

**Sustainability, Eco-Labeling, and Export Performance: A Combined
Narrative Review and Bibliometric Mapping of Scopus-Indexed Literature**

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Abstract

Sustainability has become a strategic, though conditional, determinant of export performance. Eco-labelling, ESG adoption, and environmental regulation are generally associated with improved export outcomes through expanded market access, green innovation, and lower financing costs. However, these effects are not uniform: several studies find that compliance costs and regulatory stringency reduce export volumes or discourage export participation, while others report nonlinear (U-shaped or N-shaped) relationships that depend on institutional quality and regulatory intensity. To establish how this relationship has been studied and to map the intellectual structure of the underlying research field, this study combines two complementary approaches: a narrative review based on the close analysis of individual research papers on sustainability and export performance, and a bibliometric analysis of 1,557 English-language journal articles indexed in Scopus (2000–2025), using the bibliometrix package in R. Co-occurrence and thematic mapping reveal two interlinked clusters, one centered on sustainability in international trade and the other on export performance, with environmental economics, climate change, and innovation emerging as prominent themes. Overall, the findings clarify both the direction of the sustainability–export relationship and the structure of the research examining it, providing a basis for future empirical and comparative work.

Keywords: Sustainability; Export Performance; Eco-labelling; ESG; Bibliometric Analysis

Introduction

Global trade is being transformed by a stronger set of environmental demands. More than 100 countries have taken the pledge to achieve carbon neutral status, and the implications will not be small only for countries' development and their export trade, but also for competitiveness on the global market (Schneider & La Hoz Theuer, 2019). Firms in pollution-intensive industries will be under pressure to showcase genuine sustainability credentials through their operations, and this is becoming a necessary requirement for keeping the export market open to them as governments push green initiatives and trade policies and also implement more environmental disclosure requirements. The result is that sustainability is moving from a corporate gesture that is at best voluntary to a strategic precondition for competitiveness and a prerequisite for integration into global value chains (Ali et al., 2026).

The concept of sustainability itself has evolved significantly since it entered mainstream policy discourse. The report produced by the World Commission on Environment and Development popularly known as Brundtland report defined sustainable development as a kind of work which not only meets the needs of today without leaving any future generations a difficult task, but also is not likely to exhaust the resources of the future (WCED, 1987) which made the idea of environment protection very well attached to long-run development. Later in, Elkington & Rowlands (1999) translated this idea into work practices in the corporate world with their "triple bottom line" structure. They said that in order for a company to evaluate its success and performance, all three dimensions, that is financial environmental and social should be taken into account together. In doing so, they set up an environment for the company and the country to see sustainability as an enhancement of competitiveness and the concept of how sustainability could influence export success was directly tied to views from these discussions on treating sustainability as one of the company's internal factors which affect competitiveness

There is no common agreement on whether and to what extent sustainability affects export performance. The traditional position is that complying with environment regulations costs money, which companies have to either take as a loss or raise prices, thereby losing ground to low-cost competitors overseas. This view is opposed by Porter & Linde (1995) stated that a good design of the environmental regulations will actually lead to the companies making a trade-off, a event called Porter Hypothesis. A similar debate can be found in the field of trade theory: the North, South trade model by Copeland & Taylor (1994) argues that different countries' levels of environmental regulation can influence their comparative advantage and specialization patterns. Meanwhile, Grossman & Krueger, through empirical research, show that there is a non-monotonic link between economic growth, e.g. growth driven by trade, and environmental quality. They point out that environmental quality only gets better when a certain income level is surpassed. Melitz (2003) heterogeneous-firms model brings an additional angle, highlighting that only highly productive firms voluntarily choose to export. It is possible, of course, that the sustainability capacity of an individual firm is linked to both productivity levels and capabilities of running the

business well. Sustainability in that case would be yet another factor that distinguishes the export firms from non-exporting ones besides being just a cost item. To sum up all points, there are several strands of theory that indicate that the sustainability-export link is not likely to be always positive or entirely negative, but rather to depend on the design of regulations, the level of development, and the ability of individual firms.

This theoretical ambiguity is mirrored in empirical literature. A substantial and rapidly growing body of research has examined the relationship between sustainability practices, including ESG performance, environmental regulation, and eco-label certification and export performance. This literature displays a fragmented picture, empirical findings range from strongly positive effects of sustainability on exports (e.g. Bukhari et al., 2025; Cai & Hao, 2025; Khan & Jehan, 2023), to negative effects driven by compliance costs (e.g. Fang et al., 2019; Hering & Poncet, 2014), to nonlinear (U-shaped or N-shaped) relationships that depend on institutional quality and regulatory intensity (Hu et al., 2021; H. Wang et al., 2022). Much of this research is also confined to single-country settings, most frequently China (Cai & Jia, 2024; Qiang et al., 2022; Zhou et al., 2023), leaving the field's overall structure and thematic evolution difficult to discern from any individual study.

This study therefore pursues two complementary aims. First, it reviews the empirical literature on sustainability and export performance to clarify the direction and mechanisms of this relationship, with particular attention to the textile and apparel sector, a resource-intensive, export-dependent industry in which sustainability compliance has become closely tied to market access. Second, it conducts a bibliometric analysis of the global literature indexed in Scopus between 2000 and 2025, using the Bibliometrix in R, to (1) trace publication trends, identifying the most productive and influential countries, journals, authors, and institutions, mapping the international collaboration network, and uncovering the field's thematic structure.

