance of sustainability, resource constraints are often a major barrier to effective ESG implementation (Senadheera et al., 2022). Lack of understanding, high implementation costs, and ignorance of the long-term benefits of ESG make many SMEs hesitant to adopt it (OECD, 2021). Furthermore, unlike large companies that are required to report on ESG, SMEs often do not have the same obligations, thus having less incentive to implement sustainability principles (Garrido-Ruso et al., 2024).

Although SMEs have a strategic role in the economy, there are still major challenges in sustainability, digitalization, and resource access. Therefore, further research is needed to explore how SMEs can integrate ESG principles into their business strategies. Future research directions must focus on how SMEs can adapt to global changes, overcome structural barriers, and implement innovative strategies to remain relevant and competitive. With increasing regulations and market preferences for more socially and environmentally responsible businesses, implementing ESG in SMEs is no longer just an option but a key factor in their business sustainability.

Research Method

Overview of The Bibliometric Approach

This study applied bibliometric analysis to answer research questions and identify information related to publication trends, including scientific articles, book chapters, and conference proceedings. Bibliometric analysis is an approach that uses various methods to evaluate the scientific impact and influence of research publications (Donthu et al., 2021). The advantage of this method is its flexibility, which allows it to be used at various

levels of analysis. At the micro level, this analysis can assess specific aspects such as author contributions, research themes, and journals where publications are published. Meanwhile, at the macro level, this analysis provides broader insights covering developments in specific fields of study, contributions by country, and global research trends (Sanadheera et al., 2022).

The bibliometric approach provides a structured framework for understanding how research publications influence the development of science at various scales. In addition, bibliometric science mapping tools can show the relationship between research subjects, authors, publications and citations at the journal, institution, and country levels (van Eck & Waltman, 2010). According to Sulistyaningsih et al. (2024), the Scopus database systematically searches for relevant publications under specific keywords. In addition, this study used software assistance of Publish or Perish (POP) and VOSviewer as analysis tools. VOSviewer is used to map topic by topic and compile bibliometric maps.

The Research Data Analysis

The stages of research data analysis in this study consist of several main steps (Figure 1): (1) Determining keywords, (2) Conducting an initial search, (3) Filtering and refining search results, (4) Compiling data, and (5) Analyzing data. This study uses Scopus as the main database for collecting relevant publications. Scopus was chosen because it is a reputable scientific journal database that provides references from high-quality international journals. In addition, Scopus has wide coverage in various research fields and allows automatic data export, thus simplifying the processing process without requiring manual input (Senadheera et al., 2022). Using Scopus, this study can ensure that the collected publications meet strict academic standards and provide a strong foundation for systematically analyzing ESG research trends and patterns in SMEs.



Figure 1 Data Analysis Stages

This study began by determining the keywords used in the search for scientific publications, namely ("environmental" AND "social" AND "governance" AND "SMEs"). The selection of these keywords aims to ensure that the search results are by the research objectives, namely identifying ESG research trends in SMEs. The search was carried out by considering the article title, abstract, and keywords as search strings to ensure wider coverage and obtain more comprehensive results. Furthermore, the data search and collection process was carried out using the Scopus database on June 12, 2024, considering that Scopus is a reputable scientific database providing high-quality journal references. This study uses POP software to facilitate the collection of publications. The search target was set with a maximum limit of 1,000 publications in 2000–2024. From the initial search results, 94 publications were obtained, consisting of 65 journal articles, 12 conference proceedings, 10 book series, and seven books. The data collected at this stage

was then selected and further analyzed to identify patterns and trends in ESG research in SMEs. The PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) Item Statement Flow is useful for identifying and generating a systematic search of the results (Moher et al., 2015). Identification, screening, and eligibility are the steps involved, as shown in Figure 2.

