

Navigating Sustainability: A Bibliometric Exploration of Sustainable Business Models, Green Finance, and Environmental Conservation

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[Abstract] In an era where sustainability takes center stage in global discussions, this bibliometric study utilizes data sourced from Dimensions to dissect the complex web of research surrounding topics like "Sustainable business models," "net zero," "green finance," and related themes. With a dataset of 1477 articles, robust bibliometric analyses have been employed to uncover temporal trends, influential fields of research, and thematic clusters. This exploration not only provides a comprehensive snapshot of the current state of sustainability scholarship but also offers valuable insights for future research endeavors. Harnessing the capabilities of Dimensions, this study navigates the dynamic intersections of sustainability, contributing to a broader understanding of environmental conservation and sustainable development.

[Keywords] sustainability, sustainable business models, green finance, environmental conservation, bibliometric analysis, VOSviewer

Introduction

Sustainable development and environmental conservation stand at the forefront of global discourse, reflecting an urgent need to address pressing challenges concerning the planet's well-being. As scholars and practitioners engage in this critical field, understanding the dynamics of research, emerging trends and collaborative network becomes paramount. This study employs bibliometric analysis techniques to unravel the intricate fabric of research in sustainable development, focusing on the intersection of keywords such as "Sustainable business models," "net zero," "green finance," "green banking," "sustainable transport," "green building," "energy conservation," and "renewable energy." By leveraging the wealth of data extracted from the Dimensions database, this research seeks to illuminate key patterns, influential sources, thematic clusters, and global collaborations within the expansive domain of sustainability.

Methodology

The dataset for this study was meticulously extracted from Dimensions on February 6, 2024, utilizing specific search criteria encompassing the chosen keywords. The search spanned across the Article Title, Abstract, or Keywords, resulting in a dataset of 1477 articles. This dataset forms the foundation for an in-depth exploration of the scholarly landscape in sustainable development and environmental conservation.

To dissect this dataset, a two-fold analytical approach was adopted. The first prong involved an examination of the publication and citation structure, offering insights into the temporal evolution of research trends and the overarching impact of publications. This temporal analysis was visualized through figures displaying the annual number of publications in the fields of Sustainable Development and Environmental Conservation.

The second analytical facet was an exploration of the leading fields of research, facilitated by a categorization of publications into various domains such as Commerce, Management, Tourism, and Services, Built Environment and Design, Human Society, and others. This categorization was instrumental in discerning the diverse disciplinary contributions to sustainability research.

Subsequently, network analysis using VOSviewer enabled a comprehensive investigation into the co-occurrence of themes, bibliographic coupling of sources, and bibliographic coupling of countries. This approach unveiled thematic clusters, key sources shaping the discourse, and collaborative networks among

countries in the realm of sustainability. The findings from these analyses collectively contribute to a nuanced understanding of the current state of research in sustainable development. Additionally, the identified clusters, influential countries, and pivotal sources serve as essential pillars for discussions, implications for future research, and drawing meaningful conclusions about the multifaceted field of sustainability.

Data

The dataset has been extracted from Dimensions. In search criteria the keywords — "Sustainable business models" AND "net zero" AND "green finance" OR "green banking sustainable transport" OR "green building" AND "energy conservation" OR "renewable energy" occurring at any of the places—Article Title, Abstract or Keywords have been applied. The Dimensions database returned 1477 matches as a result of this search (shown in Table 1). This resulted in the dataset for doing studies in the field of "Sustainable development", "Environmental conservation".

Table 1

Number of Articles Considered for Analysis

Title, Abstract or Keyword	
"Sustainable business models" AND "net zero" AND "green finance" OR "green banking sustainable transport" OR "green building" AND "energy conservation" OR "renewable energy"	
Chapter	1174
Edited Book	161
Article	74
Monograph	55
Preprint	8
Proceedings	5
Total	1477

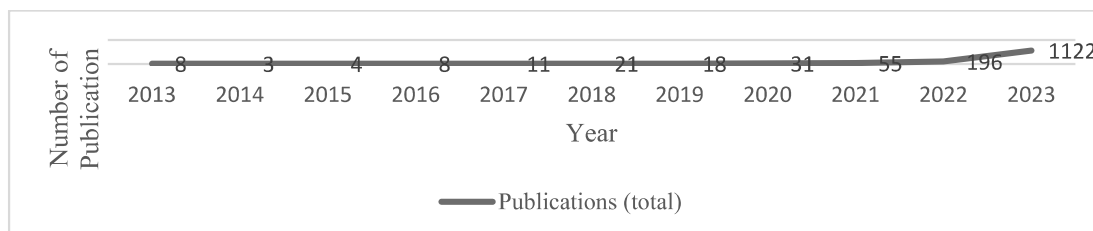
This dataset has been extracted from Dimensions on 6th February 2024. The outcomes have been deliberated in the subsequent two sections: the structure of publications and citations, and an examination of the publications authored by leading researchers.