By combining a narrative synthesis of what the literature has found with a bibliometric map of how that literature has evolved, this study offers a more complete account of the sustainability–export performance relationship than either approach alone could provide: the former clarifies the substance of the relationship, while the latter reveals the field's structure, leading contributors, and thematic trajectory. The remainder of the paper is organized as follows. Section 2 reviews the literature on sustainability and export performance. Section 3 outlines the data and methodology. Section 4 presents the results. Section 5 concludes, followed by limitations (Section 6), and future research directions (Section 7).

Literature Review

Conceptual Foundations of Sustainability and Corporate Responsibility

In the wake of severe climate change and increased carbon emissions, the depletion of nonrenewable resources, and the urgent need to decarbonize energy systems, the idea of sustainability has rightly caught the interest of government, companies' public officials, regulatory agencies, and money-market participants all across the country. The Paris Agreement, a legally binding international treaty on climate change was adopted by 195 Parties at the UN Climate Change Conference (COP21) in Paris on 12

December 2015 and entered into force on 4 November 2016, with the overarching goal of holding the global temperature increase to well below 2°C above pre-industrial levels while pursuing efforts to limit it to 1.5°C (UN, 2015). After the signing of the Paris Climate Accord in 2016, over 130 nations pledged to reach net-zero carbon emissions, a decision that would Really affect international trade and global competitiveness of respective countries (Schneider & La Hoz Theuer, 2019). In fact, the deployment of carbon market mechanism under article 6.4 of the Paris Agreement has not only raised sustainability-related problems for companies and countries further but also has given another round of pressure to businesses and governments. As a result, countries have been enacting more and more green policies of trade and environmental regulations so that industries which produce pollution at very high levels will face an uphill task in exporting their products to international markets. Such industries as those of export-dependent nature and developing economies are challenged greatly by the change in market access. As a result, sustainability is no longer merely a voluntary corporate initiative but instead a strategically important factor for securing the long-term economic development of countries or regions, competitiveness in the industry, and joining global value chains (Ali et al., 2025).

The idea of sustainability has changed remarkably from the very beginning of corporate social responsibility (CSR) discussions. Friedman (1970) who was of the opinion that the main duty of companies was to maximize their profits. Carroll (1979) later expanded this by adding new legal, ethical, and philanthropic duties as a business responsibility. Thereafter, different researchers made the distinction among three concepts: CSR as moral obligation, corporate social action as firm-led action, and corporate social performance as the result of these actions from the stakeholder point of view (Barnett, 2007; Brammer et al., 2006; Marquis et al., 2007). The idea of "corporate social" responsibility has not lived up to expectations and has been blamed for not incorporating environmental issues, mainly for those companies that heavily depend on resources or operate in environmentally harmful industries (Carry, 1999; Freeman & Reed, 1983). This prompted the research community to start using the word "sustainability" or, more accurately, "corporate sustainability" to describe all aspects of firms' responsibilities, activities, and results in the three dimensions of life: social (community welfare), environmental (natural resources, pollution), and economic (Carroll, 1979; Freeman & Reed, 1983). Corporate Sustainability Responsibility is the degree to which companies satisfy their stakeholders' expectations; corporate sustainability actions mean the real steps a company undertakes to solve social as well as environmental problems, and corporate sustainability performance refers to the tangible outcomes of a firm's sustainability strategy and its social impacts (Waddock & Graves, 1997; Wood, 1991).

Sustainability, Environmental Regulation, and Trade Competitiveness

One of the primary issues in developing countries in the 21st century is attaining a sustainable form of industrialization without damaging the environment. As international markets progressively liberalize, become more competitive and

integrated, countries need to find ways to change the types of goods they export, produce more efficiently, and establish themselves in the global supply chain to drive their economic and employment growth (Ikram & Nahdi, 2025; Wang et al., 2022). Unfortunately, industrial production, mostly when it is aimed at expanding one's overseas trade, tends to be quite harmful to nature: it causes ecological destruction, increases the number of carbon emissions, depletes natural resources, and leads to the extinction of species. International environmental treaties, in particular the Paris Agreement, have been putting more and more pressure on developing countries to develop green policies that would not compromise their ability to compete economically (Magazzino et al., 2022). This conflict has made sustainability and environmental governance the cornerstone of modern economic and industrial policy. The transition towards low-carbon development has become one of the top strategies for integrating economic growth and environmental protection on a global scale. Low-carbon or green expansion is defined as the use of renewable energies, clean technologies, sustainable management of resources, and environmentally responsible production systems (Ikram & Nahdi, 2025). Sustainability is now broadly recognized not only as an environmental protection tool but as an innovation, competitiveness and socio-economic resilience platform as well (Cao et al., 2022). Low-carbon policies, if well framed, can diversify the industrial base while improving efficiency and making the country less susceptible to external shocks; at the same time, their implementation calls for big financial input, expertise in the technical areas and reforming various institutional mechanisms (Qamruzzaman & Karim, 2024). So, the role of the state as a regulator of green innovation, research and development, and transformation of industry along sustainable lines has become increasingly important. The most effective form of government intervention would probably combine regulation, policy instruments and incentives with different kinds of funding (Adomako & Tran, 2025; Shan et al., 2021). In essence, environmental regulation is a central instrument of policy that helps the simultaneous achievement of two fundamental goals: economic growth and the preservation of the environment. Dasgupta & Heal (1979) perceive environmental regulation as the set of government policies and enforcement measures designed mainly to maintain the harmony between economic growth and environmental preservation within a given period of time. Regulation has shown variety through the years: a study done by Ren et al. (2023) reveals that formal environmental regulations enforced at governmental level are mandatory measures for environmental protection whereas the informal regulations are mainly based on public voluntary action. Besides that, pollution prevention can also be divided into two forms and pollution control measures (Lian et al., 2018; Yin et al., 2026).