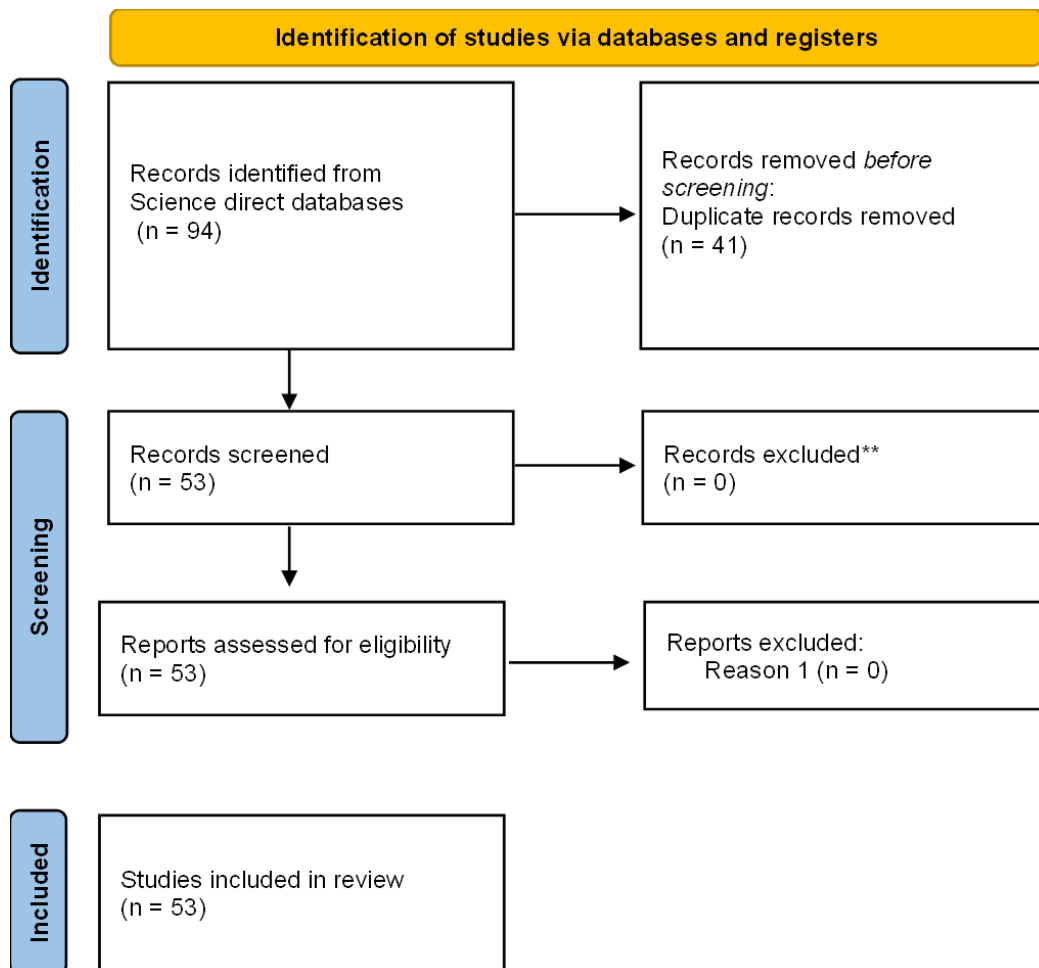


Figure 2 Flow Diagram of The Study Selection Process Using PRISMA

In the data refinement stage, 94 previously identified publications were collected and stored in an Excel file, including information such as citations, authors, titles, years, sources, and publishers. The screening process was carried out by considering several key aspects to ensure the relevance and quality of the selected publications. First, only publications that explicitly discussed ESG in SMEs were retained by evaluating the appropriateness of the title, abstract, and keywords. Second, only journal articles, book chapters, and conference proceedings were considered, while editorials or reports that did not go through the peer-review process were excluded. In addition, it was ensured that the publications came from reputable journals that Scopus indexed, were fully accessible, and had a significant impact based on the number of citations. After selection, publications that met the criteria were stored in the Research Information System (RIS)

format, including important details such as author names, title, abstract, keywords, year of publication, and publisher, and were managed in Mendeley for further reference. Additional verification was done to ensure the alignment between keywords, title, and abstract and that the publications were academic journals, not ordinary articles. From the results of this screening, 53 publications, consisting of journals, book chapters, and conference proceedings, were declared to meet the final criteria (Table 1).

Table 1 Comparative Metric

Metric Data	Initial search	Refine search
Keywords	Environmental, social, governance, SMEs	Environmental, social, governance, SMEs
Publication years	2001-2024	2001-2024
Papers	94	53
Citations	1215	972
Citation per year	52.83	42.26
Citation per paper	12.93	25.11
h-Index	17	14
g-Index	32	30
hl_norm	11	10
hl_annual	0.48	0.43

Data analysis was carried out at this stage using POP and VOSviewer software. POP provides more concise information about the author's name, year of publication, article title, number of citations, abstract of the article, journal name and publisher, which makes it easier to filter articles that match the topic. Meanwhile, VOSviewer is a free and interactive software widely used in bibliometric analysis to visualize relationships between journals, authors, citations, and keywords. Its strength lies in its ability to analyze co-citation, co-authorship, and co-occurrence, enabling the identification of research trends, scientific collaborations, and emerging topics. With the Visualization of Similarities (VOS) algorithm, this tool can group data based on similarity, facilitating mapping research structures. With support for various data formats (Scopus, Web of Science, RIS, CSV) and its ability to handle large datasets efficiently, VOSviewer is an ideal tool for large-scale bibliometric studies, including ESG analysis in SMEs.