Publication and Citation Structure

Figure 1 illustrates the total number of publications encompassing both Sustainable Development and Environmental Conservation.

Figure 1

Annual Number of Publications in the Sustainable Development and Environmental Conservation



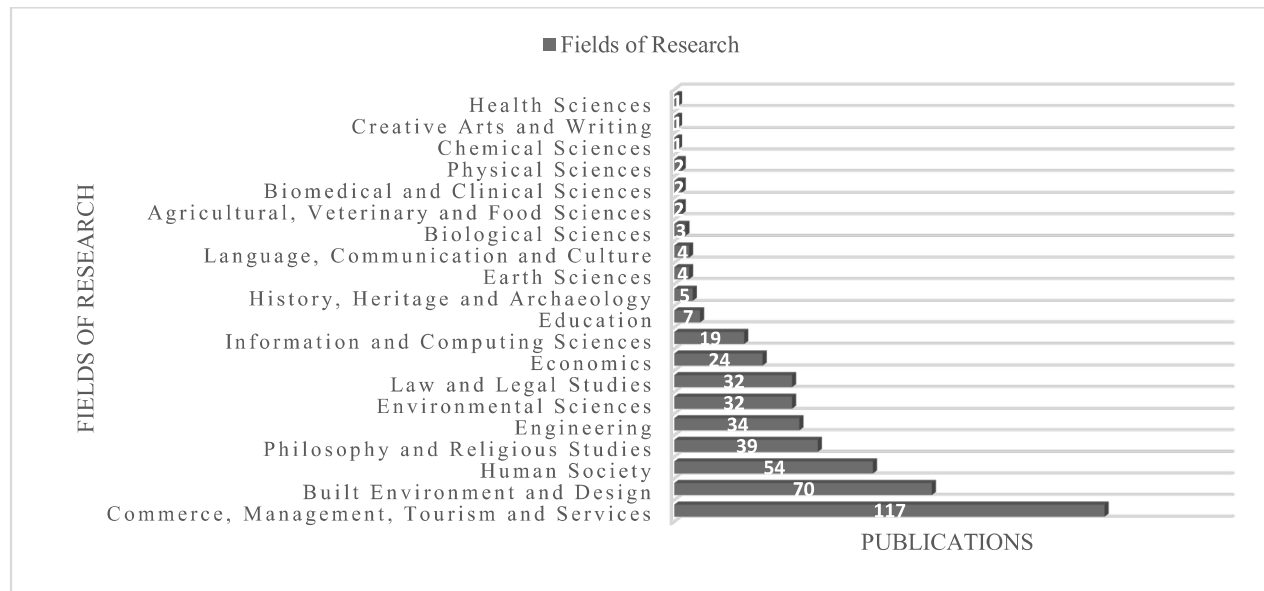
In the initial years from 2013 to 2015, the number of publications remained relatively low, ranging from 3 to 8. This suggests a gradual initiation or focus on specific research topics. There was a noticeable increase in publications from 2016 to 2018, reaching a peak of 21 in 2018. This may indicate an expanding interest in the chosen field or an increased emphasis on research during this period. The years 2019 and 2020 saw a steady increase in the number of publications, with 18 in 2019 and 31 in 2020. This suggests a growing momentum and attention to the subject matter during this time. The year 2021 witnessed a significant surge in publications, reaching 55. This could be attributed to heightened interest, increased research funding, or the emergence of critical issues in the field.

The most substantial increase occurred in 2022 and 2023, with a remarkable jump to 196 publications in 2022 and a substantial leap to 1122 publications in 2023. This exponential growth may indicate a major breakthrough, increased research activities, or a surge in the relevance of the chosen research area. The increasing trend in publications from 2013 to 2023 suggests a growing interest and emphasis on the subject matter over time. The particularly sharp rise in publications in 2022 and 2023 indicates a potential paradigm shift, significant advancements, or an urgent need for research in the chosen field during those years. A comprehensive analysis of citation structures would provide insights into the impact and influence of the publications within the academic community and beyond, offering a more nuanced understanding of the research landscape.

