

## **Trends and Hotspots in Sustainable Management Research: A Scopus-Based Bibliometric Analysis**

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### **Abstract**

**Background:** Scientific publications in sustainable management have grown rapidly in recent years. Given this expansion, it is essential to conduct a bibliometric analysis to identify research trends and thematic hotspots in the field.

**Methods:** A systematic literature review design was employed using data extracted from the Scopus database. The analysis was conducted using R Studio and the Bibliometrix package to visualize trends and map research themes.

**Results:** The analysis revealed 231 documents published across 98 sources, with an annual growth rate of 7.25%. A total of 857 authors contributed, with an average of 3.88 co-authors per document and 33.77% international collaboration. Three major thematic clusters were identified in sustainable management literature. Thematic mapping highlighted niche, motor, basic, and emerging themes. A thematic evolution was observed from general sustainable management to more focused areas such as supply chain management, environmental impact, and circular economy.

**Conclusion:** The study provides an overview of the intellectual structure and thematic development of sustainable management research. It identifies key areas of focus and evolution offering a roadmap for future investigations in the field.

**Novelty:** This study uniquely reveals strategic shifts toward the circular economy and environmental impact, aspects rarely highlighted in earlier research.

**Keyword:** Management, Publications, Research, Sustainable

## **Introduction**

Sustainable Management is a comprehensive and forward-thinking approach to managing organizations, resources, and systems in a way that ensures long-term environmental integrity, social equity, and economic prosperity. It is grounded in the principle of sustainability, which emphasizes meeting the needs of the present without compromising the ability of future generations to meet their own needs. Unlike traditional management practices that often prioritize short-term gains or economic outcomes alone, sustainable management adopts a triple bottom line perspective balancing people (social responsibility), planet (environmental stewardship), and profit (economic viability).

At its heart, sustainable management requires organizations to assess the environmental and social impacts of their operations and make strategic decisions that reduce harm, conserve resources, and promote fairness and inclusivity. This includes practices such as reducing carbon emissions, minimizing waste, using renewable energy, supporting fair labor practices, engaging stakeholders transparently, and ensuring ethical governance. Sustainable management is applicable across all sectors public, private, and non-profit and at all levels, from small businesses to multinational corporations and government institutions. For instance, in business, it involves adopting green supply chains, ethical sourcing, and sustainable product design. In public administration, it may include policies that promote clean energy, protect biodiversity, or support vulnerable populations. Moreover, sustainable management draws from various disciplines, including environmental science, economics, ethics, corporate governance, and systems thinking. It encourages innovation and long-term planning to build resilient organizations that can adapt to global challenges such as climate change, resource scarcity, inequality, and regulatory shifts. In recent years, global frameworks such as the United Nations Sustainable Development Goals (SDGs) and Environmental, Social, and Governance (ESG) criteria have further emphasized the importance of sustainable management. Organizations that embrace these principles not only contribute to a more sustainable world but often gain competitive advantage through improved reputation, operational efficiency, and stakeholder trust.

Various studies in sustainable management have emphasized integrating environmental, social, and economic goals into business strategy and operations. For example, Berg, Koelbel, and Rigobon (2022) from MIT Sloan identified significant inconsistencies among Environmental, Social, and Governance (ESG) ratings, which created confusion among investors and hindered effective decision-making. Their findings influenced global regulatory

discussions and encouraged more transparent ESG methodologies. Similarly, the Fair and Responsible Supply Chain for the Fashion Sector (FReSCH) project, funded by the European Union's Horizon 2020 program, stressed that sustainability in fashion requires a combination of environmental protection and labor rights, shaping key policies like the EU Sustainable Textiles Strategy (Goworek et al., 2023). Deloitte (2023) further contributed by showcasing how sustainability can be integrated into financial models using tools like marginal abatement cost curves and scenario planning, arguing that aligning sustainability with profitability enhances long-term resilience.

Moreover, Deloitte and the Environmental Defense Fund (2023) proposed a circular economy roadmap that companies such as Apple and Coca-Cola have followed to reduce waste and improve resource efficiency. On the technological side, a literature review by Sharma et al. (2024) explored how Industry 5.0, artificial intelligence, and sustainable composite materials can transform green supply chains but identified a lack of standardized metrics. A Systems-of-Systems (SoS) approach for environmental sustainability, studied by Pacheco et al. (2025), highlighted applications in smart cities, wildfire management, and agriculture, though challenges like system interoperability remain.

In terms of national-level planning, Hidalgo and Hausmann (2023) used economic complexity indices to assess countries' capacity to adopt green technologies, suggesting that developing nations can leverage existing non-green capabilities for green innovation. Similarly, El Baz and Laguir (2019) examined how Egyptian firms implement integrated sustainability practices, finding that cultural change and stakeholder communication are essential for success. Cross-sectoral collaboration also plays a key role, as shown in a study by Dentoni and Bitzer (2015), which emphasized trust and motivation alignment between businesses and NGOs in sustainability partnerships. Lastly, case studies from Sri Lanka, Italy, and Brazil analyzed by de Sousa Jabbour et al. (2020) show how circular and lean manufacturing practices have been implemented, though barriers like certification and consumer awareness persist.