Result and Discussion

Studies on ESG implementation, disclosure, performance, influencing factors, impacts, and evaluation cover many aspects concerning many parties, including regulators, investors, and academics. In the context of SMEs, ESG implementation faces unique challenges due to limited resources, lack of understanding, and minimal regulations requiring sustainability disclosure (Senadheera et al., 2022). Several studies have shown that SMEs often view ESG initiatives as an additional burden that requires large investments, thus being perceived as “expensive” and difficult to implement (Bansal & DesJardine, 2014).

In addition, because SMEs are not formally obligated to report their ESG performance, many are not yet aware of the long-term impacts of good sustainability management (OECD, 2021). As a result, SMEs tend to face difficulties attracting investors and gaining access to capital as more financial institutions and stakeholders consider ESG aspects in investment decisions (Gjergji et al., 2021). Therefore, support in the form of policies that encourage ESG awareness, financial incentives, and access to resources and technology are key factors in helping SMEs adopt sustainable practices effectively.

Analysis Based on The Number of Publications and Country

Analyzing the number of publications by year and country provides insight into the trend of ESG research in SMEs and how awareness and attention to this issue are evolving across regions. The increase in publications indicates that ESG is increasingly becoming an important focus for academics, business people, and other stakeholders. The results of the data analysis show that the number of ESG publications in SMEs has almost doubled every year since 2020, with the highest spike occurring from 2021 to 2023 (Figure 3).

This increase can be attributed to several key factors. First, investor awareness of the importance of transparency and accountability in sustainability practices is increasing, encouraging companies, including SMEs, to pay more attention to their ESG disclosures (Cheng & Feng, 2023; Cronin & Doyle-Kent, 2022; Gholami et al., 2022; Gjergji et al., 2021; Shalhoob & Hussainey, 2023; Yip & Yu, 2023). Many investors now consider ESG aspects as part of their risk mitigation strategies and business sustainability assessments, encouraging SMEs to adapt and increase their involvement in ESG practices.

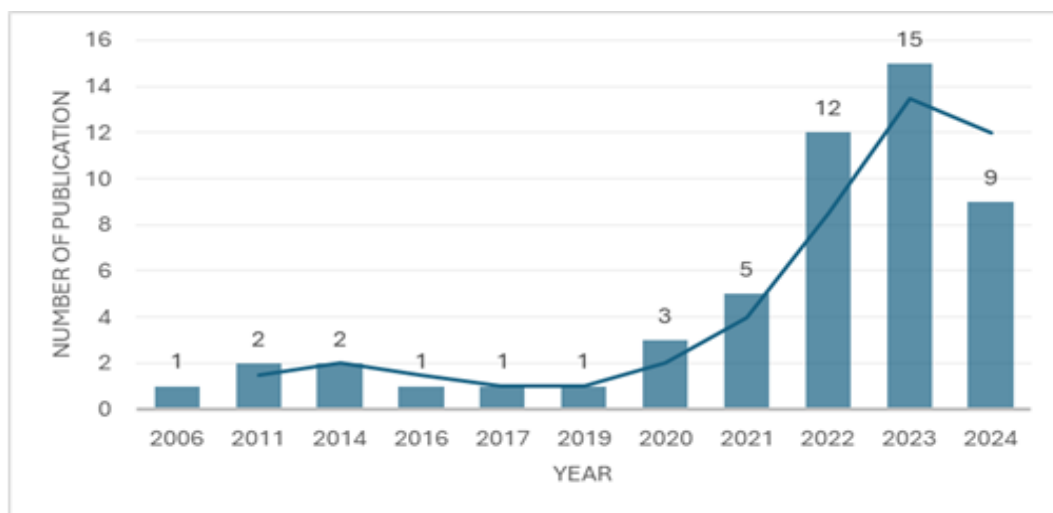


Figure 3 Yearly Number of Publications

Global regulatory and policy factors further reinforce the urgency of ESG implementation. Since the UN's launch of the 2030 Agenda for Sustainable Development, member countries have become increasingly committed to achieving the SDGs, of which ESG is one of the main indicators. Some countries have even implemented policies requiring companies to report their ESG performance, indirectly encouraging SMEs to adapt to

higher sustainability standards. Considering these factors, the surge in ESG research in SMEs in recent years reflects the increasing global awareness, regulatory pressure, and the need for more sustainable and resilient businesses in the future.