Leading Fields of Research

An analysis of Fields of Research result has been summarized in Figure 2.

Figure 2
Fields of Research



The primary field of research, as indicated by the distribution of publications across categories, prominently falls within "Commerce, Management, Tourism, and Services," with 117 publications. This suggests a significant focus on topics related to business, management practices, and the tourism sector within academic literature. Following closely, "Built Environment and Design" and "Human Society" emerge as significant research domains, with 70 and 54 publications, respectively, reflecting a notable emphasis on studies pertaining to architectural and societal aspects. The distribution underscores a diverse range of academic pursuits, with multiple disciplines contributing to the broader understanding of research in various sectors, from environmental sciences and law to economics and engineering.

Network Analysis Using VOSviewer

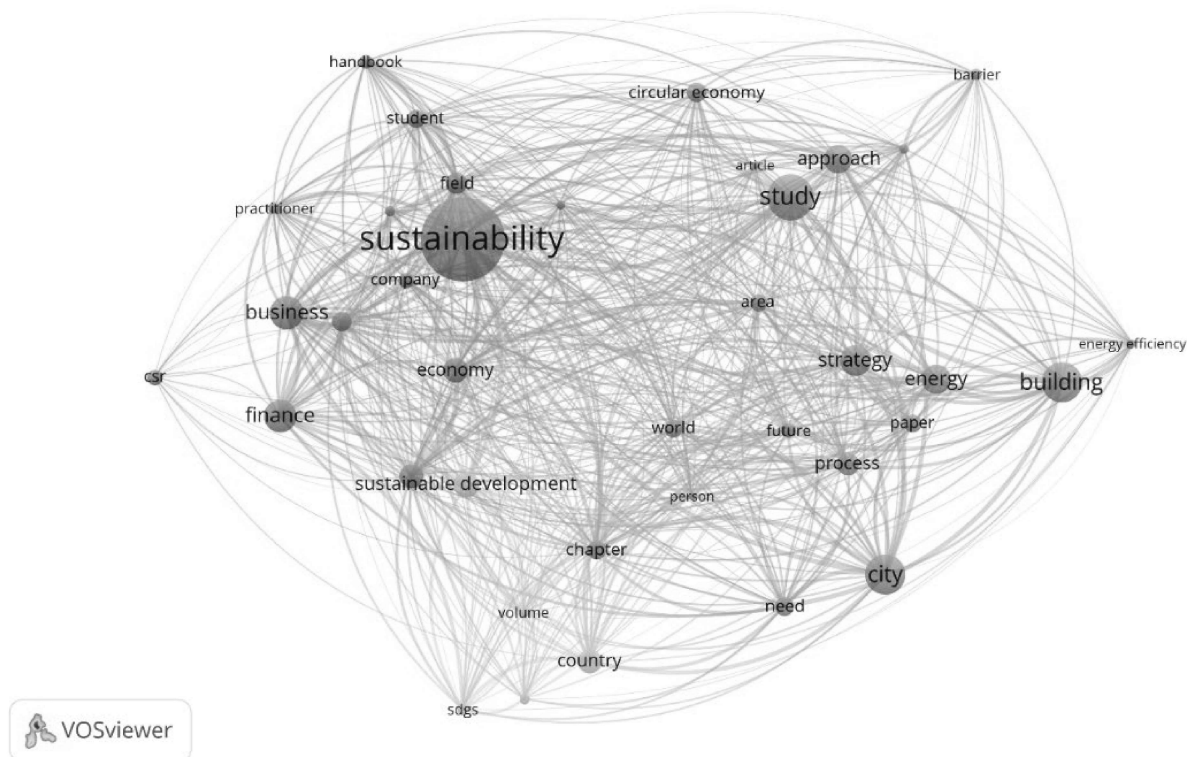
In the subsequent subsections, network analyses of co-occurrence, bibliographic coupling of sources, and countries have been conducted.

Analysis of Co-Occurrence

The co-occurrence analysis delves into the intricate interplay among sustainability, the economy, energy, and Sustainable Development Goals, revealing thematic clusters that offer insights into the multifaceted intersections of these domains. Figure 3 illustrates the resulting image.