Sustainable management has emerged as a crucial response to growing environmental, economic, and social challenges (Wu & Tham, 2023). Amid increasing global pressure for sustainable practices, research in this area has expanded rapidly across disciplines. However, this rapid growth has made it difficult to track the evolution and focus areas of the field (Shi et al., 2019). Bibliometric analysis offers a systematic way to map scholarly output, trends, and influential contributions (Ismail et al., 2025). Recognizing this gap, the authors were motivated:

1. To analyze the publication and citation trends in sustainable management research over time.
2. To examine the distribution of journals publishing sustainable management research using Bradford's Law.
3. To identify the most productive and influential authors in sustainable management research.
4. To investigate authorship productivity patterns in sustainable management research based on Lotka's Law.
5. To determine the leading institutions contributing to sustainable management research.
6. To assess the countries with the highest number of corresponding authors in sustainable management publications.
7. To explore the most frequently used keywords in sustainable management research through word cloud analysis.
8. To identify the main clusters of research topics in sustainable management using bibliographic coupling.
9. To map the key themes and their development status in sustainable management research through thematic mapping.
10. To examine the evolution of research themes in sustainable management over time.
11. To analyze patterns of international collaboration among countries in sustainable management research.

### **Research Methodology**

This study employed a Systematic Literature Review (SLR) research design to comprehensively examine the existing body of knowledge related to sustainable management. The data collection process was conducted on May 12, 2025 using the Scopus database. Initially, a broad search was performed using the keyword combinations: "sustainable AND management" and "management AND sustainable", which returned 302,500 documents. To ensure relevance to the research domain, the subject area was limited to Business, Management, and Accounting, reducing the results to 39,079 documents.

To focus on peer-reviewed research, the document type was restricted to "Article", yielding 23,130 documents. The publication stage was further limited to "Final", resulting in 22,385 documents. The search was then narrowed by specifying the keyword "sustainable management", which refined the list to 246 documents.

To enhance the academic rigor, the source type was filtered to "Journal", reducing the number to 244. Finally, the language was limited to English, resulting in a total of 231 articles selected for detailed analysis in this study.

To analyze the bibliographic data, R Studio was used in combination with the Biblioshiny web interface from the Bibliometrix R package. This allowed for quantitative and visual bibliometric analysis of publication trends, key authors, influential journals, citation networks, and thematic evolution related to sustainable management.

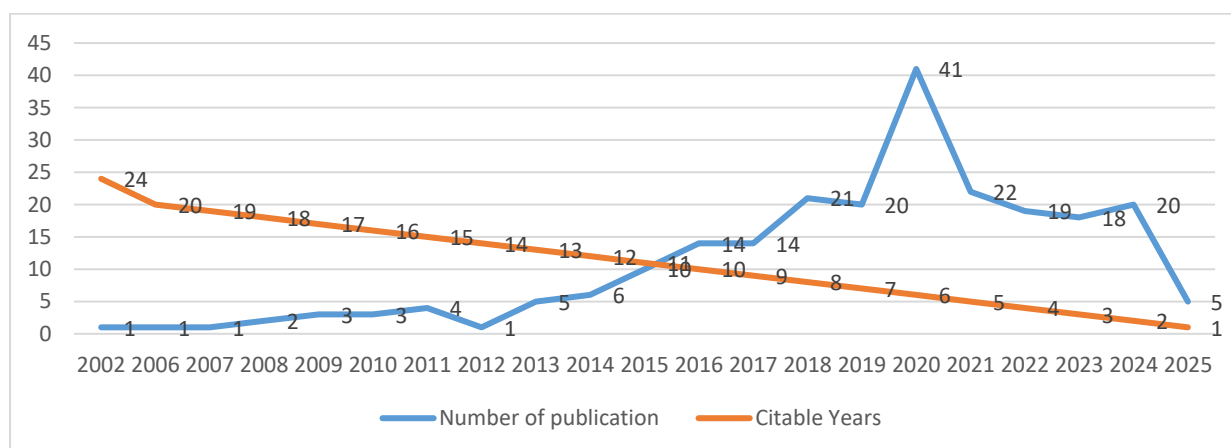
## Results

### Publication and citation trends in sustainable management research over time

From 2002 to 2013, the number of publications remained low (1–5 annually), indicating that sustainable management was a niche or emerging field with limited academic attention.

**Figure 1**

*Publication and citation trends*



A steady growth in publications began in 2014, aligning with global initiatives like the UN's Sustainable Development Goals (SDGs), showing a rising scholarly interest in sustainable practices. Publication output peaked in 2020 (41 publications), possibly driven by the COVID-19 pandemic, which spotlighted sustainability in supply chains, health systems, and business models. Publications from 2024 and 2025 appear lower in citation impact due to shorter "citable years," meaning they haven't had enough time to accumulate citations yet, not necessarily due to reduced relevance or quality.