Heightened environmental awareness among global buyers and consumers is putting enormous pressure on textile exporting companies to switch to sustainable production methods and comply with environmental standards. On a broader scale, environmental labeling and ESG (environment, social & governance) initiatives have emerged as key tools for moving towards sustainability and raising the level of international competitiveness. Environmental labels indicate that a product satisfies

environmental standards on recyclability, chemical safety, energy efficiency, and environmentally sound production processes across its life cycle (GEN, 2004; Minkov et al., 2018). Also Really companies' operations align with the international standards like ISO systems, boosts their credibility and customer trust (Zimon et al., 2020). ESG frameworks equally emphasize environmental stewardship, social objectives, and effective governance as pillars of sustainable corporate performance, promising firms to pursue value creation for society and the environment alongside profitability (Cao et al., 2022). In this sense, ESG functions as a form of "green pass," facilitating firms' entry into international markets by enhancing legitimacy, reputation, and stakeholder trust (Campbell et al., 2012; Xie et al., 2022).

Positive Effects of Sustainability on Export Performance

A substantial body of research evidence points to that export performance can be positively impacted by the adoption of sustainability practices. The implementation of sustainability programs has been linked to the enhancement of operational efficiency innovation better image of the corporation, and increased trust from stakeholders, each of which plays a role in boosting export competitiveness (Fraj et al., 2011; Galeazzo & Klassen, 2015; Hart, 1995; Katsikeas et al., 2016; Leonidou et al., 2013). This positive relationship is largely proven through the available data as the example can be Jesuka et al. (2025) who found that corporate sustainability led to the rise of export volume in Brazil, Aksoy et al. (2024) who revealed that sustainability was able to uplift export performance among Turkish companies Mostly when combined with research & development investment. In a similar vein, Cai & Hao (2025) and Hao et al. (2025) have demonstrated how ESG performance promotes Chinese exports through the removal of financing hurdles and promoting of green innovations, in addition, sustainable responsibility performance was shown by Cai & Hao (2025) as a dependable predictor of export performance. In addition, technological progress has also been a facilitator for a stronger relationship between ESG performance and export increase (Yue & Li, 2024).

Many studies have looked into how eco-labelling and environmental certification can help export competitiveness. In an example, Bukhari et al. (2025) discovered that eco-labels not only increase domestic sales but also foreign sales, whereas Khan & Jehan (2023), stated that the link between eco-labelling and export frequency are strong enough in Pakistan. As in China, Environmental Label Certification has been connected to considerable increase in export growth as well (Zhou et al., 2023). Further support has been provided from India that the use of eco-friendly marketing methods can improve both the export activities and global competitiveness of SMEs (Chishty & Sayari, 2024; Singh et al., 2024). And, Dolabella & Saeteros (2024) also show that for an extra 1% of coverage of voluntary sustainability standards (VSS) it is expected to result in an additional 1.86% in export value of the developing countries. Export sophistication is another aspect of trade sustainability that reflects a country's international competitiveness. Originally proposed by Hausmann et al. (2007), it is a broad concept measuring the technological content, productivity, and value-added features of exported goods that indicate the quality of a country's exports, its technical

capabilities, and its integration into global value chains (Ali et al. 2026; Rodrik, 2006; Yang et al., 2024; Zhang et al., 2023). In contrast, conventional industrial modernization typically leads to higher energy consumption, which means that a country could achieve both technological progress and environmental sustainability at the same time. As international trade rules on environmental protection become stricter, carbon-intensive production of even high-tech products might affect their competitiveness, and this situation has caused a lot of research on the impacts of environmental regulations and sustainability measures on export sophistication and competitiveness to thrive. In this area, several articles describe beneficial results: Weiss & Anisimova (2019) note that the environmental flexibility regulation in the pulp and paper industry in Sweden has encouraged the introduction of innovations that have not only A lot increased the energy production efficiency but also the competitiveness in the international marketplace. Ge et al. (2020) and Wang et al. (2025) assert that environmental regulation leads to export sophistication by green innovation and technological upgrading (Ge et al., 2020; Song & Ding, 2024; Wang et al., 2025; Yin et al., 2026). Also in line with the Porter Hypothesis, which claims that properly-designed environmental regulation can create a competitive advantage through innovation and productivity gains is that Grazini & Guarini (2025) state that very strict environmental regulations lead to exports of eco-products in the member states of the OECD, whereas Fabrizi et al. (2024) prove that environmental regulation has not only positive impact on exports but on innovation as well.

Negative Effects and Compliance-Cost Channels

Empirical literature however remains divided. Another strand identifies adverse effects of sustainability and environmental regulation on exports. Hering & Poncet (2014) find that tightened sulfur dioxide emission controls in Chinese cities undermined export performance, particularly in regions reliant on polluting industries. Similarly, Fang et al. (2019) show that environmental disclosure policies reduced exports in regulated Chinese regions due to rising production costs and financing constraints, while Zhang et al. (2023) attribute export declines under pollution control initiatives to increased compliance costs. Other studies suggest that ESG initiatives may introduce inefficiencies, information asymmetries, and additional financial burdens that reduce firm value and competitiveness (Fang et al., 2019; Tian & Wang, 2017).