Figure 3

Network Visualization of Co-occurrence



Each cluster has been identified by a theme, with descriptions provided below:

Cluster 1: Business Sustainability and Organizational Practices (Red)

Cluster 1 unveils a cohesive network of terms centered around business sustainability and organizational practices. Notably, the term "sustainability" emerges as the central node, demonstrating a high occurrence (344 times) and substantial total link strength (3,217). The co-occurrence of terms such as "business," "climate change," "economy," and "finance" underscores a comprehensive exploration of sustainable business practices, financial strategies, and their intersection with climate-related challenges. This cluster reflects a strong emphasis on integrating sustainability principles within the realms of business, finance, and organizational management.

Cluster 2: Sustainable Energy and Circular Economy Implementation (Green)

Cluster 2 showcases a network primarily focused on sustainable energy and the implementation of circular economy practices. The term "energy" stands out as a central theme, with a high total link strength (1,307)

and frequent occurrence (120). Co-occurring terms such as "circular economy," "barrier," and "process" suggest a nuanced exploration of challenges and approaches in implementing sustainable energy practices, emphasizing circular economy principles. This cluster reflects a concerted effort to address barriers and devise effective processes in the pursuit of sustainable energy solutions.

Cluster 3: Urban Sustainability and Strategic Approaches (Blue)

Cluster 3 highlights a network revolving around urban sustainability and strategic approaches. Key terms such as "city," "strategy," and "future" indicate a collective focus on the strategic development of sustainable urban areas. The high occurrence of "study" and "area" suggests a robust exploration of sustainable urban planning and the identification of strategic interventions for the future. This cluster signifies a comprehensive investigation into urban sustainability strategies to address the challenges of future urban development.

Cluster 4: Sustainable Development Goals and Country-Level Perspectives (Yellow)

Cluster 4 centers on sustainable development goals (SDGs) and perspectives at the country level. The terms "SDGs" and "Sustainable development goals" exhibit high total link strength and occurrence, emphasizing a regional and goal-oriented focus. The co-occurrence of terms like "Country" and "Volume" suggests a concentration on country-specific initiatives and the dissemination of knowledge through scholarly publications. This cluster underscores a localized approach to sustainable development, aligning with global SDGs while tailoring strategies to the country level.

In summary, the network visualization of co-occurrence reveals distinct thematic clusters, each contributing to the broader discourse on sustainability. These clusters signify a multi-faceted exploration of sustainable practices, ranging from business and energy to urban development and country-level initiatives, reflecting the interdisciplinary nature of sustainability research.