The publication trend in Sustainable Management shows a steady increase from 2002 onward, with a sharp rise beginning in 2015. The peak was observed in 2020 with 41

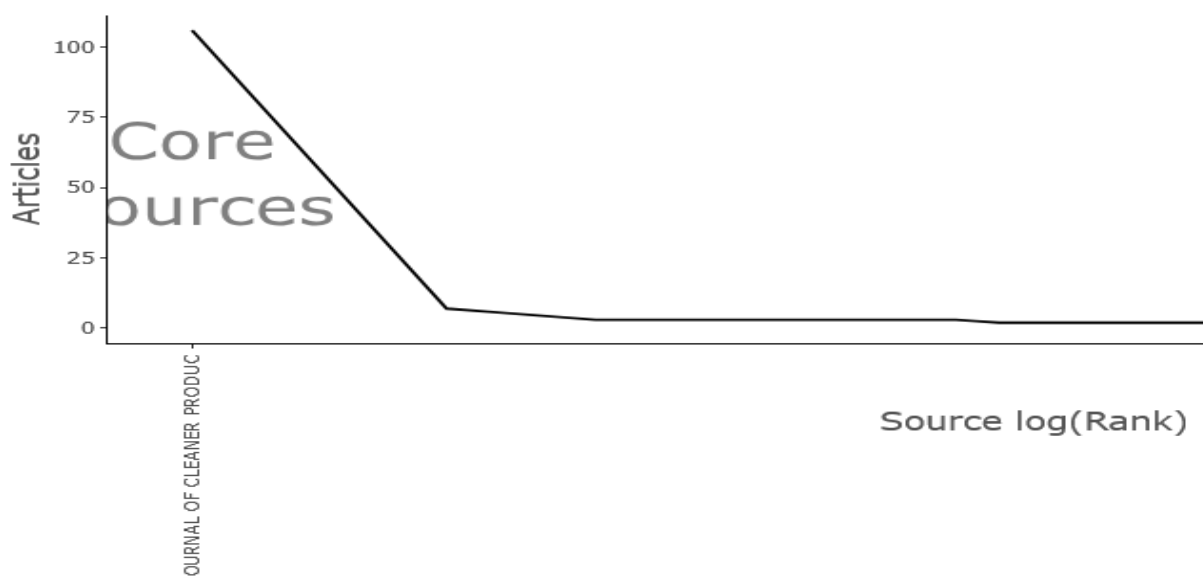
publications, reflecting heightened research interest during that period. Although the number of publications slightly declined after 2021, the trend remains significantly higher than earlier years. This pattern indicates growing academic engagement and relevance of sustainable management in recent years.

### **Distribution of journals publishing sustainable management research using Bradford's Law**

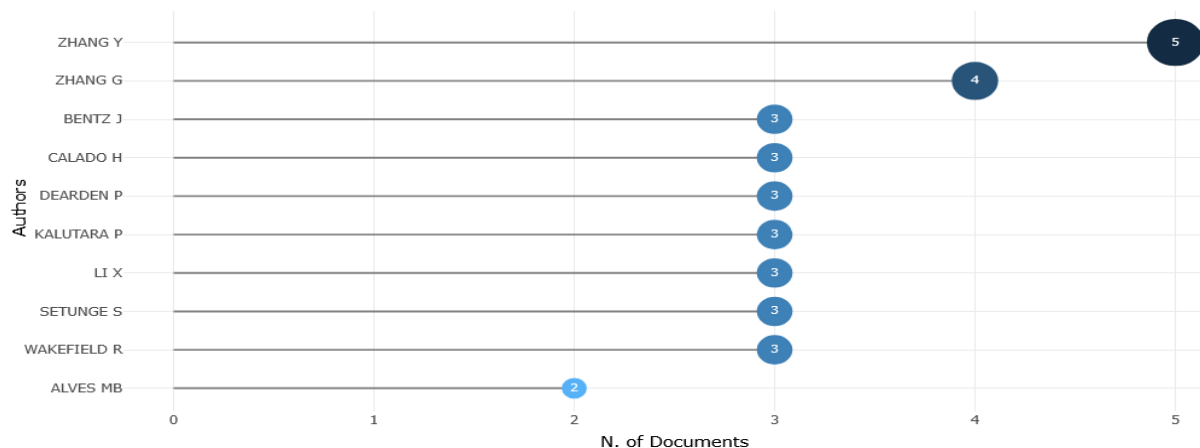
Bradford's Law highlights a group of journals that publish the highest number of relevant articles on a specific topic. These core journals are the most productive and influential sources in that research field. The result shows that the Journal of Cleaner Production stands out as the most productive source.