Nonlinear and Mixed Relationships

Another series of studies has recognized that the linkages between environmental regulation and export competitiveness follow nonlinear or mixed patterns. Hu et al. (2021) have, for example, shown that initially environmental regulations hurt export sophistication but after they cross a certain threshold, they help to increase export sophistication - a pattern that is broadly in support of the literature on the relationship being U-shaped (Hu et al., 2021; Huang & Wu, 2022; Yang et al., 2024). On the contrary, Wang et al. (2022) found an N-shaped relationship in the Chinese case. Jesuka et al. (2025) have also made the point that on one hand sustainability may

boost export volume but it can at the same time discourage export participation. The reason is probably that compliance costs increase. Ullah et al. (2021) make a similar point. They suggest that the impact of sustainability practices on export performance hinges heavily on institutional quality, technological know-how and the state of markets. This way, we believe that the degree to which sustainability affects export performance should change from one country to the other, or from one industry to the other, or even with the development stages. Many research works have analyzed how factors like environmental regulation, exports and the low-carbon transition are interconnected. For instance, a paper by Ikram & Nahdi (2025) presents a study of one of Morocco's industrial parks to find out in that case, the environment was a constraint but the government had still to reconcile its economic policy for industrial development and its policy for environmental care. Literature demonstrates that factors like sustainability measures, environment regulations, ESG performance, green innovation, environmental disclosure, eco-labeling and so on are becoming important elements that dictate a country's ability to export successfully and to export goods from various sectors. Yet, in empirical results, there has been great diversity in aspects such as types, degrees and mechanisms of these interrelationships.

Data and Methodology

Data

Bibliographic data were retrieved from the Scopus database for the period 2000–2025. The search focused on research examining sustainability, eco-labelling, environmental practices, and export performance. Following the screening and eligibility criteria, the final dataset comprised 1,557 English-language journal articles published across 468 sources. The bibliographic records included document titles, abstracts, author keywords, authors, affiliations, publication sources, publication years, and citation information. Of the 1,557 documents, 1,463 contained recorded author keywords, yielding 8,090 keyword occurrences and 4,446 unique author-keyword entries after standardizing capitalization. The analysis was conducted using the R programming environment, primarily through the bibliometrix package and its Biblioshiny interface.

Methodology

This study employs bibliometric analysis, a quantitative approach for systematically examining the development, structure, and intellectual characteristics of a research field through publication, citation, collaboration, and thematic patterns (Donthu et al., 2021). Bibliometric analysis is particularly appropriate for the present study because research on sustainability and export performance spans multiple disciplines, geographical contexts, and conceptual perspectives, making it difficult to capture the development and structure of the field through a conventional narrative review alone. Following established bibliometric practice, the analysis combines performance analysis and science mapping (Donthu et al., 2021). Performance analysis evaluates publication and citation activity across countries, journals, authors, and institutions, while science mapping examines the intellectual and social relationships within the literature through collaboration networks, keyword co-occurrence, and thematic

mapping. The combination of these approaches provides both a quantitative assessment of research productivity and impact and a structural representation of how concepts and research communities are connected.

The bibliographic records were analyzed using the R programming language, specifically the bibliometrix package and its Biblioshiny web interface (Aria & Cuccurullo, 2017). The analysis comprised several complementary procedures. First, anwas scientific production and citation analysis were conducted to examine the temporal development and scholarly impact of the research field. Second, country-, source-, author-, and institution-level productivity analyses were used to identify the principal contributors to literature. Third, country collaboration analysis was employed to examine the structure and intensity of international co-authorship. Fourth, author-keyword frequency and co-occurrence analyses were conducted to identify dominant concepts and interconnected research clusters. Finally, thematic mapping was employed to identify the conceptual structure and development of major themes within the literature (Ali & Shear, 2025; Aria & Cuccurullo, 2017; Donthu et al., 2021; Maquieira et al., 2024).

Results and Discussion

Building on the data and methodology outlined in Section 3, this section presents the results of the bibliometric analysis, based on publication and citation data retrieved from the Scopus database for the period 2000–2025, covering research on sustainability, eco-label certification, and export performance. The results are organized into a general profile of the dataset, publication trends, citation patterns, country-, source-, author-, and institution-level productivity, international collaboration networks, keyword structure, and thematic mapping. Each result is presented and interpreted in turn to establish the intellectual and structural landscape of this research domain, before Section 4.13 draws these strands together in relation to the sustainability–export performance question motivating the study.

Main Information about the Dataset

Table 1 summarizes the descriptive profile of the final dataset, computed directly from the exported Scopus records.

Table 1: Main Information about the Dataset

Description	Result
Timespan	2000–2025
Documents	1,558
Document type	Articles (100%)
Sources (journals)	468
Total citations	55,827
Average citations per document	35.83
Authors	4,549
Author's Keywords (DE)	4,446

Average co-authors per document	3.17
Single-authored documents	271 (17.4%)
Documents with international co-authorship	549 of 1,533 documents with recorded affiliations (35.8%)
Open Access documents	542 (34.8%)
Language of publication	English (99.9%), German (0.1%)

The dataset is characterized by a moderate to high degree of collaborative authorship, with an average of 3.17 co-authors per document and only 17.4% of documents single-authored. Approximately one-third of documents (35.8%) involve co-authors affiliated with more than one country, indicating a meaningful, though not dominant degree of international collaboration in this research area, consistent with the country collaboration network results discussed in Section 4.9. A little over one-third of the literature (34.8%) is published under some form of open access, suggesting that a substantial share of the field's most policy-relevant findings remain behind subscription paywalls, with potential implications for accessibility among practitioners and policymakers in developing economies.

