



TRENDS AND PATTERNS OF SUSTAINABILITY IN SMES: A BIBLIOMETRIC ANALYSIS OF ESG (ENVIRONMENTAL, SOCIAL, AND GOVERNANCE) LITERATURE

Dr. DEEPMALA BAGHEL

Assistant Professor, Indian Institute of Management Nagpur, India. Email: deepmala@iimnagpur.ac.in

Abstract

The SME sector constitutes an essential for the competitive development of any country. Notwithstanding their criticality, SMEs have been conspicuously neglected in prevailing ESG research. However, by applying bibliometric analysis on the Scopus database, this study highlights the robust state of ESG research within SMEs. An assessment of the extent and comprehensiveness of existing research is achieved by analysing publications, citation patterns, authors, countries, journals, and keywords related to ESG in SMEs. The analysis encompasses a total of 3,449 scientific publications that were published between the years 1991 and 2023. The VOS viewer software is used to visually represent the results.

The analysis indicates a notable increase in the quantity of publications and a greater concretization of the term ESG after 2021. On the contrary, the concept of sustainability has existed from the beginning in SMEs. Nonetheless, over the years, various perspectives have been emerged to map ESG, including CSR, green innovation, circular economy, and sustainability reporting. As a result of the widely acknowledged economic ramifications of ESG in emergent markets, it is suggested that every aspect of ESG in SMEs be investigated. Pertaining specifically to SMEs, a distinct ecosystem and an intertwined socio-political context necessitate a socially contextualized ESG definition. Development of a unique response mechanism to the contemporary capitalist market influences their economic aspects pertaining to ESG practices. New words like green innovation, sustainability disclosure, ESG reporting, and green washing have emerged, indicating the future directions of ESG studies in SMEs.

Key Words: Environment, Social, Governance, SMEs, bibliometric, VOS viewer

1. INTRODUCTION

The SME sector is indispensable to the competitive advancement of any nation. Smaller businesses have primarily facilitated employment creation, livelihood protection, and work provision in both developed and developing regions of the world over the past several decades. Research, while discussing the role of SMEs in sustainable development, postulates that SMEs act as drivers of innovation and economic growth, contributing to poverty reduction and environmental sustainability (Kaplinsky, 2000). They are the foundation for entrepreneurship development. Therefore, if we wish to bring about holistic development in the current world, it is vital that we comprehend the ESG trends among SMEs. Because SMEs operate in direct contact with nature, they rely on it as primary consumers. Consequently, their environmental footprints are crucial for promoting sustainable development. In the present age of technological advancement, it is important for industries and natural resource storage houses to collaborate in a reciprocal fashion, rather of adhering to the traditional notion of one party always benefiting at the expense of the other. The endeavor to achieve sustainability and Environmental, Social, and Governance (ESG) practices in the developing regions of the world is not only a moral obligation but also a crucial strategic requirement. By embracing these principles, we can unlock new opportunities for innovation, economic development, and social progress. In this context, the Environmental, Social, and Governance (ESG) concepts serve as fundamental principles for achieving sustainable development, which is crucial for establishing a balanced and mutually beneficial relationship between humans and nature (Wan and Dawood,



2022). Corporate irresponsibility towards society, environment degradation and financial frauds are examples of social responsibility issues that have been on the rise recently (Lee and Lee, 2022). To answer these pressing issues, ESG begins to gain traction since 2004 when the UN Global Compact report entitled “Who Cares Wins,” recommended incorporating them in the overall management of the company (United Nations, 2004). The ESG practices help attain the United Nations’ Sustainable Development Goals as they extend beyond business organisations and communities, transforming the sustainability of markets and society. ESG is making the business environment more competitive, transparent, and socially and ethically responsible. Today, 90% of investors attach greater importance to ESG performance in their decision-making than they did before the COVID-19 pandemic and 74% of investors are more likely to divest from companies with poor ESG track records according to EY’s Global Private Equity Survey 2021 that surveyed 320 institutional investors across 19 countries (EY, 2021).

While there is no universally agreed-upon academic definition of ESG, it has emerged as the fundamental framework for promoting sustainable development across all sectors of the economy worldwide. The EU has played a proactive role in concretizing ESG definition and influencing ESG policies by producing reports like the “EU Sustainable Finance Taxonomy” and the “European Green Deal”. These reports outline the EU’s strategy for sustainability and its dedication to tackling environmental and social issues through a holistic approach encompassing financial markets, business practices, and policy measures. The disclosure of company’s ESG practices has proven to positively impact financial and market performance, mitigate investment risks and enhance the reputation of firms. The United Nations Principles for Responsible Investment (United Nations, 2004; UN PRI report, 2020) provides a framework for incorporating ESG considerations into investment practices as the ESG criteria help to better determine the future financial performance of companies.

SMEs play a crucial role in attaining sustainable development goals (SDGs) by having the ability to generate equitable economic growth and diminish inequities. Their sustainability practices are crucial for the social and environmental well-being as they are often deeply embedded in local communities. Despite their importance, are frequently left out of sustainability research because of methodological obstacles, such as a lack of data and issues in approaching SMEs for study. Consequently, there is a dearth of comprehensive studies on the sustainability initiatives undertaken by small industries. Over the years SMEs have been missing from the mainstream applications of ESG disclosure because of limited reporting requirements and resources, higher costs, lack of capacity, inability to obtain ESG-accurate information, operational flexibility, lack of aligned methodological frameworks for ESG integration, and the complexity of management’s commitment and risk management (Shalhoob and Hussainey, 2022). Research affirms that in emerging economies, small and medium-sized enterprises (SMEs) tend to neglect social and environmental concerns (Das, et al., 2020). However, research emphasizes the ESG’s positive impact in SMEs that are more flexible, maintain closer customer and supplier relationships, have faster decision-making processes, and are community-focussed (Shalhoob and Hussainey, 2022).

Hence, it is essential to conduct deeper theoretical and empirical investigations on the sustainability aspects of SMEs, encompassing their goals, challenges, and outcomes. Research with innovative approaches for exploring sustainability in SMEs can offer significant knowledge for policymakers and professionals. This work seeks to connect SMEs with sustainability research by utilizing a cutting-edge methodology called bibliometric analysis and incorporating multidisciplinary perspectives. The paper is organized as follows: first, a theoretical and conceptual framework is provided, followed by the methodology, results, and discussion, and finally, the conclusion.



