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Exploring the State of Research on Tourism Sustainability: A Bibliometric Analysis in the Post-COVID Era

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Abstract This study conducts a literature analysis on tourism sustainability to understand the current state of research in the field and identify potential areas for future study. The analysis, based on 3823 articles published between 2020–2023, aims to examine the number of citations of the main articles, determine the main authors and countries dealing with tourism sustainability, examine the interactions between authors and countries, and determine which dimensions of sustainability (economic, environmental, social, and cultural-historical) attract the most research interest. The results reveal that the economic dimension of sustainability is the most researched followed by the environmental dimension, while the social and cultural-historical dimensions receive less attention. This study provides valuable insights for researchers, practitioners, and policy-makers in the field of sustainable tourism, particularly in light of the impact of the COVID-19 pandemic on the industry.

Keywords tourism sustainability; bibliometric analysis; literature analysis; COVID-19; VOSviewer; sustainability dimensions; keyword analysis; content analysis

1. Introduction

The concept of sustainability has become increasingly relevant in recent years, particularly in the context of tourism and especially after COVID-19 [1]. Tourism is a vital economic sector that contributes to the development of many countries, but it can also have negative impacts on the environment, society, and culture. Therefore, it is important to examine the literature on sustainable tourism in order to understand the current state of research and identify potential areas for future study. The reason for that is to identify existing gaps and opportunities for further research. This could contribute to the development of sustainable tourism practices that minimize negative impacts and maximize positive outcomes for the environment, society, and culture.

The objective of this paper is to conduct a bibliometric analysis of the literature on sustainable tourism to identify the main trends and gaps in the field. This can provide valuable insights and knowledge for researchers, practitioners, and policymakers. The study will be based on a comprehensive sample of articles published in international journals, and the analysis will be conducted using a variety of tools and techniques, including co-authorship analysis, keyword analysis, and content analysis.

The COVID-19 pandemic has significantly impacted the tourism industry, resulting in a decline in global tourism activity and posing challenges to its sustainability. Sustainable tourism, which previously focused on balancing economic growth and environmental conservation, is now being scrutinized for its social sustainability. This study aims to investigate the effects of the pandemic on the research focus of sustainable tourism, contributing to the current understanding of the state of research on the topic and identifying gaps that can guide future research directions. By examining these changes, this research can offer insights into the challenges and opportunities presented by the COVID-19 pandemic in the context of sustainable tourism. The research questions of the study are the below:

1. What is the impact of COVID-19 pandemic on the tourism industry and the role of sustainability in the recovery process as reflected in the top cited articles in the relevant international literature?
2. Who are the most productive authors, and which countries are the most productive in terms of publications on tourism sustainability? What is the pattern of collaboration among authors and between authors and countries in this field of research?

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3. What are the dimensions of sustainability that have attracted the most research attention, and which ones have received the least attention in the relevant international literature on tourism sustainability?

The main goals of conducting a bibliometric analysis are to identify gaps and trends in a particular field of research. Answering the research questions mentioned above can identify the key authors and countries contributing to the literature on sustainable tourism, as well as the patterns of collaboration between them. Additionally, the dimensions of sustainability that have received the most and least attention in the literature can be determined, which can help to guide future research in the field. These research questions are therefore important for providing a comprehensive analysis of the state of research on sustainable tourism and identifying opportunities for further study. This information can help guide future research efforts and support the development of sustainable tourism practices that are more resilient in the face of crises.

The research methods used in this study involved the application of bibliometric techniques, specifically citation analysis, co-authorship analysis, co-occurrence analysis, and content analysis. These methods were selected for their ability to provide a comprehensive overview of the literature on sustainable tourism, including its major themes, authors, and publications. However, it is important to note that the bibliometric approach has certain limitations, such as the exclusion of non-English language articles and the database used in this study being restricted to articles as document type and journals as the source type.

The paper is organized as follows. First, an overview of the literature on sustainable tourism will be provided. Second, the research methods used in the study, including the sample, data collection, and analysis techniques, will be described. Third, the results of the study, including the main findings and conclusions, will be presented. Finally, the implications of the study for researchers, practitioners, and policy-makers working in the field of sustainable tourism will be discussed.