Based on 53 publications analyzed in this study, the European continent occupies the highest position in producing publications in ESG in SMEs, with 26 publications. Then followed by Asia (17), Africa (6), Australia (2), and America (2). The countries that publish the most publications are China (10) and Italy (6). Followed by the Czech Republic (4), United Kingdom (4), Hong Kong (3), Germany (3) and Portugal (3). A description of the number of publications from all countries is in Table 2.

Table 2 Number of Publications from Continent

Country	No. of Publications
<i>Asia</i>	
China	10
Hong Kong	3
Indonesia	2
Vietnam	2
<i>Australia & New Zealand</i>	
Australia	1
New Zealand	1
<i>Africa & the Middle East</i>	
Ghana	1
Palestine	1
Qatar	1
Saudi Arabia	1
South Africa	1
Turkey	1
<i>Europe</i>	
Bulgaria	1
Czech Republic	4
Denmark	1
Germany	3
Ireland	1
Italy	6
Portugal	3
Romania	1
Spain	1
Switzerland	1
United Kingdom	4
<i>Americas</i>	
Mexico	1
Nicaragua	1

The differences in the number of ESG publications across countries reflect the level of regulation, sustainability awareness, and market pressures in each region. Countries in

Asia and Europe, such as China, Italy, and the UK, dominate ESG research due to stringent policies, investor pressure, and the integration of SMEs into global supply chains. The European Union, for example, has implemented the Corporate Sustainability Reporting Directive that encourages ESG transparency, while China is active in its green development strategy and Net Zero 2060 target. In addition, financial markets in developed countries increasingly demand ESG transparency, so research in this area is growing rapidly. In contrast, countries in Africa, the Middle East, and Latin America have fewer ESG publications, likely due to the lack of stringent ESG regulations, limited research resources, and SMEs' greater focus on economic stability rather than sustainability. In many developing countries, ESG is often seen as an additional burden rather than a business strategy, so ESG adoption and research are still limited. Therefore, further efforts are needed to improve the understanding and implementation of ESG in various parts of the world to ensure that SMEs can adapt to global sustainability standards.

Analysis Based on Document Types and Citation Trends

Analysis based on document type and citation trends was conducted to gain a more comprehensive understanding of the characteristics of scientific publications on the topic of ESG in SMEs. Identification of document types aims to determine the most dominant form of scientific contribution. Meanwhile, citation trend analysis aims to evaluate how much a publication has a scientific impact on a particular field of study.

Based on the bibliometric analysis in Table 3 regarding the categorization of publications based on document types, it is dominated by document types in the form of journal articles, which cover 83.00% of the total publications. Furthermore, book chapters contribute 5.70%, followed by conference papers at 9.40%. Other types of documents include review articles, each at 1.90%. This finding showed that most scientific studies on this topic are published in journal articles, reflecting high academic attention and the dominance of empirical and conceptual approaches in developing literature on ESG in SMEs, especially in corporate governance and sustainability.

Table 3 Categorization of Publications Into Document Types and Percentage of Publications

Document	Number of Publications	% of Publications
Articles	44	83.00
Book chapter	3	5.70
Conference paper	5	9.40
Review	1	1.90

The trend and citation pattern analysis shown in Table 4 indicate that old articles tend to have more citations, such as the study by Jorgensen and Knudsen (2006) published in Corporate Governance, the main reference with 104 citations. Old articles tend to get more citations because they have more time to be cited and are often fundamental studies that form the basis of further research. In addition, important articles that get many citations are considered to have high credibility, so they are often used as the main reference by researchers in the field of SME's ESG.