**Figure 2**

*Bradford's Law*

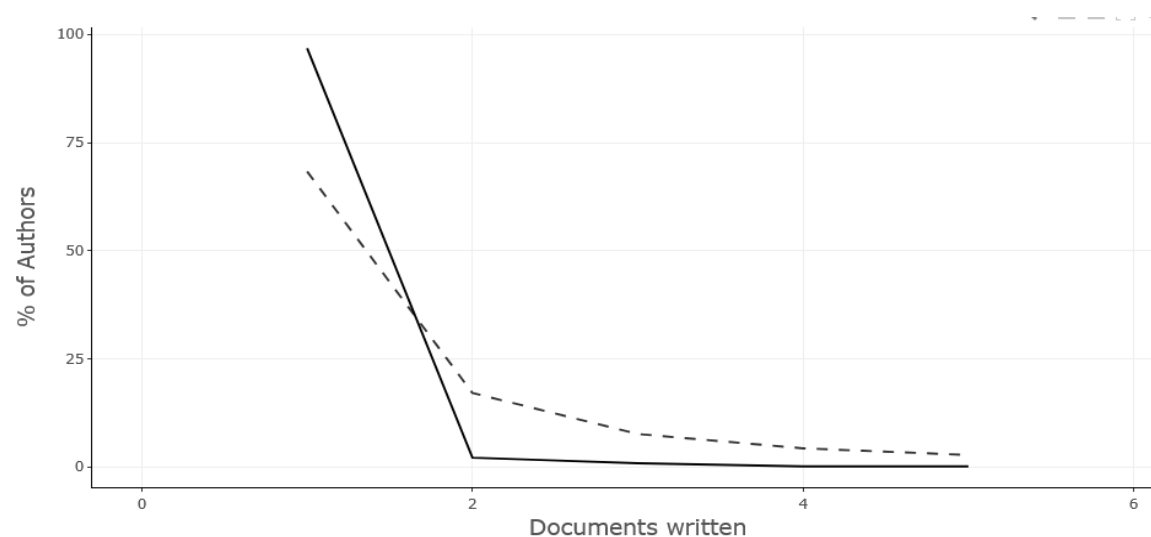


### **Most productive and influential authors in sustainable management research**

**Figure 3***Most productive and influential authors*

The most relevant authors in the dataset are identified through their article counts and fractionalized contributions. ZHANG Y holds the highest number of articles with 5, though his fractionalized score of 0.67 reflects frequent collaboration and a lower individual share per publication. LI X, with 3 articles and a fractionalized score of 0.92, demonstrates the strongest individual contribution, suggesting a leading role in most of the research efforts. Authors such as BENTZ J, CALADO H, DEARDEN P, KALUTARA P, SETUNGE S, and WAKEFIELD R each have 3 articles and a fractionalized value of 0.75, showing consistent and significant involvement in co-authored works. ALVES MB, with 2 articles and a fractionalized score of 0.50, shows notable participation, indicating a developing presence in the research field.

### Authorship productivity patterns in sustainable management research based on Lotka's Law

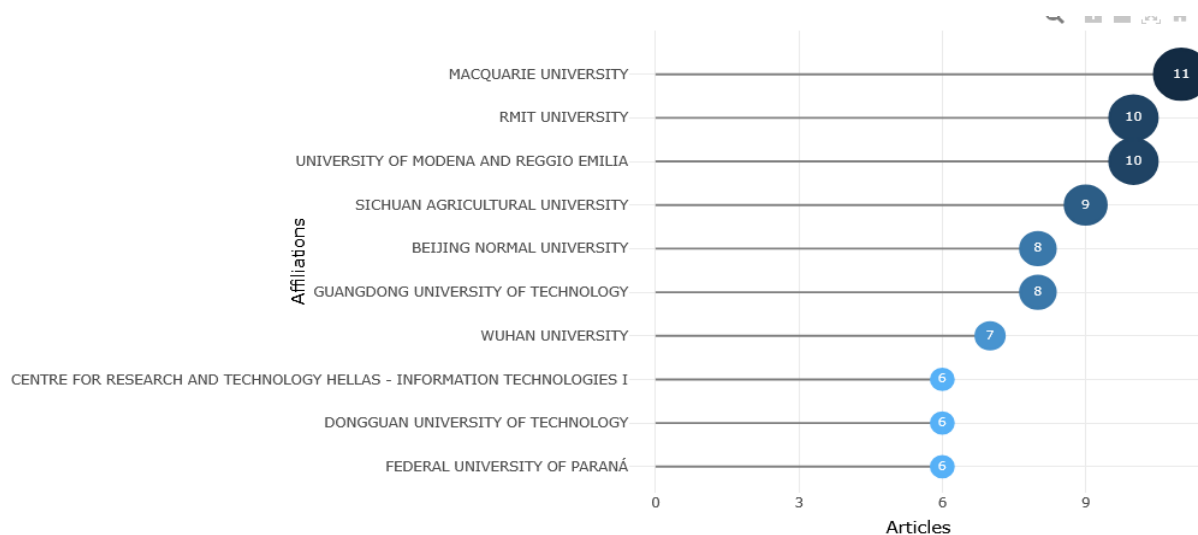
**Figure 4***Lotka's Law*

Lotka's Law is a principle that describes the frequency of publication by authors in a given field. In the bibliometric study on the topic of sustainable management, the results show that out of the total authors, 830 have written only one document, representing 96.8% of all contributors. In contrast, only 18 authors have written two documents (2.1%), and even fewer have published more: 7 authors wrote three documents (0.8%), while only one author each contributed four and five documents (0.1% each). This distribution clearly illustrates Lotka's Law, showing that author productivity in the field is highly skewed dominated by single-publication contributors, with very few highly prolific authors.