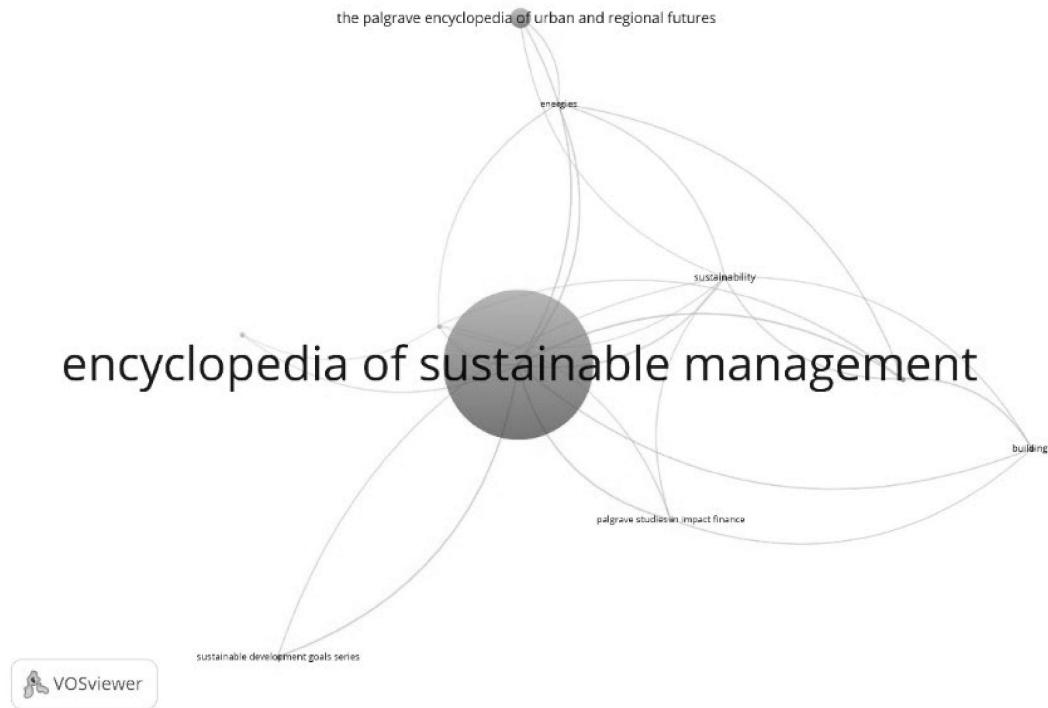
Bibliographic Coupling of Sources

Bibliographic coupling, a measure of the relationship between two sources (journals), intensifies when there is a higher number of shared references among their publications. In this instance, only sources with a minimum of three publications were considered. The citation counts for each publication remained at the default value of 1. Under these criteria, 10 sources were identified. VOSviewer, for each source, calculates the total link strength of bibliographic coupling links. The selection of sources for the final graph is based on the total link strength (TLS). Nodes positioned closer to each other in the graph indicate publications that are frequently co-cited. Figure 4 illustrates the outcome of this analysis.

Table 2

Bibliographic Coupling of Journals or Sources

Cluster	Journals or Sources	Links	Total links Strength	Documents
1	Encyclopaedia of sustainable management	9	221	1024
	Palgrave studies in impact finance	4	21	3
2	Sustainable development goals series	2	26	3
	Energies	5	37	3
3	The Palgrave Encyclopaedia of urban and regional futures	3	16	141
	Buildings	4	32	3
4	Journal of cleaner production	5	120	10
	SSRN electronic Journal	6	68	7
5	World sustainability series	2	3	6
	Sustainability	8	70	8

Figure 4*Bibliographic Coupling of Journals or Sources****Cluster 1: Comprehensive Sustainability Insights***

Cluster 1 illustrates a cohesive network with a strong emphasis on comprehensive sustainability insights. The "Encyclopedia of Sustainable Management" emerges as a central node with the highest total link strength (221) and documents (1,024), indicating its significance as a comprehensive resource for sustainable management literature. Additionally, the inclusion of "Palgrave Studies in Impact Finance" and the "Sustainable Development Goals Series" suggests a well-rounded exploration of sustainability encompassing financial impact and alignment with global development goals.

Cluster 2: Energy and Urban Regional Futures

Cluster 2 revolves around energy-related themes, urban and regional futures. The journal "Energies" assumes a central role, indicating its importance as a core source for research in the energy domain. The "Palgrave Encyclopedia of Urban and Regional Futures" complements this focus, contributing to an understanding of sustainable urban development. This cluster suggests a specific emphasis on energy-related studies with a nuanced exploration of urban and regional sustainability.

Cluster 3: Sustainable Buildings and Cleaner Production

Cluster 3 highlights a network dedicated to sustainable buildings and cleaner production. The journals "Buildings" and the "Journal of Cleaner Production" emerge as key sources, indicating a concerted effort to explore sustainable practices in building construction and cleaner production processes. The clustering of these sources implies a specialized focus on sustainable practices within the built environment and production sectors.

Cluster 4: SSRN Electronic Journal and World Sustainability Series

Cluster 4 reveals a network centered on the "SSRN Electronic Journal" and the "World Sustainability Series." The SSRN Electronic Journal exhibits a relatively high total link strength, suggesting a significant influence in the digital realm. The inclusion of the "World Sustainability Series" indicates a global perspective on sustainability. This cluster suggests a blend of digital scholarship through SSRN and a broader exploration of sustainability across various domains.

Cluster 5: General Sustainability Focus

Cluster 5 showcases a diverse yet interconnected network with a general sustainability focus. The journal "Sustainability" serves as a central node, indicating its relevance as a comprehensive source in the broader sustainability literature. This cluster implies a balanced exploration of sustainability across multiple dimensions, reflecting a holistic approach to the subject.