2. CONCEPTUAL CLARIFICATION

2.1 ESG and Industrial sector

ESG, as defined by Gillan et al. (2021), is the incorporation of environmental, social, and governance factors into the structure of organizations and investors. This study thoroughly examines environmental, social, and governance (ESG) factors. ESG has been a topic of discussion in academic and industrial circles from its beginning. Extensive research has thoroughly demonstrated the positive and negative correlation between the business and ESG. Historically, it has been observed that in their pursuit of a sustainable competitive advantage, the majority of businesses emphasize the maximization of profits rather than the preservation of environmental, social, and governance (ESG) norms (Freeman et al., 2021). Contrary to that, numerous studies have exhaustively proven the various benefits of ESG reporting for businesses, such as enhancing the firm's value and alleviating the potential future regulatory load and its associated costs (Boffo et al., 2020). Furthermore, it has been disclosed that a business's strong performance on ESG indicators has a significant impact on the appreciation of both tangible and intangible assets. The presence of green indicators positively affects the performance of stocks of that firm and generates favorable returns for investors. The adoption of an ESG framework is also linked to the reduction of financial limitations and plays a crucial role in fostering competitive advantage and innovation within industries (Aboud, and Diab, 2018; Esty et al., 2019).

The resource-based theory lens enables us to observe the favorable outcomes that arise from ESG practices in industries. In the period of stakeholder capitalism, industries rely on their resource base to maintain a competitive edge and thrive in a competitive market. According to resource-based theory, investments in environmental and social responsibility can indeed affect the overall performance of industries. There is presence of approach highlights the strategic significance of valued resources (such as sustainable practices) and capabilities in achieving competitive advantage and enhancing financial outcomes.

Scholars have been advocating for stakeholder governance and sustainability advocacy (Barney et al., 2021) as a means to rectify the inequitable distribution of finite resources. It is crucial that humanity acknowledges the necessity of reducing its environmental, social, and governance-related (ESG) footprint and making contributions to the long-term sustainability of its resources. In addition to operational efficiencies, cost savings, an improved brand reputation, and increased customer loyalty, these modifications may also result in enhanced financial performance.

2.2 ESG and SMEs

Research confirms about ESG providing multiple advantages to SMEs across various dimensions. Management of human resources, risk management, knowledge generation, financial and competitive performance enhancement is witnessed in SMEs (Kaplinsky, 2000; Bartolacci et al., 2020). According to a survey of 800+ SMEs across six Asian markets conducted by DBS and Bloomberg Media Studios in August 2022, 92% of Indian SMEs consider ESG to be a high priority for their business, surpassing the regional average of 83% across Asia. This indicates a strong recognition among Indian SMEs of the value and importance of transitioning to more sustainable business models. Similarly, in Malaysia, ESG practices and disclosures have a positive consequence on the firm's value. The existence of a CSR committee on the Board of Directors, the dispersion of forecasted earnings and the ownership concentration of the firm affect these values. Particularly significant is the role of ESG disclosures, which can mitigate the adverse impact of weaknesses and enhance the



positive effects of strengths within a firm (Sadiq et al., 2020). A similar pattern emerges in the context of Chinese power generation companies. Demonstrating strong ESG performance is linked to improved financial performance, particularly for small-scale power generation enterprises. This observation carries noteworthy implications for stakeholders such as investors, company management, decision-makers, and regulatory bodies. The positive link between ESG and financial outcomes facilitates China's swift integration into major international exchanges, forms the basis for the development of financial markets, establishes corporate social responsibility standards, amplifies international recognition, and reduces barriers to expansion (Zhao et al., 2018). While the positive relationship is consistent between China and India, China's more pronounced prominence may stem from its early adoption of ESG governance principles. Moreover, regulatory standards and the enforcement thereof contribute to each country's impact on ESG indicators (Zhao et al., 2018).

The positive effects of sustainable behaviour in SMEs can extend beyond local boundaries. As these businesses grow and prosper, they can contribute to economic development at the national level and even participate in international markets, thus influencing the global economic landscape (Bartolacci et al., 2020). Russo, et al., (2010) argue that small firms can benefit from integrating sustainability into their business models, leading to improved performance and competitiveness. They stress the importance of research that provides practical guidance for SMEs in this regard. This could involve examining the relative influence of environmental initiatives, ethical business practices, and social responsibility efforts of small firms. Exploring the relationship between sustainable behaviour and financial performance is particularly important for SMEs, as they often have limited resources and face unique challenges. Understanding how sustainable practices can contribute to their operational improvement would lead to more resilient and successful SMEs. Gibb, Allan (2000) discusses the challenges faced by SMEs in adopting sustainable practices, including limited resources and lack of awareness. He calls for research that focuses on the unique needs and constraints of SMEs in the context of sustainability. Spence, Laura J. (2009) examines the factors influencing SMEs' adoption of sustainable practices, highlighting the importance of institutional support and market incentives. She emphasizes the need for research that explores the motivations and barriers faced by SMEs in this area. Acar, et al., (2012) examine the role of SMEs in sustainable development, highlighting the potential for SMEs to contribute to environmental protection and social inclusion. Nawrocka, and John (2017) analyze the challenges faced by SMEs in implementing sustainable practices, including regulatory constraints and financial limitations. They emphasize the need for research that addresses these challenges and provides practical solutions for SMEs. Parker, et al., (2017) discuss the importance of integrating sustainability into SMEs' strategic planning processes. They argue that SMEs can benefit from adopting a long-term perspective on sustainability, which can lead to improved performance and resilience. While there is general agreement on the positive link between ESG and SME performance, it is also emphasized that further research is needed to identify specific aspects of sustainable behaviours that have the significant impact on industry outcomes. This study aims to conduct thorough research on ESG in SMEs. To achieve the specified goal, a bibliometric analysis has been conducted. This paper is a component of a research project that aims to investigate the prospects of ESG in SMEs in India. Therefore, the main goal is to explore various aspects and research areas related to this topic in order to gain a more comprehensive and in-depth understanding. The literature confirms that bibliometric analyses have investigated the topic of ESG. However, the application of this analysis to ESG in SMEs remains unexplored. Like other academic disciplines, bibliometric analysis may yield varying outcomes when using data from different databases. Using a variety of retrieval algorithms allows us to gather a larger pool of closely related searches. Additionally, by



adjusting the threshold values in methods like keyword co-occurrence analysis, author keywords, scholar research, etc., we could discover additional potential connections. In light of these considerations, we use 3449 articles from the Scopus Collection database and VOSviewer to conduct a bibliometric and visual study of the ESG topic, with the goal of addressing any gaps in the analysis.