### Leading institutions contributing to sustainable management research

**Figure 5**

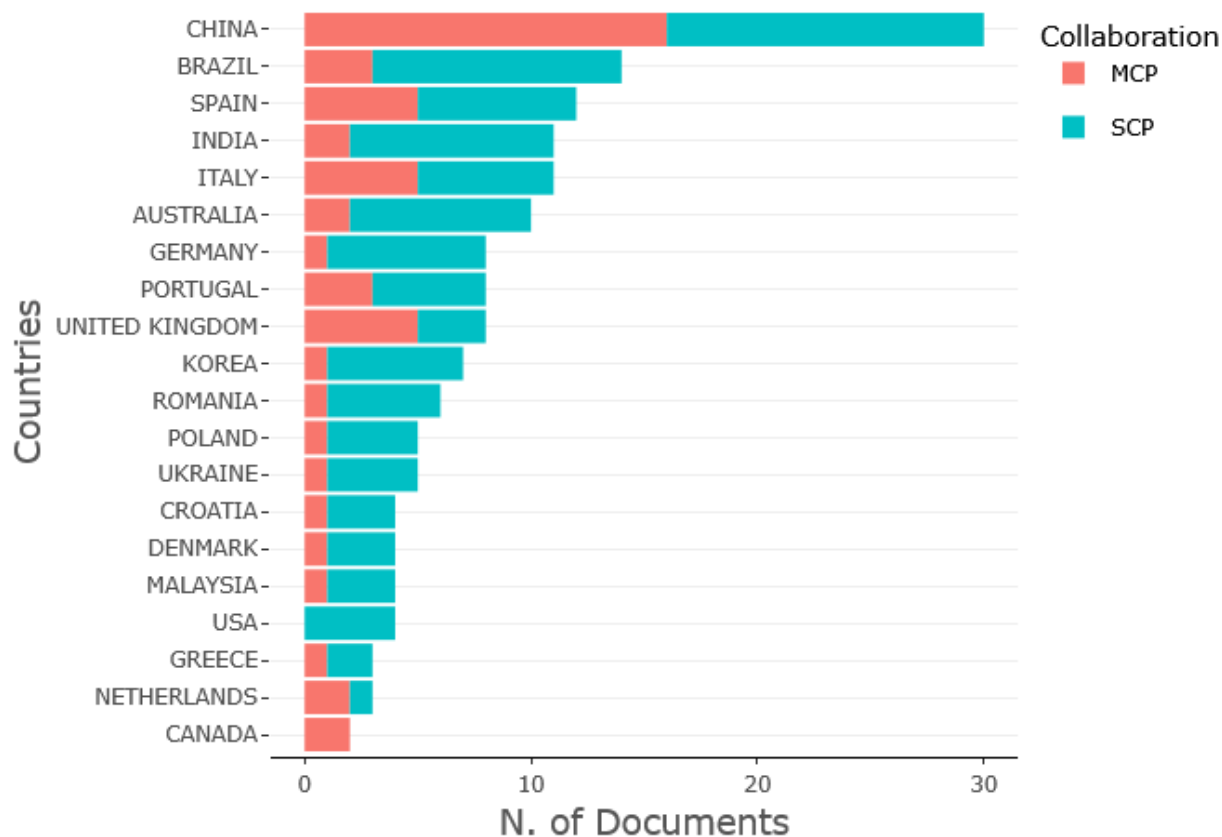
*Leading institutions*



The leading institutions contributing to sustainable management research include Macquarie University with 11 articles, followed by RMIT University and the University of Modena and Reggio Emilia with 10 articles each. Sichuan Agricultural University contributed 9 articles, while both Beijing Normal University and Guangdong University of Technology published 8 articles. Wuhan University produced 7 articles, and CERTH/ITI, Dongguan University of Technology, and the Federal University of Paraná each contributed 6 articles.

### Countries with the highest number of corresponding authors in sustainable management publications



**Figure 6***Countries with the highest number of corresponding authors*

The analysis of corresponding authors in sustainable management publications reveals that China leads with the highest number of articles (30), including 14 single-country publications (SCP) and 16 multiple-country publications (MCP). Following China, Brazil contributes 14 articles, predominantly single-country (11 SCP), while Spain accounts for 12 articles with a balance between single-country (7) and multiple-country (5) collaborations. India and Italy both have 11 articles each, with India showing more single-country publications (9 SCP) and Italy having a relatively higher number of multiple-country collaborations (5 MCP). Other notable contributors include Australia (10 articles), Germany (8 articles), Portugal (8 articles), the United Kingdom (8 articles), and Korea (7 articles), reflecting diverse international participation and collaboration in sustainable management research.