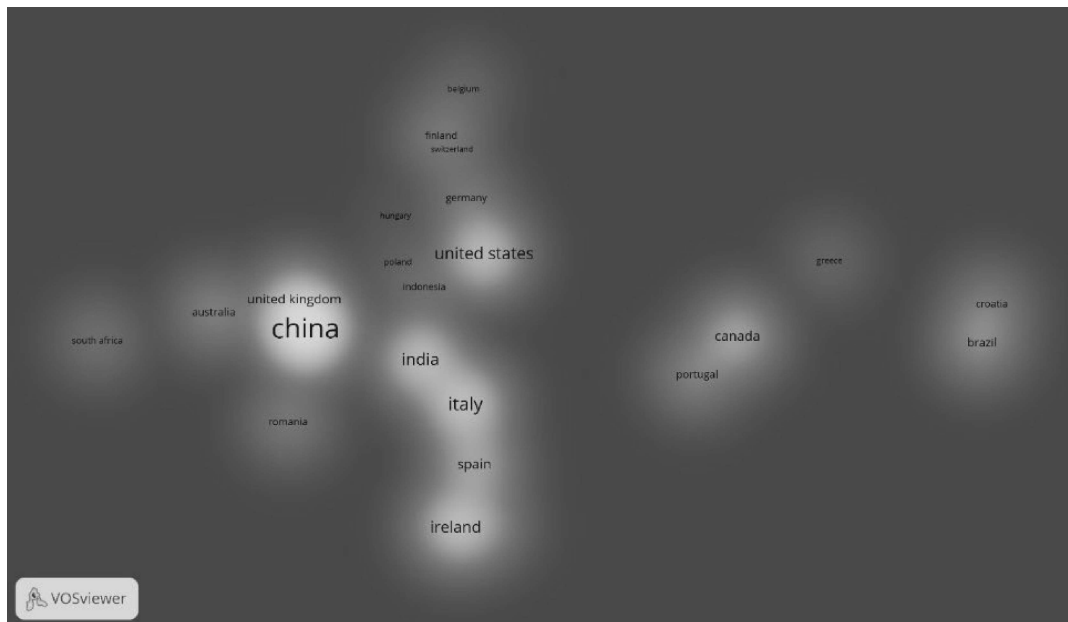
The bibliographic coupling of journals or sources reveals distinct clusters, each with a specialized focus on sustainability within specific domains such as management, energy, buildings, digital platforms, and a general comprehensive perspective. The identified sources within each cluster provide valuable insights into the key literature shaping the discourse on sustainability across various disciplines.

Bibliographic Coupling of Countries

For the analysis, the default values for the minimum number of documents and citations for a country were retained at 4 and 1, respectively. Out of the 55 countries considered, 25 countries met these thresholds. The findings are illustrated in Figure 5.

Figure 5

Density Visualization on Bibliographic Coupling of Countries



The density visualization of bibliographic coupling of countries reveals distinctive clusters with varying levels of interconnectedness and normative citations. Each cluster represents a group of countries that share significant linkages in scholarly literature, with the normative citation values indicating the strength of influence within the network.

Cluster 1: European Influence

Cluster 1 predominantly comprises European countries, highlighting their regional influence in sustainability literature. Germany emerges as a standout with the highest total link strength (854), indicating its significant presence in sustainability research. Finland and the United States closely follow, with notable normative citation values (20.28 and 78.42, respectively). These countries contribute to a dense network, reflecting a shared focus on sustainability and their impact on global scholarship. Particularly, the United States serves as a central hub with substantial normative citations, highlighting its pivotal role in shaping global sustainability discourse.

Cluster 2: Global Reach with a Focus on China and the UK

Cluster 2 illustrates a more globally dispersed network, with a spotlight in Australia, China, and the United Kingdom. China emerges as a central node with considerable total link strength (714) and an exceptionally high normative citation value (177.39), signifying its profound influence on global sustainability literature. The United Kingdom also plays a central role, demonstrating high total link strength (1789) and a notable normative citation value (40.86). This cluster reflects diverse collaboration among countries with distinct regional influences, portraying a global perspective on sustainability research.

Cluster 3: Diverse Collaboration and Regional Influence

Cluster 3 showcases diverse collaboration among countries from different continents. Brazil and Canada emerge as central nodes, contributing significantly to the total link strength and normative citation values. This cluster underscores a collaborative and regionally diverse approach to sustainability research, with Portugal also demonstrating notable influence in the network.