2. Literature Review

Tourism sustainability refers to the capacity of the tourism industry to maintain its favorable impacts while also effectively recuperating from adverse effects, even during times of turbulence or crisis, such as the COVID-19 pandemic [1]. The literature on the topic of tourism sustainability has grown significantly in recent years, as evidenced by a search for articles utilizing the keywords “tourism”, “sustainability” and “bibliometric analysis” in Scopus and the Web of Science (WoS) databases. As of 28 January 2023, a total of 53 articles were found that addressed various aspects of tourism sustainability, such as over-tourism [2], corporate social responsibility [3,4], community participation [5], sharing economy [6], sustainability education [7], sustainability in hospitality and tourism [8], tourism management and marketing [9], and tourism entrepreneurship [10,11]. This indicates a growing interest in the field of tourism sustainability and highlights the need for further examination of the literature in this area. A more specific search for articles utilizing the keywords “tourism sustainability” and “bibliometric analysis” in the Scopus and WoS databases yielded four relevant publications.

In their study, Bhatt et al. (2022) [1] aimed to structure knowledge about tourism sustainability amidst the COVID-19 pandemic. To achieve this objective, they employed a bibliometric approach, utilizing 440 sources from Scopus to identify the relevant fields in which research is concentrated. Bibliometric indicators such as analysis of authors, sources, citations, keywords, collaboration index, annual productivity, and publication growth were utilized, along with descriptive statistics to summarize the bibliographic data. Additionally, the bibliometric techniques of factor analysis and visualizations were employed to analyze the conceptual, intellectual, and social structure of the knowledge, utilizing Multiple Correspondence Analysis (MCA), co-word analysis, co-citation networks, and collaboration networks of authors, institutions, and countries. The authors used the Biblioshiny version of the statistical R package for the MCA analysis.

Segui-Amortegui et al. (2019) [12] examined the state of technology in relation to tourism, sustainability, and competitiveness by extracting a total of 808 relevant articles from WoS. To perform their analysis, the authors employed widely-accepted measures in bibliometric research such as the total number of papers and citations, the h-index, the number of publications above a specific threshold, the impact factor, and the ratio of article citations per year (CY). They also utilized techniques such as keyword co-occurrence, co-citation of cited references, journal co-

citation, author co-citation, bibliographic coupling of authors, and co-authorship links between researchers, countries, or institutions.

Similarly, Salleh and Bushroa (2022) [13] examined the current status of digitization technologies in the cultural heritage sectors of Malaysia. To conduct their analysis, they searched sources in WoS and Scopus and extracted 175 relevant studies. The authors employed bibliometric analysis via the bibliophagy package available in the R-Studio tool. Cavalcante et al. (2021) [14] examined sustainable tourism practices related to marketing by analyzing 694 articles from WoS. The study employed the co-occurrence of publications by year, keyword trends, co-occurrence, bibliographic coupling, and co-authorship analysis between countries and institutions to analyze the data.

The literature review of previous studies on tourism sustainability has revealed the complexity of the concept and the need for a comprehensive examination of the various dimensions of sustainability. Bibliometric analysis has been employed in several studies [1,12–14] to structure knowledge and determine the fields in which research is concentrated. The use of various bibliometric indicators, such as co-citation, co-occurrence, and co-authority analysis have been utilized to summarize the bibliographic data. Furthermore, analysis such as Multiple Correspondence Analysis (MCA) [1], and content analysis, have been used to analyze the conceptual, intellectual, and social structure of the knowledge.

In light of these studies, the current study aims to delve deeper into the examination of the various dimensions of tourism sustainability by conducting a comprehensive performance analysis, for the period 2020–early January 2023. This study will be guided by advanced bibliometric techniques and draw on a significant number of studies to provide a more nuanced understanding of the state of tourism sustainability and highlight areas that warrant further attention. This study aligns with the findings of previous studies [15,16] that have emphasized the importance of a holistic approach to comprehending the concept of tourism sustainability. Serrano et al. (2019) [15] utilized the terms “sustaina* AND touris*” to identify relevant articles for review in their analysis, spanning from 1987 to 2018 and yielding a sample of 4574 studies. Moyle et al. (2020) [16] conducted an analysis of the international literature from 1987 to 2017, resulting in a sample of 839 articles.

3. Methodology and Data

The present study employed a range of software tools and a programming language to carry out the methodology and data analysis. The identification of the examined keywords was facilitated by some SEO tools, as described in Section 3.1. The bibliometric analysis was conducted using VoSviewer, as detailed in Sections 3.2, 3.4, and 3.5. Additionally, the content analysis was performed using the programming language Python and the Natural Language Toolkit (NLTK) library, which are elaborated on in Section 3.6.

3.1. Dataset

In order to achieve the objectives of the study, several SEO tools such as moz.com, keywordeverywhere, semrush.com, jaaxy, wordstream, and keyword tool were utilized to determine the primary keywords closely related to “tourism sustainability”. These keywords were then employed in Scopus to extract the database used in the study, which covers the period from 2020 to 25 January 2023. Table 1 illustrates the specific details of the database used. The decision to begin the analysis in 2020 was influenced by two main factors. Firstly, the COVID-19 pandemic outbreak in 2020 had a significant impact on global tourism and caused notable changes in the industry [1,17,18]. Secondly, most previous studies have focused on earlier years, resulting in a gap in the investigation of recent years [1,12–14,19–22]. The present study aims to bridge this gap by examining recent developments in the field.