Table 4 Publications with The Highest Citation

Title	Authors and Years	Journal	Citation
Sustainable competitiveness in global value chains: How do small Danish firms behave?	(Jorgensen & Knudsen, 2006)	Corporate Governance	104
The role of innovation for performance improvement through corporate social responsibility practices among small and medium-sized suppliers in China	(Zhu et al., 2019)	Corporate Social Responsibility and Environmental Management	96
Small and Medium Enterprises and Global Risks: Evidence from Manufacturing SMEs in Turkey	(Asgary et al., 2020)	International Journal of Disaster Risk Science	92
Environmental Management, Climate Change, CSR, and Governance in Clusters of Small Firms in Developing Countries: Toward an Integrated Analytical Framework	(Puppim de Oliveira & Jabbour, 2017)	Business and Society	77
The effects of environmental, social and governance disclosure on the cost of capital in small and medium enterprises: The role of family business status	(Gjergji et al., 2021)	Business Strategy and the Environment	65
Sustainability and its integration into corporate governance focusing on corporate performance management and reporting.	(Krechovská & Procházková, 2014)	Procedia Engineering	63
Can digital transformation improve market and ESG performance? Evidence from Chinese SMEs	(Wang & Esperança, 2023)	Journal of Cleaner Production	52
How stakeholders affect the pursuit of Environmental, Social, and Governance. Evidence from innovative small and medium enterprises	(Esposito De Falco et al., 2021)	Corporate Social Responsibility and Environmental Management	49
Environmental regulation and ESG of SMEs in China: Porter hypothesis re-tested	(Chen et al., 2022)	Science of the Total Environment	34
Sustainability: Environmental, social and corporate governance performance in Czech SMEs	(Kocmanova et al., 2011)	Singapore Economic Review	23

Furthermore, several influential journals on ESG and SMEs issues include Corporate Social Responsibility and Environmental Management, Business Strategy and the Environment, and Journal of Cleaner Production. Publications in these journals indicate that the main focus of ESG research in SMEs is the relationship between business strategy, environmental regulation, and sustainability performance. Highly cited articles, such as Zhu et al. (2019) and Gjergji et al. (2021), indicate that ESG transparency, innovation, and

sustainability integration in SME management are of primary concern to academics and investors.

In addition, the trend of ESG research in SMEs shows a shift in focus from mere sustainability disclosure to the role of digital technology, environmental policies, and their impact on SME competitiveness and access to finance. Studies such as Wang and Esperança (2023) highlight how digital transformation can improve ESG performance, while Chen et al. (2022) discuss how environmental regulations can affect ESG adoption in SMEs.

Overall, the trend of ESG research in SMEs is growing rapidly, with more and more studies exploring the relationship between ESG and business strategy, long-term sustainability, and the impact of regulation and technological innovation. The dominance of publications in journals focusing on sustainability and corporate governance shows that ESG in SMEs is not only an academic issue but also highly relevant to business practice and industry policy. These findings provide important insights for researchers, policymakers, and SME players in understanding how sustainability strategies can be implemented more effectively in various SME business sectors.

VOS Viewer Output

From the screening of 53 publications analyzed using VOS viewer software, three types of visualizations were network visualization, overlay visualization, and density visualization. Figure 4 maps the relationships between keywords in the study on ESG in SMEs, where nodes represent specific keywords.

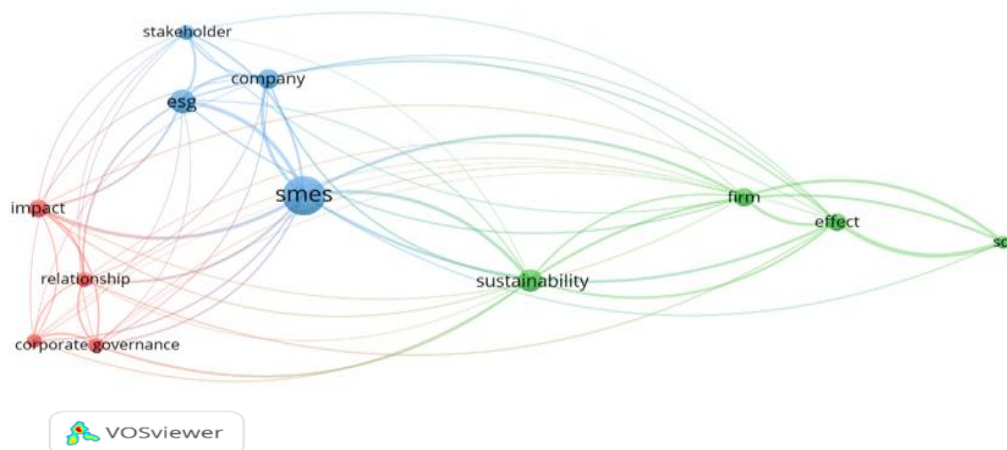


Figure 4 Network Visualization

The node's size indicates the frequency of occurrence in the analysis; the more significant the node, the more frequently the keyword appears. Lines between nodes indicate the relationships between topics, with thicker lines representing stronger relationships.