3. BIBLIOMETRIC RESEARCH METHOD

3.1 Overview: Bibliometric analysis is an advanced methodology that can be employed as a supplementary method to the manual literature evaluation. A bibliometric study focuses on analysing data pertaining to keywords, references, publications, and the productivity of authors, countries, and institutions. Bibliometric analysis, as a technology-driven method, empowers academics to perform thorough and all-encompassing study. The purpose of a research review is to succinctly explain the present state of research, identify forthcoming development patterns, and offer recommendations and concepts for future study on certain subjects.

After establishing the importance of investigating ESG in SMEs the author performs a bibliometric literature evaluation to estimate the magnitude and scope of the research in this topic. This investigation aims to offer a conceptual framework and research objectives for future investigations into the reasons why SMEs should prioritize enhancing their ESG prospects. Using the "literature survey" method, the author conducted a thorough and precise analysis of available literature to address the specified research inquiries and organized the findings logically in connection to those topics.

3.2 Database selection and search terms: The current research defines the appropriate investigation words as Environment, Social and Governance (ESG) and Small, and Medium Enterprises (SMEs). In order to ensure that all aspects of ESG were included in this research, it was necessary to consider the keywords associated with each domain.

As figure 1 confirms, the keywords are used for "Scopus data extraction and document selections". The Scopus database was utilized to collect data on authors, researchers, affiliated institutions, other organizations, and countries that have made contributions to the ESG research. Information on various published items, such as research articles and book chapters, and reviews. Various subject areas were classified into specific disciplines, including mathematics, sciences, engineering, business management, economics, and finance. The published research was categorized according to the year of publication, number of publications per year, and number of citations obtained. This categorization was done to determine the research orientations and emerging trends. Given the goal of investigating the availability and development of ESG research in the SME domain, the researcher employed a combination of qualitative and quantitative measures to obtain precise data for analysis. The documents provided for analysis consist of "Articles", "Editorials", and "Reviews" that are exclusively published in English. The bibliometric mapping approach offers a method to visually represent the trajectory of a research field by analysing its performance and creating a map of its scientific landscape.

There are several steps involved in cleaning and organizing the final data. As mentioned by Donthu et al. (2021), bibliographic and bibliometric data are utilized to visualize and interpret the findings. To enhance analysis and achieve more accurate results, the researchers utilized the natural language processing function provided by the VOSviewer software to tidy up various terms found in the titles, abstracts, and keywords of the article. Finally, many of these cleansing techniques contribute to achieving a consistent evaluation of themes.

To delve deeply into the evolution of the ESG concept in the domain of SMEs, the years 1991 to 2023 are selected in order to comprehend the notion of sustainability, which evolved into ESG. The term 'sustainability' in its current form did not emerge until 1987, when it was introduced in the renowned Brundtland Report (also titled 'Our Common Future'), which was compiled by a number of nations for the United Nations. In the years that followed, globalization and robust industrial development continued. 1990-1991 constituted a pivotal period in the study of sustainable development. As an increasing number of nations acknowledge the perils of unsustainable industrial growth, they contemplate the notion of sustainability, which subsequently evolved into corporate social responsibility (CSR) and eventually culminated in today's environmental, social, and governance (ESG) practices. In light of this consideration, the search topic keywords for the article were established as `sme AND esg OR environment* OR sustainab* OR msme OR governance OR csr OR "green invest"` in the title, abstract, and keywords.

The criteria for document retention: (1) Relevant literature in fields other than social sciences, humanities, environment, business, business finance, economics, and management were excluded based on Scopus categories; (2) only articles, book chapters, editorials, and reviews were considered in the analysis; and (3) the language of the papers was English. A grand total of 6,393 publications were acquired. The methodology employed to determine which publications to include is depicted in Figure 1. In the end, 3449 articles were transmitted to analysis software after being downloaded. The list of articles was then exported as a Scopus CSV file for analysis in Vos Viewer. The year wise publication data was directly copied in Excel for analysis. For all the 3449 articles, keyword, citation, author, country and bibliographic coupling analysis was carried out using Vos Viewer. Some results are presented as maps, whereas some are presented as tables.

3.3 Software for visual representation: The VOSviewer program was utilized for the purpose of visualizing data. VOSviewer is a freely available software that is commonly utilized in bibliometric research studies to create visual maps of journals, authors, citation data, and keywords. These maps provide viewers with visualization diagrams that have a strong visual effect and make analysis easier.