#### **Most frequently used keywords in sustainable management research through word cloud analysis**

### Figure 7

### Most frequently used keywords



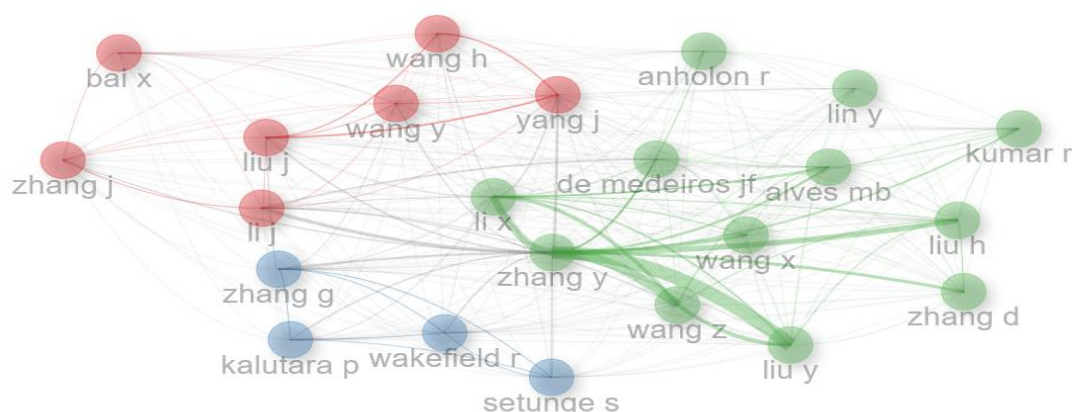
The word cloud analysis reveals the most frequently used keywords in sustainable management research. The term “sustainable management” appears most prominently with a frequency of 137, followed closely by “sustainable development” at 111 occurrences. Other significant keywords include “decision making” (22), “life cycle” (20), and “waste management” (18). Terms related to resource and environmental aspects such as “environmental management” (15), “supply chain management” (14), “supply chains” (14), and “water management” (13) also appear frequently. Additionally, “agriculture” is noted with 10 occurrences, highlighting its role within sustainable management research topics.

### Main clusters of research topics in sustainable management using bibliographic coupling

Cluster-wise analysis of the main research topics in sustainable management based on bibliographic coupling identifies groups of closely related studies to reveal key thematic areas within the field. The results show three clusters.

### Figure 8

### *Main clusters using bibliographic coupling*

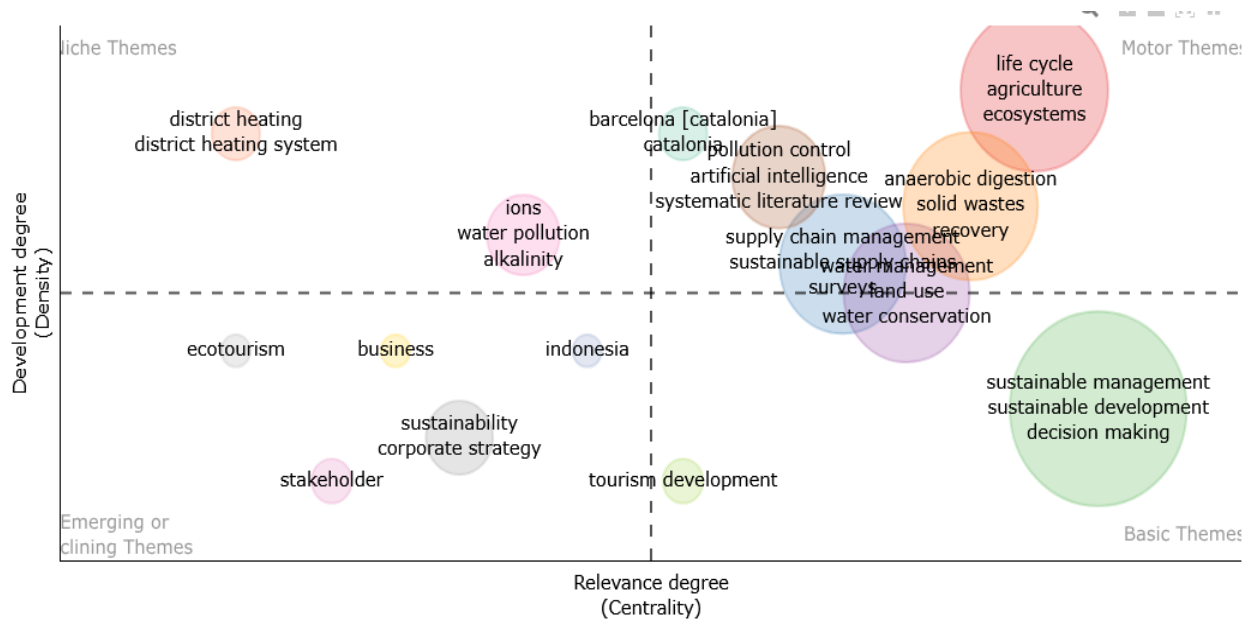


**Red Cluster:** This cluster focuses strongly on water management within the broader context of sustainable management and development. The very high frequency of water management (87.5%) indicates that a significant proportion of research in this cluster centers on managing water resources sustainably. Sustainable management and sustainable development are also relevant but to a lesser extent. This cluster represents a thematic niche where water resource management intersects with sustainable management practices, highlighting its importance in the sustainable management research landscape.