Based on the visualization, there are 3 clusters and 11 items related to ESG in SMEs, as shown in Table 5.

Table 5 Keyword Clusters

Clusters	Items
Cluster 1	SMEs, ESG, Company, Stakeholders
Cluster 2	Effect, firm, sustainability, supply chain finance
Cluster 3`	Corporate governance, corporate social responsibility, impact, relationship

Regarding the overlay visualization in Figure 5, the results are similar to the previous one but with the addition of a time dimension depicted by the color gradient on the nodes. The colors indicate the volume of research in those years. 2019 is marked in blue, while green and yellow represent the most recent years, 2020 to 2023. The most frequently appearing keywords in early 2020 were SMEs, corporate social responsibility, supply chain finance, and governance. From mid-2020 to early 2021, impact, effect, stakeholders and company dominated the research. Then, from mid-2022 to the end of 2023, ESG and relationships received more attention.



Figure 5 Overlay Visualization

Density analysis (Figure 6) addresses the same issues but emphasizes the main clusters and relationships between research topics. Different colors refer to groups of items closely related to each other. The node's size indicates the frequency of that topic in the dataset. The main focus is SMEs, as shown in the blue cluster, and the themes closely related to it are ESG, company, and stakeholders. Meanwhile, the keyword 'corporate governance,' marked in red, is closely related to impact, corporate social responsibility and relationship. The keywords in the green cluster are sustainability, firm, effect and supply chain finance.

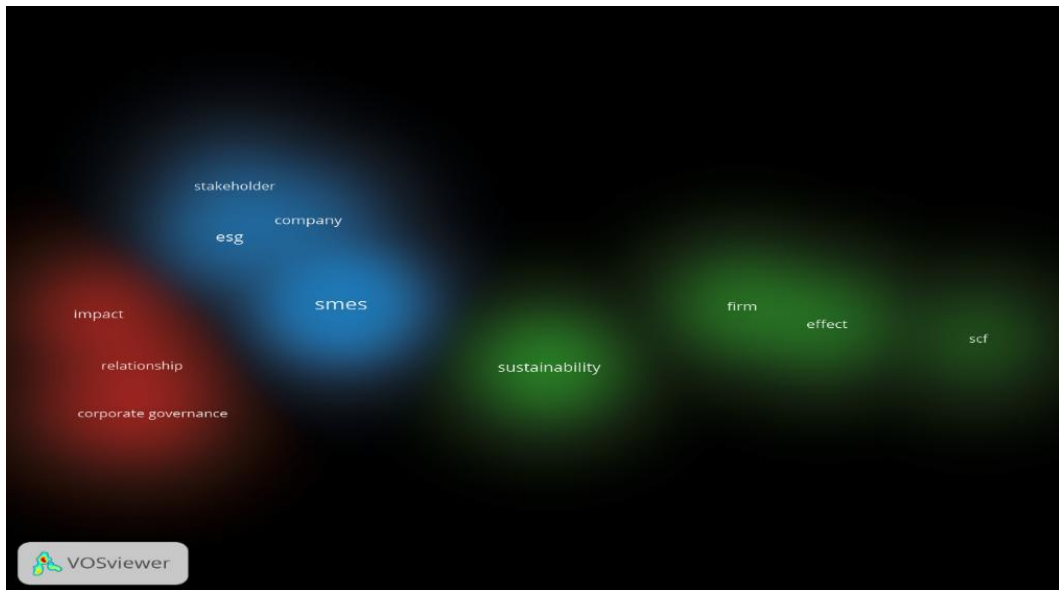


Figure 6 Density Visualization

ESG Research Trends in SMEs

The trend of ESG research on SMEs increases yearly, indicating that sustainability is increasingly becoming a major concern for the global small and medium business sectors. This study analyzes current issues related to ESG in the context of SMEs through a bibliometric approach using VOSviewer software. This analysis was conducted on 53 academic publications obtained from the Scopus database, which includes various studies on the implementation and impact of ESG on SMEs in various countries. The study results show that China has the largest number of publications in ESG studies on SMEs, reflecting the high attention of academics and practitioners to sustainability in the SME sector in that country.