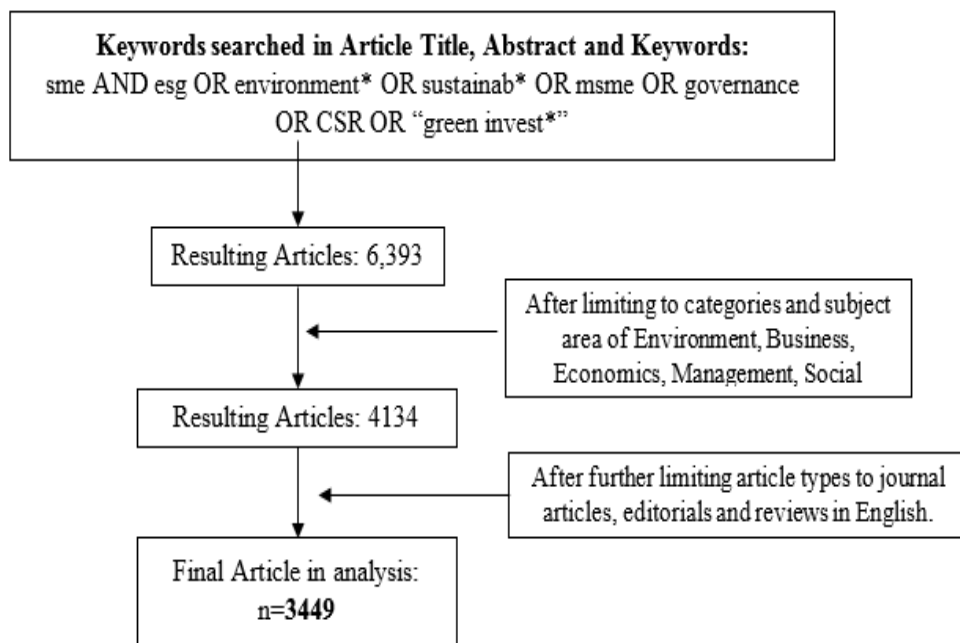


Figure 1: Selection process for including articles for the analysis

4. RESULTS AND DISCUSSION

4.1 Publications analysis



Figure 2: Yearly and cumulative number of publications on ESG from 1991 to 2023

Analysing temporal aspects serves to elucidate the inception and evolution of the study topic. From 1991 to 2023, a substantial volume of publications on environmental, social, and governance (ESG) in SMEs topics were published. Figure 2 illustrates the annual publication count, revealing a significant and particularly pronounced increase in recent years. There has been a steady rise in the number of publications over the years. The 1990s proved to be a pivotal period in the field of business. The 1990s witnessed a surge in the internationalization and globalization of corporations. SMEs were exposed to worldwide norms and best practices in sustainability through this trend, which influenced their response to ESG concerns. However, all through this period, SMEs were not regarded as an optimal platform for implementing ESG practices. Consequently, a dearth of published works is evident during this temporal span, which persisted until 2015, when a discernible surge in paper publications becomes apparent. The UN adopted the 17-SDG 2030 Agenda for Sustainable Development in September 2015. At COP21 in December 2015, the Paris Agreement was adopted. The Financial Stability Board (FSB) created the TCFD to encourage voluntary climate-related financial disclosures. The TCFD's 2017 guidelines have become a standard for firms to disclose climate risks and opportunities. In general, the years following 2015 were a crucial time for ESG, characterized by important advancements that still influence the sustainability field today.

From 2020 on, an increasing number of papers, 269, were published; by 2023, that number had escalated to 432. The COVID-19 pandemic has brought to the forefront the significance of sustainability and resilience in the conduct of business. In order to adapt to shifting market conditions and develop resilience, SMEs are reassessing their business models and practices, frequently with an emphasis on ESG factors. The research in this time as visible from Table- shows issues like SMEs' increasing reporting of ESG information to investors, consumers, and authorities for sustainable transparency and accountability linked with greater chances of funding and investment opportunities. SMEs are now using data analytics and digital platforms to improve ESG performance. The industry exhibits a wide range of sustainability methods, but faces difficulties due to limited resources and a lack of knowledge.

4.2 Co-citation analysis

An examination of the citation patterns exhibited by academic articles pertaining to ESG in SMEs and published between 1991 and 2023 can yield valuable insights regarding the progression and influence of research in this domain. Co-citation analysis is a scholarly approach which encourages inquiry into the intellectual framework of an area of study with conceptual underpinnings and offers insights into prospective developments within that

domain. in this research, key authors and articles that contribute to ESG in SME research are essentially identified.

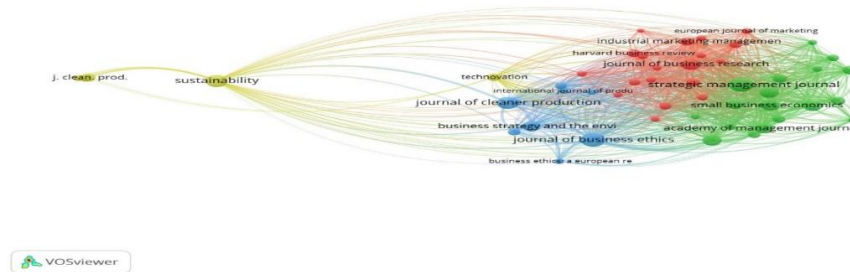


Figure 3: Visual representation of the cited authors' co-citation network

Figure 3 depicts the co-citation network of the cited sources. Out of the 54857 sources, 1043 entries meet the threshold requirement that a source must have at least 20 citations. For each of the 1043 sources, the total strength of the co-citation links with other sources are calculated. 50 sources with the greatest total link strength is selected. 50 sources are grouped into 4 clusters. Nodes with identical colours in Figure 4 are associated with the same cluster. Each node's area represents the quantity of citations attributed to a particular document. An increased node size signifies a greater quantity of citations. Per VOSviewer, a node corresponds to a solitary reference (Fabregat-Aibar et al., 2019). The data presented in Figure 3 and table 1 illustrate the Journal of Cleaner Production (total citations-5,925), Sustainability (4,007), Journal of Business Ethics (2,644), Business Strategy and the Environment (2,614), and Small business economics (2,089), are top 5 journals who received a greater number of citations. Table 1 lists the citation wise top 30 journals in the ESG in SME field.

Table 1: Citation wise top 30 journals

SR. NO.	JOURNAL	TOTAL CITATIONS
1	Journal of Cleaner Production	5,925
2	Sustainability (Switzerland)	4,007
3	Journal of Business Ethics	2,644
4	Business Strategy and the Environment	2,614
5	Small Business Economics	2,089
6	Journal of Enterprise Information Management	1,488
7	Corporate Social Responsibility and Environmental Management	1,393
8	Journal of Small Business and Enterprise Development	1,325
9	Journal of Banking and Finance	1,271
10	Environmental Impact Assessment Review	1,227
11	International Small Business Journal	1,172
12	Journal of Business Research	1,098
13	Management Decision	986
14	Journal of Business Venturing	974
15	Journal of Manufacturing Technology Management	938
16	Production Planning and Control	831
17	International Journal of Production Economics	811
18	Technovation	770
19	International Journal of Production Research	747
20	Long Range Planning	738

The journals with the greatest number of total publications are Journal of Cleaner Production (5,925), Sustainability (Switzerland) (4,007), and Journal of Business Ethics (2,644), which emerged as the most dominant sources.

4.3 Analysis of research articles

The most cited and influential articles in the field of ESG in SMEs are listed in Table 2. "Global perspectives on e-waste" by Widmer R.; Oswald-Krapf H.; Sinha-Khetriwal D.; Schnellmann M.; Boni H. (2005) is the most influential article with 1208 citations. The article is affiliated with the journal 'Environmental Impact Assessment Review'. The paper discusses e-waste as both a burgeoning issue and a potential avenue for business in contemporary society. The study's research indicates that e-waste recycling in India is primarily carried out by small to medium-sized enterprises (SME) in the informal sector. The second most cited paper was "ESG and financial performance: aggregated evidence from more than 2000 empirical studies", written by Friede G.; Busch T.; Bassen A. (2015), who confirmed the positive ESG impact on Corporate finance performance.