**Blue Cluster:** This cluster is centered on decision-making processes and research methodologies within sustainable management. The 100% frequency of design/methodology/approach highlights that this cluster represents methodological studies or papers focused on how sustainable management research is conducted. Decision making, as a key element, suggests that studies in this cluster address how decisions are made within sustainable management frameworks. The relatively smaller size and high impact suggest focused, influential research on improving or evaluating research methods and decision-making models.

**Green Cluster:** This is the largest and most central cluster, with 12 nodes and the highest centrality value (4.906). The cluster strongly integrates sustainable management with sustainable development and environmental management, indicating a broad, interconnected research focus on these overlapping areas. The high frequencies for sustainable development and environmental management (both above 70%) suggest that this cluster covers comprehensive approaches to sustainability, focusing on both the development aspect and environmental considerations. It likely represents the core thematic area of sustainable management research, linking environmental issues directly with sustainable development goals.

**Key themes development status in sustainable management research through thematic mapping**

**Figure 9***Key themes*

The thematic map of sustainable management research reveals a diverse and evolving knowledge structure. In the top-right quadrant, life cycle, agriculture, and ecosystems emerge as motor themes, representing well-developed and highly influential areas of research. These themes are central to sustainability discussions and demonstrate both academic maturity and practical relevance, particularly in guiding environmental policy and resource management.

In contrast, sustainable management, sustainable development, and decision making are identified as basic themes in the bottom-right quadrant. Although they are highly relevant and widely connected across the research field, they remain less developed in terms of depth and cohesiveness, indicating opportunities for future theoretical and empirical elaboration.

In the top-left quadrant, district heating systems and water pollution (including alkalinity and ions) are categorized as niche themes topics that are richly developed within their own areas but relatively isolated from the broader discourse of sustainable management. Meanwhile, ecotourism, business, stakeholder strategy, and tourism development appear in the bottom-left quadrant as either emerging or declining themes. Their lower density and centrality suggest limited current influence, though they may regain importance if reframed in the context of global sustainability challenges.

Centrally positioned themes such as artificial intelligence, pollution control, supply chain management, and solid waste treatment reflect dynamic and evolving areas of research. These are gaining traction through technological innovation and interdisciplinary approaches, offering promising directions for future sustainable management practices.

Overall; The map demonstrates that sustainable management is not a monolithic field but a complex, interconnected landscape with varying levels of maturity and focus.

High-potential areas (AI, pollution control, supply chains) can be leveraged for policy and innovation.

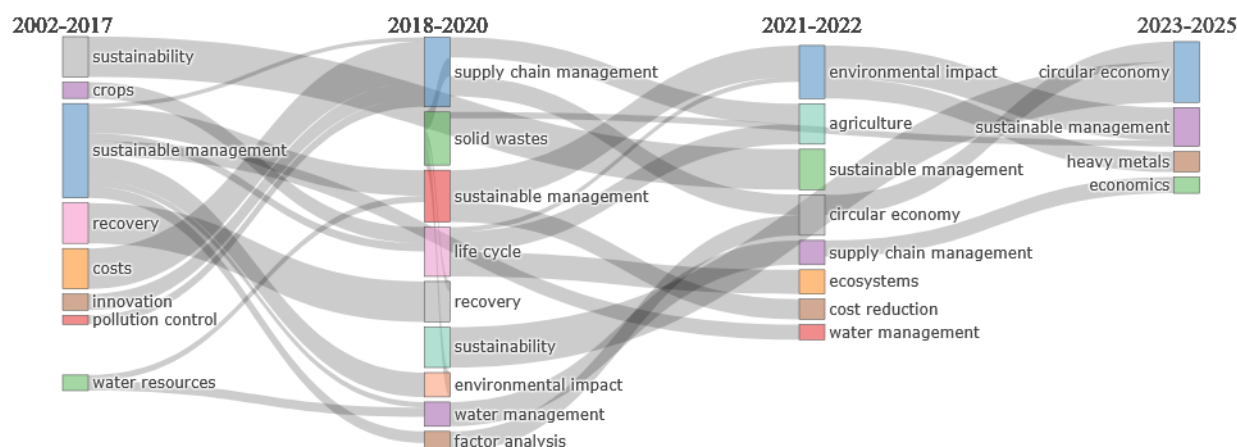
There is a need for greater integration of niche or emerging themes with central sustainability discourses to avoid fragmentation.

Researchers and practitioners should consider bridging the gaps between high-density isolated topics and low-density core themes for a more holistic and actionable sustainability framework.

### Evolution of research themes in sustainable management over time

**Figure 10**

#### *Evolution of research themes*



The thematic progression within sustainable management research from 2002 to 2025 demonstrates a logical and strategic evolution, driven by the increasing urgency and complexity of sustainability challenges.

In the initial period (2002–2017), the primary focus was on broad and foundational concepts, with "sustainable management" and "sustainability" emerging as the main nodes. These reflected early efforts to establish a conceptual framework for balancing environmental, economic, and social priorities. Other notable themes during this period included "recovery" and "water resources," indicating early interest in resource reuse and water-related sustainability challenges.

Between 2018 and 2020, "sustainable management" remained a central theme, but the field began to shift toward more applied and operational areas. "Supply chain management" became a major focus, highlighting the integration of sustainability into logistical and production

processes. Additionally, "solid wastes" and "life cycle" gained prominence, suggesting a growing emphasis on waste reduction and lifecycle thinking in sustainable practices.