Although most discussions and research are still concentrated in Asia, especially in China, studies on ESG in SMEs have also developed in various countries outside the region. Some active countries in this research include Hong Kong, Indonesia, Vietnam, Australia, New Zealand, Ghana, Palestine, Qatar, Saudi Arabia, South Africa, Turkey, Mexico, and Nicaragua. The diversity of research locations shows that ESG issues in SMEs have global relevance, not only limited to developed countries but also to developing countries that are beginning to realize the importance of sustainability in the business world.

The findings of this study indicate that geographical factors and government policies in each country influence the development of ESG studies in SMEs (Senadheera et al., 2022). Geographical factors include differences in economic conditions, business culture, and the level of awareness and readiness of SMEs to adopt ESG. In developed countries with strict environmental regulations and high consumer awareness, SMEs are more proactive in implementing ESG practices. Conversely, in developing countries, limited access to technology, green funding, and lack of understanding of ESG are major obstacles to its implementation.

In addition, government policies play a crucial role in encouraging or inhibiting the development of ESG in SMEs. European Union countries, for example, have implemented regulations that encourage SMEs to adopt ESG through clear incentives and reporting standards. Conversely, in countries where ESG regulations are not yet strong, external pressure from the global market, investors, and business partners are the main drivers for SMEs implementing ESG to remain competitive. Therefore, further research is needed to explore how public policy and market dynamics can create a more supportive ecosystem for SMEs in implementing ESG sustainably.

Key Themes in ESG Research on SMEs

Furthermore, this study shows that research on ESG in the context of SMEs focuses on several main themes divided into three main groups (Figure 6). First, the group marked in blue highlights the close relationship between SMEs, ESG, companies, and stakeholders. ESG studies in SMEs discuss the role of companies and stakeholders in implementing sustainability policies. Second, the group in red focuses on aspects of corporate governance with key keywords such as corporate governance, impact, and relationship. ESG implementation in SMEs is often associated with its impact on business relationships and corporate governance. Third, the green group links sustainability, firm effect, and supply chain finance, indicating that sustainability is closely related to business performance and sustainable corporate financial strategies.

SMEs emerged as a central keyword that strongly connects with various ESG aspects, reflecting that research in this field is growing and highlighting how SMEs adopt sustainability principles to increase business value and competitiveness. The strong relationship between sustainability and firm effect shows that sustainability is a social responsibility and a strategic factor that can influence SME growth and performance (Jorgensen & Knudsen, 2006; Zhu et al., 2024). However, although ESG adoption can bring economic and reputational benefits to SMEs, the implementation challenges are still quite large. Many SMEs face resource constraints, whether in terms of finance, knowledge, or managerial capabilities, which makes ESG implementation more complex than large companies (Garrido-Ruso et al., 2024; Hammann et al., 2009; Ozkan et al., 2023).

Meanwhile, the corporate governance aspect in SMEs plays an important role in determining the impact of ESG on business, with a close relationship to impact and relationship, which reflects how corporate governance can affect relationships with stakeholders (Chiloane-Tsoka & Rasivetshele, 2014; Gholami et al., 2022; Harasheh, 2023; Kocmanova et al., 2011; Krechovská & Procházková, 2014; Puppim de Oliveira & Jabbour, 2017; Shalhoob & Hussainey, 2023; Tiep Le & Nguyen, 2022; Wang & Esperança, 2023). However, although good corporate governance can improve transparency and accountability in ESG implementation, many SMEs still face structural obstacles in adopting effective corporate governance practices. One of the main challenges is the lack of compliance with clear governance standards, especially in developing countries where regulations are still loose and oversight mechanisms are not optimal (Shalhoob & Hussainey, 2023; Tiep Le & Nguyen, 2022; Wang & Esperança, 2023). In addition, due to the smaller size and structure of SMEs compared to large companies, the governance

systems implemented are often more informal and dependent on the owner or a small group of key stakeholders, which can lead to a lack of accountability and conflicts of interest (Puppim de Oliveira & Jabbour, 2017).

Several studies have shown that the effectiveness of corporate governance in improving ESG impacts also depends heavily on external factors, such as pressure from regulators, consumer demand, and access to financial resources (Harasheh, 2023). SMEs with limited access to capital markets or external funding sources often find it difficult to implement stricter governance standards due to the additional costs incurred for ESG compliance and reporting (Shalhoob & Hussainey, 2023). Therefore, although corporate governance is important in improving stakeholder relations and ESG impacts in SMEs, a more flexible approach tailored to SMEs' characteristics and capacities is needed.