The most fruitful years for research on ESG in SMEs, when considering the cumulative impact, are between 2008 and 2023. During this period, there is a greater emphasis on the ESG concept. Prior to 2008, the research was fragmented with the focus was primarily on topics like reducing pollution and ensuring clearer production. However, beginning in 2008, businesses began to prioritize social aspects pertaining to their employees. Due to the advancements in global awareness and knowledge of the need to protect the globe from natural disasters, there has been a growing recognition of the importance of considering all three parts of ESG (environment, social, and governance) together. Subsequently, in the years 2015 and 2016, the notion of ESG (environment, social, and governance) garnered substantial interest in academic investigations, as can be discerned from the table 2 about the top 20 most influential articles on ESG in SMEs.

Table 2: The top 20 most influential articles on ESG in SMEs as per Author(s)

SR	Title	Authors	Year	Journal	Citations
1	Global perspectives on e-waste	Widmer R.; Oswald-Krapf H.; Sinha-Khetriwal D.; Schnellmann M.; Böni H.	2005	Environmental Impact Assessment Review	1,208
2	ESG and financial performance: aggregated evidence from more than 2000 empirical studies	Friede G.; Busch T.; Bassen A.	2015	Journal of Sustainable Finance and Investment	1,135
3	Sustainability-oriented innovation of SMEs: A systematic review	Klewitz J.; Hansen E.G.	2014	Journal of Cleaner Production	844
4	Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers	Rizos V.; Behrens A.; van der Gaast W.; Hofman E.; Ioannou A.; Kafyeke T.; Flamos A.; Rinaldi R.; Papadelis S.; Hirschnitz-Garbers M.; Topi C.	2016	Sustainability (Switzerland)	619
5	Critical success factors for implementing knowledge management in small and medium enterprises	Yew Wong K.	2005	Industrial Management & Data Systems	619
6	Cloud computing adoption by SMEs in the north east	Alshamaila Y.; Papagiannidis S.; Li F.	2013	Journal of Enterprise Information	568



	of England: A multi-perspective framework			Management	
7	Corporate sustainability and innovation in SMEs: Evidence of themes and activities in practice	Bos-Brouwers H.E.J.	2010	Business Strategy and the Environment	542
8	Small and medium enterprises across the globe	Ayyagari M.; Beck T.; Demirguc-Kunt A.	2007	Small Business Economics	505
9	Drivers and enablers that foster environmental management capabilities in small- and medium-sized suppliers in supply chains	Lee S.-Y.; Klassen R.D.	2008	Production and Operations Management	498
10	Small firms' training and competitiveness. Building upon the small business as a learning organisation	Gibb A.A.	1997	International Small Business Journal	479
11	Investigating stakeholder theory and social capital: CSR in large firms and SMEs	Russo A.; Perrini F.	2010	Journal of Business Ethics	472
12	Building an integrative model of small business growth	Wiklund J.; Patzelt H.; Shepherd D.A.	2009	Small Business Economics	413
13	Capital structure decision making: A model for family business	Romano C.A.; Tanewski G.A.; Smyrniotou K.X.	2001	Journal of Business Venturing	410
14	Organizing corporate social responsibility in small and large firms: Size matters	Baumann-Pauly D.; Wickert C.; Spence L.J.; Scherer A.G.	2013	Journal of Business Ethics	402
15	CSR strategies of SMEs and large firms. Evidence from Italy	Perrini F.; Russo A.; Tencati A.	2007	Journal of Business Ethics	368
16	Barriers and stimuli for ecodesign in SMEs	Van Hemel C.; Cramer J.	2002	Journal of Cleaner Production	356
17	Investigating corporate social responsibility in supply chains: a SME perspective	Ciliberti F.; Pontrandolfo P.; Scozzi B.	2008	Journal of Cleaner Production	332
18	Entrepreneurial orientation and the business performance of SMEs: A quantitative study from the Netherlands	Kraus S.; Rigtering J.P.C.; Hughes M.; Hosman V.	2012	Review of Managerial Science	331
19	Strategy development in small and medium sized enterprises for sustainability and increased value creation	Moore S.B.; Manring S.L.	2009	Journal of Cleaner Production	325
20	Six sigma in small- and medium-sized UK manufacturing enterprises: Some empirical observations	Antony J.; Kumar M.; Madu C.N.	2005	International Journal of Quality and Reliability Management	318

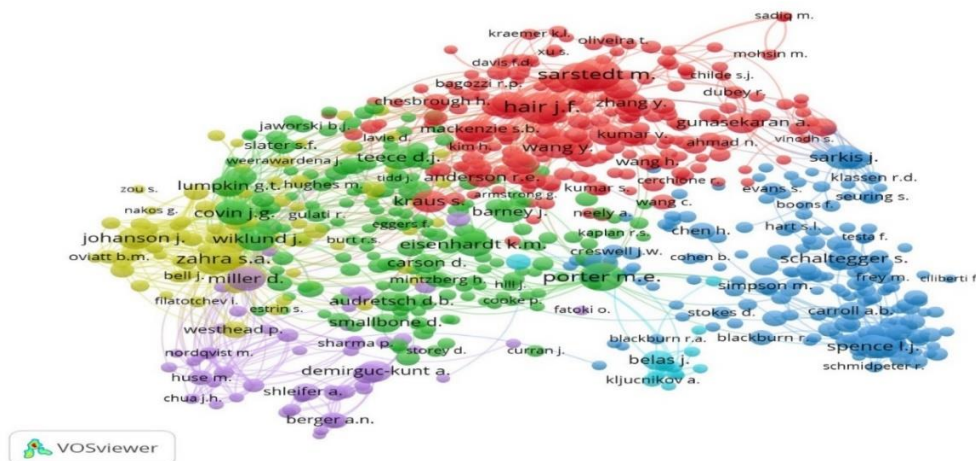


Figure 4: the co-citation network of cited authors (with minimum 50 citations)

Likewise, the co-citation network of cited authors as determined by VOSviewer is illustrated in Figure 4. The 6 clusters display 744 cited authors with a minimum of 50 citations out of 161061 cited authors. Authors like Porter, Sarstedt m., Kraus, Spence, Zahra, Sarkis, Eisenhardt, Teece, hair, had more than 300 citations.