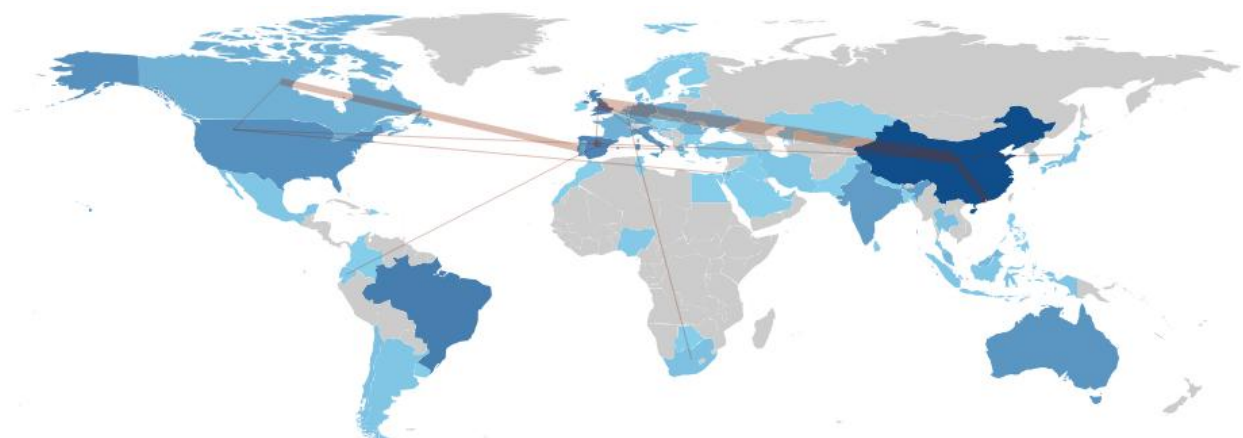
From 2021 to 2022, while "sustainable management" continued to be important, there was a clear rise in the significance of "environmental impact" and "circular economy." These themes reflect an increased concern with quantifying ecological effects and transitioning from linear to circular models of resource use. This period marks a more strategic and systems-based approach to sustainability.

In the most recent period (2023–2025), "circular economy" has become the dominant node, indicating a mature and focused shift toward regenerative economic systems. "Sustainable management" remains a key theme, while new areas such as "heavy metals" and "economics" have emerged, pointing to growing interest in environmental contamination and the integration of economic analysis into sustainability frameworks.

### **Patterns of international collaboration among countries in sustainable management research**

**Figure 11**

*Patterns of international collaboration among countries*



The map illustrates global patterns of international collaboration in sustainable management research, highlighting significant disparities in engagement across regions. Countries shaded in dark blue such as China, the United States, the United Kingdom, Germany, Brazil, and Australia are the most active participants, indicating high levels of research output and collaboration. These nations serve as central hubs in the global research network, often setting the agenda and connecting with multiple international partners. China, in particular, stands out with widespread links to both European and Asian countries, reflecting its growing leadership in sustainability research.

Lighter shades of blue represent countries with moderate or emerging involvement, including India, South Korea, Canada, France, and Japan. Meanwhile, grey areas indicate minimal or no participation, primarily in parts of Africa, Central Asia, and smaller island nations, revealing gaps in global research integration. The connecting lines on the map show strong collaborative ties, especially between transatlantic partners like the USA and Europe, as well as between China and Western countries. These connections reflect a globalized research environment where sustainable management is increasingly addressed through international cooperation.

Regionally, Europe shows a high degree of intra-regional and international collaboration, while Asia is largely driven by China's dominance, with India and Japan also contributing. In contrast, Africa has limited representation apart from South Africa, and Latin America's activity is centered on Brazil. Australia plays a key bridging role between the Asia-Pacific and Western countries. Overall, the map underscores the central role of global networks in advancing sustainable management research while also highlighting the need to support underrepresented regions to foster more inclusive and equitable participation in this critical field.

## **Conclusion**

Sustainable management research has expanded significantly over the past two decades, with accelerated growth in recent years signaling its rising academic and practical relevance. Leading journals and highly collaborative authorship patterns demonstrate the field's interdisciplinary character, while geographic contributions remain concentrated in a few key regions. Thematic analysis identifies dominant research areas, including water management and circular systems, alongside underdeveloped niches that warrant further exploration. Emerging trends point to increasing integration of technology and policy-driven solutions in sustainability discourse. To sustain momentum, future research should bridge gaps between theory and real-world application while fostering broader international cooperation.

## **Recommendation**

Expand interdisciplinary studies to integrate water, energy, and food systems within circular economy frameworks.

Develop advanced decision-making tools using AI and participatory methods for real-world sustainability challenges.

Strengthen global research partnerships to improve supply chain sustainability, particularly in developing nations.

Increase focus on underexplored areas like district heating and ecotourism through targeted funding and policy support.

Accelerate technology adoption (e.g., blockchain, IoT) to enable scalable circular economy solutions.

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