Bibliometric results show that ESG in the context of SMEs is closely related to CSR, given the significant role of SMEs in the global economy, job creation, and sustainable development (Honig, 2001; Puppim de Oliveira & Jabbour, 2017; Tiep Le & Nguyen, 2022; Wang & Esperança, 2023). Although SMEs are more flexible in adopting CSR initiatives, they face challenges meeting more structured ESG standards due to resource constraints. ESG and CSR complement each other—CSR provides an ethical and social foundation, while ESG offers a data-driven framework for measurement and reporting (Chiloane-Tsoka & Rasivetshele, 2014). Recent trends show that SMEs increasingly integrate CSR into their ESG strategies, shifting from a philanthropic approach to long-term impact, such as supporting community adaptation to climate change. In addition, investors are increasingly interested in ESG-aligned CSR, as companies with a structured sustainability approach are more likely to receive sustainable funding. In addition, ESG is also linked to Supply Chain Finance (SCF), a financial mechanism that optimizes cash flow in the supply chain through transaction-based financing between buyers and suppliers. Integrating ESG with SCF allows companies to encourage suppliers to adopt sustainable practices by providing financial incentives. For SMEs, this creates opportunities to access green finance and improve operational efficiency, although challenges such as limited access to capital remain a major barrier (Cheng & Feng, 2023; Wang & Esperança, 2023).

Future Research Suggestion

Based on the results of the bibliometric analysis, several research agendas can be further studied. First, empirical studies are needed to understand the application of ESG to SMEs in various sectors and countries and how corporate governance can be adjusted to each context. Second, research can examine a more adaptive corporate governance model for SMEs, considering the limited resources compared to large companies and different leadership structures. Third, studies are needed on the long-term impact of ESG on the value of SME companies, especially in increasing business competitiveness and resilience to crises. Fourth, research can examine regulations and public policies that support the application of ESG to SMEs without burdening them financially or administratively. Finally, examining digital technologies such as artificial intelligence and big data in ESG performance management and reporting is becoming increasingly relevant.

In the future, developing ESG studies on SMEs will require considering several key aspects to implement the results effectively. First, a sector-based approach must be applied because different industry characteristics will affect how ESG can be optimally adopted. Second, studies must pay attention to the size and capacity of SMEs, considering that not all SMEs have sufficient resources to adopt complex ESG standards like large companies. Therefore, it is necessary to develop a more flexible ESG implementation model that can be adjusted to the scale of the business.

Third, future research should consider incentives that can increase SME participation in ESG implementation, such as access to green funding, tax relief, or support from financial institutions and the government. Many SMEs may hesitate to invest in ESG practices without clear incentives. Fourth, integrating ESG with digital transformation is a key factor that must be further explored because technology can help SMEs reduce administrative burdens, increase reporting efficiency, and facilitate the implementation of sustainability policies.

By considering these aspects, ESG development in SMEs can be more effective, not only in meeting sustainability demands but also in creating long-term value for businesses. In addition, a collaboration between academics, regulators, and industry players will play an important role in ensuring that ESG implementation in SMEs can run practically and impact their business growth.

Conclusion

The results of the bibliometric analysis showed that ESG publications in SMEs have increased significantly, almost doubling each year since 2020. Of the 53 publications analyzed in Scopus, Europe was the most productive region with 26 publications, followed by Asia (17), Africa (6), Australia (2), and America (2). The main keywords that have frequently appeared since 2020 are SMEs, CSR, SCF, and governance, reflecting the research focus on sustainability, governance, and supply chains in SMEs. This study contributes by mapping the trend of ESG publications in SMEs, including journal analysis, citations, authors, methodology, and literature reviews, which can be the basis for further studies. However, this study has limitations, such as only using the Scopus database, so it does not include publications from other sources such as Emerald and Google Scholar. In addition, despite using various software such as POP, VOSViewer, Mendeley, and Microsoft Excel, there is still the potential for subjective bias in data selection and analysis. Therefore, further research is recommended to expand the scope of the database and apply stricter research protocols to improve objectivity and accuracy in mapping ESG literature in SMEs.

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Research trends on environmental, social, and governance in SMEs: A bibliometric analysis

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.



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