4.4 Analysis of authors

The study has utilized two categories of keywords grouping for author analysis. The primary term for the search is "smes" as the objective is to find ESG publications within the SME sector. While examining the concept of environmental, social, and governance (ESG) in SMEs, the study come across academic papers that cover various topics such as e-waste, circular economy, sustainability for SMEs, environmental management capabilities for SMEs, training and maintenance of human resources for sustainability, and more. These papers demonstrate the comprehensive nature of the challenges and the corresponding research in this field. Given the distinct research needs of SMEs, it is essential to prioritize ESG research specifically tailored to the sector.

Table 3: Top 30-The most productive authors writing on environmental, social and governance (ESG).

Sr. No.	Author	Publications	Citation	Citations per publication	Total link strength
1	Belas, Jaroslav	18	435	24.2	66
2	Dvorsky, Jan	12	313	26.1	56
3	Torkkeli, Lasse	12	198	16.5	84
4	Cepel, Martin	9	272	27.9	22
5	Gilmore, Audrey	9	424	47.1	10
6	Cepel, Martin	9	272	30.2	37
7	Laguir, Issam	8	219	27.4	109
8	Kraus, Sascha	7	665	95.0	15
9	Saarenketo, Sami	7	213	30.4	60
10	Smallbone, David	6	415	69.2	8
11	Gavurova, Beata	6	268	44.7	32
12	Elbaz, Jamal	6	142	23.7	77
13	Parker, Craig M.	6	52	8.7	76
14	Van Gils, Anita	5	422	84.4	6
15	Dey, Prasanta Kumar	5	293	58.6	50
16	Carson, David	5	267	53.4	8

17	O'Dwyer, Michele	5	193	38.6	14
18	Stekelorum, Rébecca	5	102	20.4	90
19	Dvorský, Ján	5	81	16.2	15
20	Fraunholz, Bardo	5	44	8.8	76
21	Zutshi, Ambika	5	44	8.8	76
22	Uzhegova, Maria	5	37	7.4	66
23	Hughes, Mathew	4	670	167.5	9
24	Dora, Manoj	4	320	80.0	13
25	Krasniqi, Besnik A.	4	245	61.3	10
26	Mcadam, Rodney	4	233	58.3	6
27	Ahmad, Syed Zamberi	4	219	54.8	3
28	Kuivalainen, Olli	4	175	43.8	17
29	Madrid-Guijarro, Antonia	4	142	35.5	20
30	García-Pérez-De-Lema, Domingo	4	112	28.0	13

The study aims to comprehensively investigate all facets of ESG. Consequently, it also conducted analyses of those authors who have made significant contributions to the field of ESG, with SMEs being of secondary variable. The author has selected ESG as the main input variable in the Scopus research database for bibliometric analysis and we got authors who have made significant contributions to ESG research. The authors who have contributed the most to ESG research in the SME sector are listed in Table 4. Out of the 8399 authors in total, 881 meet the requirement of having received a minimum of 100 citations. A total of 136 authors have been chosen based on their strongest links. Table 4 presents scholars who have primarily written on ESG in smes. Belas, Jaroslav, with 435 total publications, 24.2 citations per paper, and 66 strength links, and Hughes, Mathew, with 670 citations and 167.5 citations per paper, are the most prolific authors in the field of ESG research in SMEs, indicating a promising trend. Belas is a renowned scholar who conducts research on the ethics and social responsibility of small-scale businesses.

With 335.1 citations per paper (C/P) from Harvard University, Serafeim is the most prolific author in the ESG domain as a whole, demonstrating an upward trend. Numerous awards and recognition have been bestowed upon Serafeim, an accomplished authority in the field of ESG research, who writes on corporate objectives, sustainability, and the incorporation of ESG concerns into investment and business strategy. Whose research is also applicable to small scale sectors. Cheng, Beiting, Harvard University, is another well-known writer who focuses on finance and corporate social responsibility. Ioannou, Ioannis Busch, Timo Friede, Gunnar Bassen, and Alexander are other significant contributors. This group of writers examines the relationship between corporate social responsibility and the financial and business outcomes of companies. As such, they address issues related to green finance, green innovation, sustainable compensation plans, ESG integration and investment management, and ethical investing.

Table 4: Top 30-The most productive authors (based on no. of citations) writing on environmental, social and governance (ESG).

Sr.No.	Author	Publications	Citations	Citations per publication	Total link strength
1	Serafeim, George	8	2,681	335.1	444
2	Cheng, Beiting	1	1,759	1,759.0	344
3	Ioannou, Ioannis	2	1,759	879.5	344
4	Busch, Timo	5	1,683	336.6	578
5	Friede, Gunnar	2	1,176	588.0	519
6	Bassen, Alexander	2	1,146	573.0	487

The co-occurrence network of the 477 author keywords, as produced by the VOSviewer software, is depicted in Figure 5. Figure 5 illustrates two noteworthy co-occurrences that pertain to the concepts of sustainability (indicated in dark blue) and SME (indicated in blue). Each includes citations to an extensive collection of associated secondary keywords. As an illustration, sustainability is predominantly linked to a multitude of operational aspects within a given sector, including supply chain management and sustainable development. In addition, it is associated with AI, digital transformation, and industry 4.0. It illustrates the ongoing research effort to identify viable strategies for small enterprises to achieve sustainable growth. An additional noteworthy keyword is "SME," which is frequently associated with secondary keywords. This suggests that the literature on SMEs is preoccupied with tying together various facets of environmental, social, and governance (ESG) without explicitly linking to the keyword "ESG."

According to the major author keywords, the main topics are divided into nine clusters:

1. Small business management (red cluster): This area strongly forms a link between corporate social responsibility, environmental management, and small business management.
2. The blue cluster shows the factors that affect ESG. According to research, these include agency theory, institutional theory, legitimacy theory, and stakeholder theory. According to Stakeholder Theory, board characteristics, gender diversity, materiality, ownership structure, stakeholders, transparency, determinants, and emerging markets all have an impact on ESG (Cucari et al., 2018). Similarly, keywords in this cluster involve CSR, governance, resources, and gender.
3. The results of sustainable business management include the following keywords: networking, innovativeness, market orientation, open innovation, cleaner productions, and supply chain management (green cluster).
4. The association between ESG and sustainability, the circular economy, and digitalization (yellow cluster)
5. Social markets, social media, e-commerce, and cloud computing are all associated with ESG, indicating that SMEs frequently integrate ESG with external social formations to create value (purple cluster).
6. Factors such as business strategy and decision-making, SME performance, ambidexterity, and competitive advantage contribute to ESG in SMEs (orange cluster).
7. Research links keywords like clusters, institutions, and internationalization to examine the drivers of ESG in SMEs (brown cluster).
8. Intangibles from ESG research are linked to SME research, resulting in keywords like trust and communication (pink cluster).