Publication Trend Analysis

Table 2 reports the annual number of publications on sustainability, eco-label certification, and export performance between 2000 and 2025.

Table 2: Annual Scientific Production (2000–2025)

Year	Publications	Year	Publications	Year	Publications
2000	10	2009	28	2018	83
2001	9	2010	37	2019	78
2002	6	2011	34	2020	106
2003	8	2012	40	2021	92
2004	20	2013	41	2022	117
2005	8	2014	47	2023	172
2006	19	2015	44	2024	208
2007	20	2016	56	2025	177
2008	24	2017	74	Total	1,558

Table 2 illustrates the yearly output of scholarly work on sustainability and export performance, which encompasses investigations on sustainability practices, environmental sustainability disclosure, ESG initiatives, eco-label certifications, and other environmentally oriented business strategies. The table discloses a steady rise in publications from 2000 to 2025. In the initial phase (2000-2010), the research output was quite low, which means that the academic community paid very little attention to the interrelation between sustainability and export performance. Even so, the number

of publications grew gradually from 2011, reflecting a rising concern about environmental issues and the role of sustainability in international trade and business operations. Such growth accelerated markedly after 2016, at the time when methods of the United Nations Sustainable Development Goals (SDGs) and sustainability-related regulations became increasingly stringent, while environmental criteria were getting tougher in international markets. The yearly publications soared dramatically from about 56 papers in 2016 to over 200 papers in 2024, thereby displaying the wide academic interest in exploring the contribution of sustainability initiatives to export competitiveness, market access, and international business performance. Even though there is a minor decrease in 2025, it is most probably because of the partial indexing of the current year's publications rather than a decrease in research activity.

Citation Analysis

Table 3 presents the average number of citations received per year by publications in this field, from 2000 to 2025.

Table 3: Average Citations per Year (2000–2025)

Year	Avg. Citations	Year	Avg. Citations	Year	Avg. Citations
2000	6	2009	41	2018	43
2001	40	2010	45	2019	56
2002	53	2011	76	2020	45
2003	158	2012	65	2021	55
2004	53	2013	66	2022	31
2005	105	2014	64	2023	20
2006	42	2015	40	2024	14
2007	55	2016	44	2025	4
2008	61	2017	31		

The citation data displays substantial variation, ranging from a peak of 158 average citations for publications in 2003 to a low of 4 citations for those in 2025. This pattern reflects the time-dependent nature of citation accumulation rather than differences in the underlying quality of the research. The 2003 peak is attributable to a small number of early seminal contributions that established the conceptual foundations of the field and have continued to be cited extensively by subsequent pattern corroborated directly in the underlying dataset, where two of the most heavily cited documents overall were published in 2003. Conversely, the markedly low citation figures for 2024 (14) and 2025 (4) reflect the limited time these recent publications have had to accumulate citations, not a deficiency in their scholarly contribution. This same explanation accounts for the gradual decline in average citations observed from 2020 onward (45, 55, 31, and 20 in 2020–2023, respectively).

Most Globally Cited Documents

To complement the year-level citation averages above, Table 4 reports the ten individual documents with the highest citation counts in the dataset, identified directly from the Scopus export.

Table 4: Ten Most Globally Cited Documents

Rank	Authors	Title	Year	Source	Citations
1	(Chiou et al., 2011)	The influence of greening the suppliers and green innovation on environmental performance	2011	Transportation Research Part E: Logistics and Transportation Review	1,129
2	(A. Khan et al., 2013)	Corporate Governance and Corporate Social Responsibility Disclosures: Evidence from an Emerging Economy	2013	Journal of Business Ethics	965
3	(Ageron et al., 2012)	Sustainable supply management: An empirical study	2012	International Journal of Production Economics	772
4	(Fernando et al., 2019)	Pursuing green growth in technology firms through the connections between environmental innovation and sustainable business performance	2019	Resources, Conservation and Recycling	653
5	(Yadav et al., 2020)	A framework to overcome sustainable supply chain	2020	Journal of Cleaner Production	556

		challenges through solution measures of industry 4.0 and sustainability			
6	(Guan & Ma, 2003)	Innovative capability and export performance of Chinese firms	2003	Technovation	546
7	(Ahuja & Katila, 2004)	Where do resources come from? The role of idiosyncratic situations	2004	Strategic Management Journal	516
8	(Weber & Matthews, 2008)	Quantifying the global and distributional aspects of American household carbon footprint	2008	Ecological Economics	473
9	(Dorninger et al., 2021)	Global patterns of ecologically unequal exchange: Implications for sustainability in the 21st century	2021	Ecological Economics	427
10	(Kolk, 2003)	Trends in sustainability reporting by the fortune global 250	2003	Business Strategy and the Environment	425

The most-cited document in the dataset, Chiou et al. (2011), examines the influence of green supplier management and green innovation on environmental performance, a supply-chain-oriented perspective that aligns closely with the international trade and supply chain management cluster identified in the keyword co-occurrence analysis

(Section 4.11). Several other highly cited works, including Khan et al. (2013) and Kolk (2003), center on corporate sustainability disclosure and reporting, indicating that governance and transparency mechanisms represent an influential, if less numerically dominant, strand within the broader field. Notably, two of the ten most-cited documents Guan & Ma (2003) and Kolk (2003) were published in 2003, directly corroborating the unusually high average citation figure recorded for that year in Table 3.