Cluster 4: India and Italy's Dominance

Cluster 4 emphasizes the dominance of India and Italy in sustainability literature. Both countries exhibit substantial total link strength and exceptionally high normative citation values (79.87 for India and 87.03 for Italy), highlighting their significant impact on global sustainability discourse. Spain also contributes notably to the network within this cluster.

Highest Normative Citation Countries:

Among the highlighted clusters, China stands out as the country with the highest normative citation value (177.39), indicating its unparalleled influence in shaping global sustainability research. The United States, Italy, and India also display considerable normative citation values, underscoring their pivotal roles in the network. The density visualization provides a comprehensive understanding of the bibliographic coupling of countries in sustainability research, revealing regional collaborations, global influences, and the prominence of specific countries.

Conclusion

The bibliometric analysis provides a comprehensive overview of the state of research in sustainable development and environmental conservation. The increasing trend in publications, diverse fields of research, thematic clusters, and global collaboration underscore the dynamic and evolving nature of sustainability studies. The identified clusters, the influential countries and sources serve as valuable resources for researchers, policymakers, as well as practitioners working towards a sustainable future. The findings contribute to a deeper understanding of the research landscape and provide directions for future inquiries in the field of sustainability.

Contribution

The analysis of the dataset extracted from Dimensions offers valuable insights into the landscape of research on sustainable development and environmental conservation. The intersection of keywords such as "Sustainable business models," "net zero," "green finance," "green banking," "sustainable transport," "green

building," "energy conservation," and "renewable energy" has yielded a substantial dataset of 1477 articles, covering a broad spectrum of topics within the realms of sustainability.

Publication and Citation Structure

The annual number of publications in the field exhibits interesting trends. The initial years (2013-2015) witnessed a relatively low number of publications, suggesting a gradual initiation or focused exploration of specific research topics. A notable increase from 2016 to 2018 indicates a growing interest or increased emphasis on research during that period. The subsequent years show a steady rise, with a significant surge in 2022 and 2023, implying a potential paradigm shift or increased relevance of the research area during these years. This growing trend highlights an increasing emphasis and interest in sustainability research over time.

Leading Fields of Research

The leading fields of research, as indicated by the distribution of publications, prominently fall within "Commerce, Management, Tourism, and Services," "Built Environment and Design," and "Human Society." This underscores the interdisciplinary nature of sustainability research, with contributions from various disciplines such as environmental sciences, law, economics, and engineering. The diversity of academic pursuits reflected in the leading fields emphasizes the multifaceted nature of sustainability studies.

Network Analysis Using VOSviewer

The co-occurrence analysis unveils thematic clusters representing different aspects of sustainability. These clusters include "Business Sustainability and Organizational Practices," "Sustainable Energy and Circular Economy Implementation," "Urban Sustainability and Strategic Approaches," and "Sustainable Development Goals and Country-Level Perspectives." Each cluster signifies a nuanced exploration of sustainability, reflecting the interdisciplinary and comprehensive nature of the field.

Bibliographic Coupling of Sources

The bibliographic coupling of sources reveals distinct clusters focused on comprehensive sustainability insights, energy and urban regional futures, sustainable buildings and cleaner production, SSRN Electronic Journal and World Sustainability Series, and a general sustainability focus. Each cluster represents a specialized focus within the broader sustainability literature, providing insights into key literature shaping the discourse in specific domains.

Bibliographic Coupling of Countries

The density visualization of bibliographic coupling of countries showcases distinctive clusters, each representing a group of countries with significant linkages in scholarly literature. Cluster 1 highlights European influence, Cluster 2 emphasizes a global reach with a focus on China and the UK, Cluster 3 showcases diverse collaboration and regional influence, and Cluster 4 underscores India and Italy's dominance. China emerges as a central hub with the highest normative citation value, indicating unparalleled influence in shaping global sustainability research.

Future Research

Interdisciplinary Collaboration: The interdisciplinary nature of sustainability research is evident in the leading fields of research. Future studies could further explore collaborative efforts between different disciplines to address complex sustainability challenges comprehensively.

Global Perspectives: The dominance of China, the United States, Italy, and India in bibliographic coupling highlights the global nature of sustainability research. Future research could delve into comparative analyses of sustainability initiatives and approaches across countries.

Emerging Trends: The exponential growth in publications in 2022 and 2023 suggests emerging trends or critical breakthroughs in sustainability research. Further investigation into the factors contributing to this surge could guide future research directions.

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