The word ESG is not frequently appeared in ESG research in SMEs. As is evident from Table 5 and Figure 6. Initially associated with sustainability and social responsibility, and subsequently with environment, society, and governance, each of the three terms has demonstrated a robust correlation (refer to Table 5). ESG is a contemporary notion that emerged during the twenty-first century. Environmental, social, and governance are its three pillars (Esty & Karpilow, 2019; Koroleva et al., 2020). While the environmental pillar was initially not widely acknowledged, its significance has grown in recent times as a result of global warming, climate change, biodiversity loss, and depletion of natural resources.

Numerous scholars have provided evidence regarding the manner in which environmental factors, particularly those pertaining to climate change, are evaluated by corporations, irrespective of sector (Clark, 2019; Díaz et al., 2021). The correlation between sustainability and keywords such as environment, environment management, and environment innovation, eco-innovation, and cleaner production is evident in this research.

Table 5: list of keywords associated with terms - environment, social, governance and esg in descending order of its occurrence

Keywords	Occurrences	Total link strength
Corporate social responsibility	136	617
Corporate governance	38	166
Governance	32	188
Environmental performance	29	127
Environment	25	136
Corporate social responsibility (csr)	24	107
Environmental management	23	110
Environmental sustainability	23	123
Social capital	20	85
Social responsibility	15	70
Environmental	10	63
Environmental responsibility	10	40
Social entrepreneurship	6	37
Social sustainability	6	28
Environmental management system	5	25
Environmental practices	5	21

The temporal analysis of top 30 keywords through overlay visualisation is presented below.

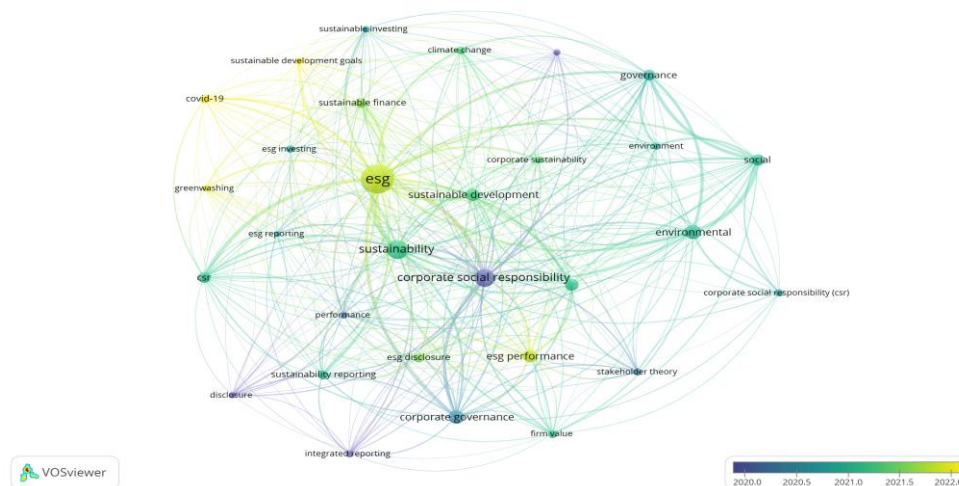


Figure 6: Year wise Analysis of Keywords

Through temporal research, it has been observed that awareness about sustainability has developed and manifested in different terms. During the initial time, corporate social responsibility was regarded as a significant idea for elucidating the industry's obligations towards society. During the 2020s, there has been a growing emphasis on the importance of the environment and governance as indicators of ESG performance. This has led to the increased use of terminology such as corporate governance, governance, environment, stakeholder theory, disclosure, and integrated corporate reporting (highlighted in purple in Figure 6). Recently, sustainable development goals have gained significant attention, and the industrial sector has been recognized as a crucial contributor to achieving these goals.

Consequently, we observe phrases such as sustainable goals, and Covid-19 being closely associated with ESG, represented by the colour yellow. El Ghouli et al. (2011) conducted a study on the relationship between ESG performance and investors. They discovered a favorable correlation between a high ESG score and improved investment outcomes in enterprises. Recent advancements in the ESG sector also entail an increased focus on investors evaluating businesses based on ESG criteria to identify superior investment opportunities. The trend of integrating ESG considerations into investment decision-making is seen in the concepts of sustainable investing, ESG performance, ESG reporting, and greenwashing. All these words have garnered academic attention, contributing to a comprehensive knowledge of ESG.

4.6 Analysis of Countrywide research for ESG in SMEs

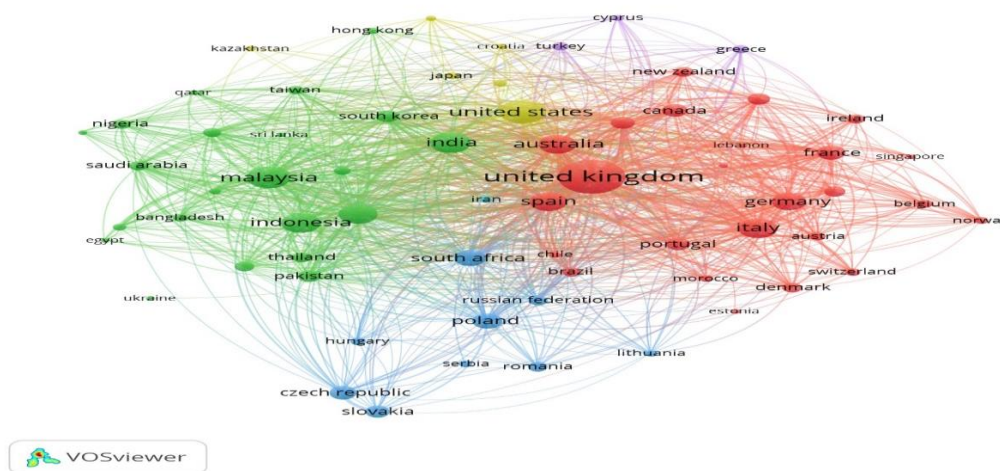


Figure 7: Bibliographic coupling of countries (with minimum 10 publications):

The figure 7 above describes the country wise documents, citations and total strength. Countries like United Kingdom with 228548 link strength, United States (119777), Spain (109558), China (100583), and Malaysia (97403) and have the highest numbers of publications and relative citations, average citations and link strengths. This shows that developed nations are at the forefront of research and publication in sustainable development and ESG in SMEs. However, although India does not have the same citation rates as other developed publishing nations, it has the promising link strengths of 78043 suggesting of its research links with other nations. This is also attributable to the initiative that the India in recent years has taken towards sustainability and ESG in businesses.