Country-Wise Scientific Production

Table 5 reports on the ten most productive countries in this research area.

Table 5: Ten Most Productive Countries

Rank	Country	Publications
1	China	210
2	United States	154
3	United Kingdom	113
4	India	64
5	Germany	63
6	Australia	62
7	Spain	55
8	Canada	48
9	Pakistan	48
10	Netherlands	45

Table 5 illustrates the total count of research papers on sustainability, eco-label certification, and export performance in various countries as per Scopus database. China tops the list worldwide with 210 papers, a testament to its considerable funding in green trade and sustainability research, the US comes second with 154 papers, and the UK with 113 papers, which shows that the biggest economies still hold the lead in this sector. India comes at fourth with 64 papers, slightly behind is Germany with 63 papers, Australia with 62 papers, and Spain with 55. Canada and Pakistan both have 48 papers, which is a significant level of research productivity from Pakistan as an emerging economy. The Netherlands is the last in the top ten with 45 publications. Overall, while most of the top positions are held by developed countries, the inclusion of India and Pakistan in the top ten list is an indication of the widening participation in the research on sustainability and eco-label certification for export performance.

Country Collaboration Network

Figure 1: Countries collaboration network

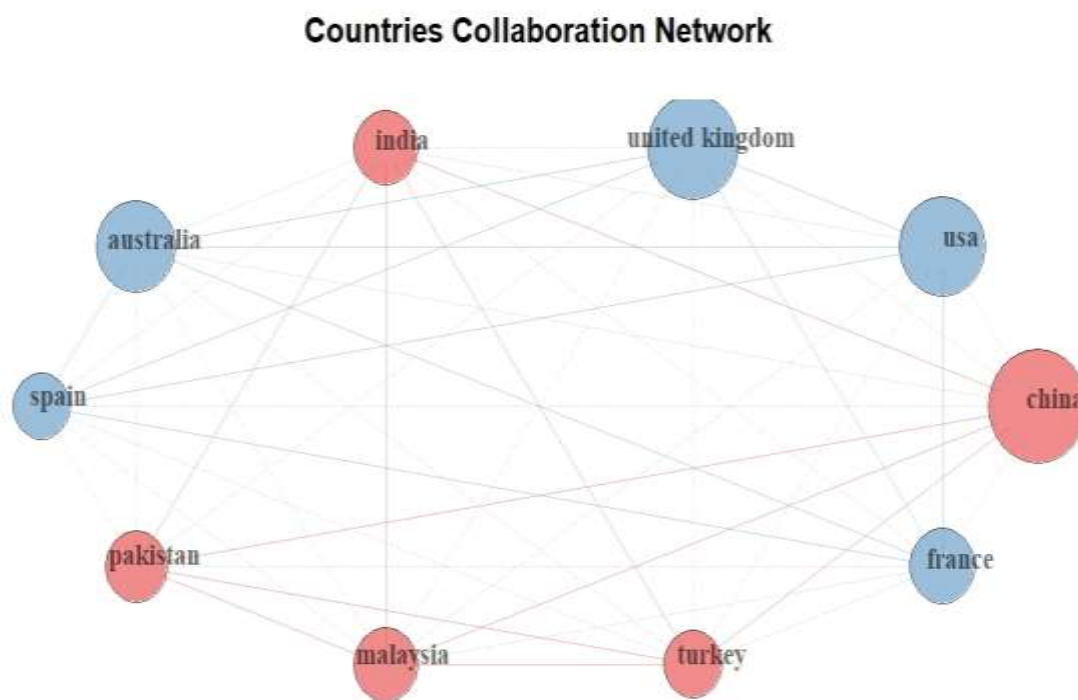


Figure 1 illustrates the collaboration network of countries that are actively conducting studies on sustainability, eco-label certification, and export performance. It visually represents the global cooperation of researchers and pinpoints the most collaborative and contributing countries in this research area. In the network graph, a country is represented by a node and the size of a node corresponds to the level of a country's contributions and its impact on the research field. The lines between the nodes show co-authorships between countries and represent the collaborative relationships. Countries with larger nodes and more connections are more influential in the global research network. From the figure, we can see that China is the most dominant country in the collaboration network, which is reflected by its bigger node size and its links with various countries. The country's central location suggests that China is a major center for international research collaboration and the spread of knowledge for sustainability, eco-label certification, and export performance. Also, the United States and the United Kingdom hold prominent positions in the network, having strong collaborative ties with many countries and That means Much contributing to the globalization of research in this sector.

The key supporting countries are India Pakistan Australia France Malaysia, and Turkey. These six countries are directly linked to the three main collaboration centers of China, United States, and United Kingdom. This connection relies on the exchange of skills, data, and novel research techniques through international collaborations. Besides the network shows that Australia, Malaysia, and Turkey are also collaborating with each other as well as with other main nodes. Such international collaborations broaden perspectives and enhance the quality of the global pool of

scholars engaged in research on sustainability. Each connecting line in the figure represents a co-authorship link between countries. Usually, the more connecting lines there are, the stronger the international collaborations and the higher the degree of integration in the global scientific community. These collaborative relationships are crucial in sustainability research where environmental, economic, and trade issues are so complex and interlinked, so that they require and benefit from diverse expertise and international perspectives.

Most Frequent Author Keywords

Table 6 reports the fifteen most frequently occurring author keywords across the dataset, computed directly from the Scopus export's Author Keywords field, which contains 4,446 unique keyword entries in total.

Table 6: Most Frequent Author Keywords

Rank	Keyword	Frequency
1	Sustainability	281
2	Exports	209
3	International trade	202
4	China	74
5	Sustainable development	70
6	Corporate social responsibility	65
7	Economic growth	59
8	Trade	57
9	Environmental sustainability	55
10	Circular economy	35
11	Natural resources	33
12	Imports	30
13	Innovation	29
14	Developing countries	26

The dominance of "sustainability," "international trade," "exports/export," and "China" among the most frequent author keywords directly corroborates the two-cluster structure identified in the keyword co-occurrence network (Section 4.8) and the prominence of China observed throughout the country-, author-, and network-level results. The relatively modest frequency of "circular economy" (35 occurrences, ranked 11th) provides additional, document-level support for its classification as an emerging rather than fully matured theme in the thematic map (Section 4.9).

Keyword Co-Occurrence Analysis

Figure 2 presents the keyword co-occurrence network derived from publications on sustainability, eco-labelling, and export performance, in which node size reflects keyword frequency and line thickness reflects the strength of co-occurrence between terms. The network reveals two principal thematic clusters.

Figure 2: Keyword co-occurrence network

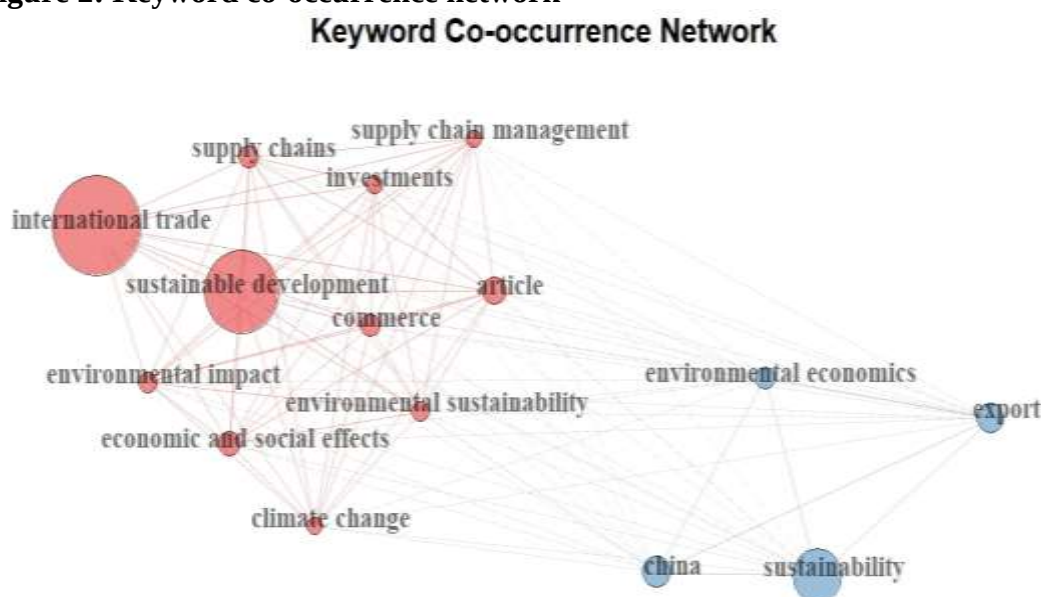


Figure 2 the keyword co-occurrence network of the relationship between exports, sustainability, and FP. The network shows how keywords are related to each other based on their frequency in the literature. The size of a node depends on the frequency of the corresponding keyword, while the thickness of a line that connects two nodes shows the strength of the co-occurrence. The network indicates that there are two main research areas: Cluster 01 shows international trade and sustainability (Red Cluster). International trade and sustainable development are the two most influential central themes in the red cluster. Apart from these, the cluster also consists of related concepts like environmental impact, environmental sustainability, climate change, economic and social effects commerce investments, and supply chain management. The strong connections among these keywords suggest that the interplay of sustainability-oriented initiatives and environmental concerns with international trade and supply chain operations is a popular topic covered in many publications.