The above figure represents the co-authorship links across countries. It consists of 6 clusters of 66 countries. The cluster in red is formed by the European countries of Belgium, Portugal, Netherlands, Switzerland, Italy, Austria and non-European Australia and New Zealand. This cluster forms co-authorship links within European countries and across non-European nations alike. The green cluster consists of, India, China and other Asian countries like Malaysia, Pakistan, Saudi Arabia, Singapore, etc. The co-authorship links between these countries can be explained by the geographical similarities that may be responsible for the kind of research carried out in those regions. The yellow cluster of co-authorship is covering all the countries on the network. Since USA forms the major country of this cluster, its reach is far and the co-authorship link is spread across countries due to the US research innovation and initiative. The blue cluster is formed by South African countries, who form co-authorship links with other



non-European countries as well. The purple cluster forms the outlier countries of Czech, Poland and Romania, Lithuania but each of these countries form co-authorship links with other countries. Research priorities vary across countries. For instance, the developed world of the United States and Europe places greater emphasis on ESG investing, while the developing world of Asia is more concerned with the social dimensions of ESG. In contrast, developing and underdeveloped countries in South Africa conducted more research on pollution and governance aspects of ESG.

Future prospects

Given the widely recognized economic ramifications of ESG in relation to emerging markets, it is urgent to examine every dimension of ESG. Future research needs to be directed towards that. Compared to large-scale industries, small and medium-sized enterprises (SMEs) exhibit a unique socio-political context, economic system, and ecosystem that is intricately intertwined with the cultural life of stakeholders. Consequently, their response mechanism to the contemporary capitalist market is distinct, which could have an impact on their economic aspects related to ESG practices. Presently, in case of SMEs this aspect of economic impacts of ESG on SMEs are not researched in detailed. Further, multidisciplinary research will also add substance to the existing CSR focused research domain. ESG information disclosure and ratings is an emerging field in which the majority of studies have demonstrated the beneficial impact of ESG information disclosure and examined the factors that influence it. SME acquisition and maintenance of ESG information, on the other hand, is a laborious undertaking; consequently, they lag behind in this area. Thus, this may be attributable to the intriguing area of research that awaits further investigation. Furthermore, there is a growing concern about the misrepresentation of ESG information, also known as greenwashing, which has become a prominent issue in this field and warrants further investigation. Moreover, according to ESG rating organizations, it is crucial for different countries to incorporate their unique circumstances in order to build a scientifically rigorous and effective system of ESG rating criteria. Hence, the development of country-specific studies is highly encouraged for future prospects. ESG rating agencies like as Bloomberg, MSCI, and Sustainabilityalytics conduct thorough and unique analyses of publicly accessible ESG data and provide scores to company. Therefore, the varying ESG scores for a firm can be perplexing. Furthermore, a majority of instruments are designed according to specifications specific to large-scale industries, making them obsolete for SMEs. Therefore, the development of distinct analytical tools for SMEs is the critical area that requires future attention.

In the current era, where big data is the new social currency, it is necessary to integrate ESG studies with machine learning, artificial intelligence, and other technologies and methodologies in order to develop quantitative tools for ESG research, information gathering, and rating scale creation.

CONCLUSION

The objective of this research is to provide insight into key information pertaining to ESG research in the small-scale industrial sector. This research conducted a bibliometric examination of research pertaining to ESG and associated factors. The information was extracted from the Scopus Core Collection database, and VOSviewer was utilized to generate the visualizations. To analyse and examine the collected data co-citation analysis, bibliographic coupling, and keyword co-occurrence are applied. Nevertheless, it is feasible to modify the threshold parameters for subsequent evaluations so as to identify further potential connections among subtopics. The bibliometric approach has proven to be effective in illuminating the



research trends in the field of ESG. The timeline spanning from the 1990s to 2022 has exhibited fluctuations in the prevalence of paper publications, as well as the specific themes that have been addressed over different time periods. During the first era, SMEs have been primarily focused on investing in sustainability without fully comprehending the requirements for achieving sustainable development. Subsequently, there has been a change in focus towards corporate social responsibility (CSR) as a responsibility of industries to achieve sustainability. The period after 2000 has witnessed a shift towards various aspects of ESG, first with social and environmental concerns, and then focusing on governance issues within the SME sector. Thus, we observe that the idea of ESG has a very recent birth, despite the fact that the underlying subject has been for a long time. In ESG research, intriguing entrants such as circular economy, waste management, green innovation, stakeholder theory, cultural capital, and social capital are currently emerging; these topics require additional in-depth examination. This shift in research reflects the practical considerations that SME sectors have been leaning upon for their business operations. The analysis suggests that future trends in ESG research should focus on a socio-culturally contextualize and multidisciplinary approach towards studying ESG in SMEs. This approach should consider the economic impact of ESG on SMEs, particularly in emerging markets. ESG rating, information disclosure, and greenwashing are another some of pertinent themes for future research to explore.

There were certain constraints in this investigation. The data used in this bibliometric analysis were obtained from the Scopus Core Collection database, therefore limited to the available papers as well as analysis techniques. It is important to note that data from other databases or acquired at various dates may have led to varying results and conclusions. Furthermore, our research was constrained to the domains of business, business finance, economics, and management. Consequently, the analyses may not have comprehensively encompassed all existing literature, resulting in an inadequate compilation of articles pertaining to the ESG topic. Furthermore, we employed topic (titles, abstracts, or keywords) as the scope of our search, potentially yielding further discoveries. Future research can overcome these constraints by expanding the scope of databases and document formats, as well as employing synonymous terminology. Therefore, by examining pertinent subtopics or employing other categorization methods in the literature, we can yield more interesting and potential areas of inquiry.

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