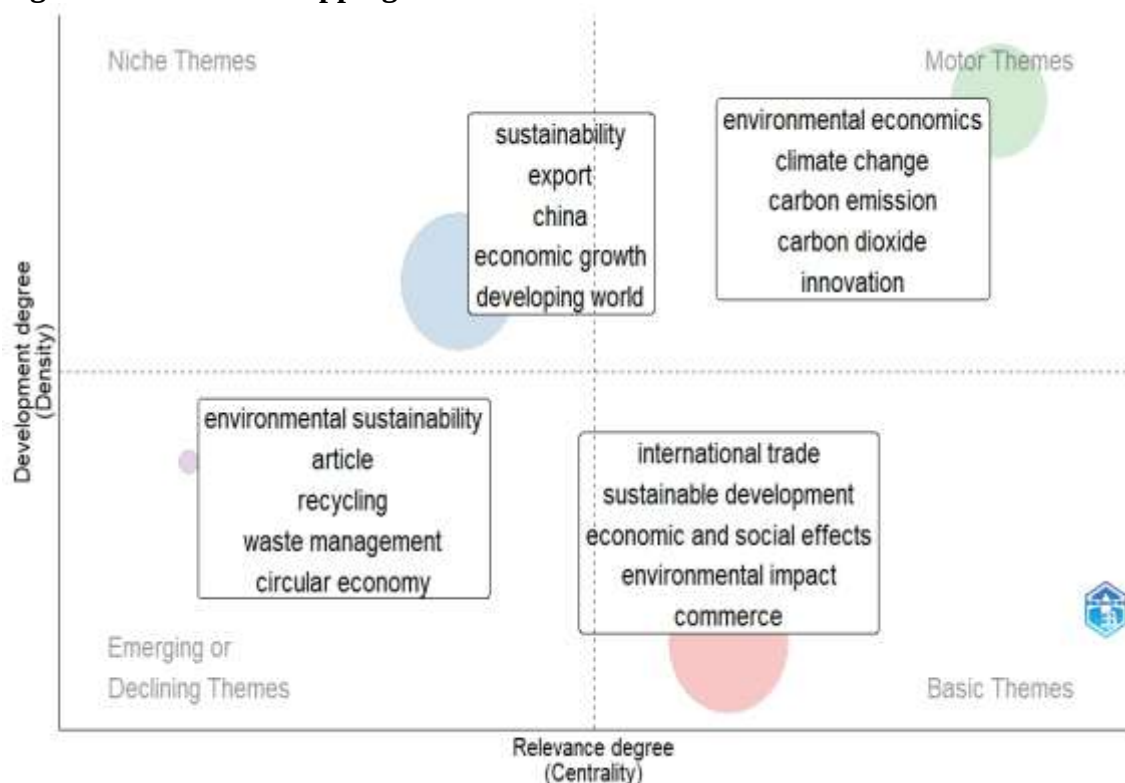
Cluster 2 shows export performance and sustainability (Blue Cluster). The dominant keywords of the blue cluster are sustainability export, China, and environmental economics. These four keywords are tightly linked suggests that the latest research is geared towards a better understanding of the role of sustainability as a business practice, environmental regulations as a policy tool, and competitive advantages stemming from exports with China serving as an example. The cluster underscores Truth is sustainable economic development is one of the driving forces behind export

performance and environmental results. Overall, the network gives evidence that sustainability is a kind of linchpin, that brings together the three quite different areas of environment, economy, and trade. The high ranking of international trade, sustainable development, and sustainability among keywords suggests that the three constitute the core of the intellectual landscape of the originating field. Besides these, the appearance of supply chain management, climate change, and environmental economics as keywords is a revealing sign of the multi-disciplinarity of modern research that brings together the economic, environmental management, and international business viewpoints.

Thematic Mapping

Figure 3 presents a thematic map of the field, in which themes are classified according to their centrality and density into motor themes, basic themes, niche themes, and emerging or declining themes.

Figure 3: Thematic Mapping



The thematic map shows that the research on exports and sustainability is motivated by environmental economics, climate change, carbon emissions, and innovation, which are present in the motor themes quadrant. Their high centrality and density imply that these topics are both well-developed and very influential in the field. Meanwhile, international trade, sustainable development, environmental impact, and commerce make up the basic themes of the literature, essentially the core at which

most of the research is focused. The cluster with environmental sustainability recycling waste management, and circular economy is located in the emerging or declining themes quadrant, suggesting these topics are either becoming new research directions or have not yet fully matured. To sum up, the map illustrates a clear transition of the literature from the traditional trade studies to sustainability-oriented issues, emphasizing the environmental and climate-related ones as major factors in determining future research on exports and economic development.

Conclusion

This study examined the relationship between sustainability and export performance by combining a review of empirical literature with a bibliometric analysis of the broader research field. The literature review indicates that sustainability practices, eco-labelling, ESG adoption, and environmental regulation, generally have a positive effect on export performance, working primarily through improved market access, product differentiation, reduced financing costs, and green innovation. This effect is not uniform, however: several studies find that compliance costs and regulatory stringency reduce export volumes or discourage export participation, particularly in the short run, while others identify nonlinear (U-shaped or N-shaped) relationships that depend on institutional quality and the intensity of regulation. The overall picture is one in which sustainability enhances export performance under most conditions, but the size and even the direction of the effect depend on firm capacity, market context, and how environmental policy is designed and implemented.

The bibliometric analysis complements this picture by mapping the intellectual structure of the wider field. Drawing on 1,558 English-language articles published across 468 journals between 2000 and 2025, the field has expanded substantially since 2016, alongside the global adoption of the Sustainable Development Goals. China, the United States, and the United Kingdom lead in productivity and collaboration, and the Journal of Cleaner Production and Resources Policy are its leading outlets. The field's most-cited works centered on green supply chain innovation and corporate sustainability disclosure, align with the two dominant themes identified through keyword analysis: sustainability in international trade, and export performance with a strong China-specific focus. Environmental economics, climate change, and innovation are the most developed themes, while circular economy research remains comparatively nascent. Overall, the findings show that sustainability has become an important, though conditional, driver of export performance, and that the research examining this relationship has grown rapidly while remaining concentrated in a small number of countries, journals, and thematic clusters.

Limitations

This study has several common bibliometric limitations. It relies exclusively on Scopus, missing publications indexed only elsewhere; it characterizes publication and citation patterns but not causal validity. Keyword-based search may also miss studies using alternative terminology, and author/institutional name disambiguation is a recognized bibliometric challenge that can introduce minor ranking inaccuracies.

Future Research

Future research can be done on firm-level studies quantifying eco-labelling and ESG effects on export performance in specific developing economies; cross-database bibliometric analysis (Web of Science alongside Scopus) to validate the observed trends; research on circular economy practices and export performance, given this theme's emerging status; and a systematic meta-analysis reconciling the literature's divergent positive, negative, and nonlinear findings on sustainability and export performance.

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