Table 1. Data Retrieval Constraints and Parameters for the Scopus Database.

Database:	Scopus
Search field:	Title, Abstract, Keywords
Keywords:	“sustainable tourism” OR “tourism sustainability” OR “eco-tourism” OR “sustainability of tourism” OR “tourism sustainable development” OR “ecotourism” OR “responsible tourism” OR “green tourism” OR “environmental tourism” OR “unsustainable tourism” OR “environmental tourism” OR “tourism green branding”
Open access:	All
Years:	2020–2023
Author name:	Exclude Undefined names
Subject area:	All
Publication stage:	All
Document type:	Article
Source title:	Journal
Affiliation:	All
Funding sponsor:	All
Country:	All
Source type:	All
Language:	English
Search string:	TITLE-ABS-KEY (“sustainable tourism” OR “tourism sustainability” OR “eco-tourism” OR “sustainability of tourism” OR “tourism sustainable development” OR “ecotourism” OR “responsible tourism” OR “green tourism” OR “environmental tourism” OR “unsustainable tourism” OR “environmental tourism” OR “tourism green branding”) AND (LIMIT-TO(SRCTYPE, “j”)) AND (LIMIT-TO(DOCTYPE, “ar”)) AND (LIMIT-TO(LANGUAGE, “English”)) AND (LIMIT-TO(PUBYEAR, 2023) OR LIMIT-TO(PUBYEAR, 2022) OR LIMIT-TO(PUBYEAR, 2021) OR LIMIT-TO(PUBYEAR, 2020))
Data extracted:	25 January 2023
Number of publications:	3828

3.2. Citation Analysis

Citation analysis is a widely utilized technique in the bibliometric analysis [12,14]. This method quantifies the frequency with which a particular paper or author is cited within other publications, thereby providing a means to evaluate the impact and influence of the paper or author within a specific field of study. The citation analysis approach enables researchers to assess the significance and relevance of a given paper or author, as well as to gain a deeper understanding of the relationships between different studies within the field. Moreover, citation analysis is considered a reliable method of measuring the impact and reach of scientific research and can be used to identify the most highly cited and influential publications within a field.

3.3. Co-authorship Analysis

Co-authorship analysis is a commonly used approach in bibliometric research for identifying collaboration patterns among authors, institutions, and countries in a given field of study [12,14]. This analysis aims to identify the key actors, institutions, and research trends within the examined field and to identify research gaps and opportunities.

3.4. Co-occurrence Analysis

Co-occurrence analysis, a technique widely used in bibliometric research, helps to understand the relationships between keywords or concepts that frequently appear together in literature. The method of author co-occurrence of keywords evaluates the most commonly used keywords in documents [14]. The connections or lines in the analysis depict the number of articles in which a specific keyword appears in conjunction with another keyword. Thicker lines indicate a higher frequency of co-occurrence, reflecting the intensity of collaboration between the two keywords. The distance between the nodes in the analysis reflects the number of articles in which the two keywords appear together, compared to their co-occurrence with other keywords [12].

3.5. Content Analysis

In this study, the programming language Python and the Natural Language Toolkit (NLTK) library were utilized to perform a content analysis of the dataset containing journal articles. The concept of sustainability was divided into four dimensions: social, environmental, economic, and cultural-historic, as proposed in a recent paper [23], and a set of keywords was identified for each dimension, as illustrated in Table 2. In the beginning, the code processes the abstracts of each journal article by removing stop words, which are commonly used words that do not contain significant meaning. Next, the code iterates through the dataset, and for each journal article, it counts the number of occurrences of the keywords for each dimension of sustainability. The code then prints the classification of the journal article in terms of sustainability dimension and the author. Finally, the total number of occurrences of keywords per dimension of sustainability and journal is determined, providing an overall understanding of the distribution of sustainability-related content in the dataset.

Table 2. Keywords regarding the dimension of sustainability.

Dimension of Sustainability	Keywords
Social	“culture”, “history”, “rooted stories”, “customs”, “traditions”, “events”, “festivals”, “feasts”, “marks”, “symbols”, “people and places”, “identity”, “diverse values”, “tolerance and care”, “life”, “collective growth”, “respect”, “cultural traditions”, “human dignity”, “low-impact lifestyles”, “fauna and flora”, “people”, “forests”, “seas”, “oceans”, “flora and fauna”, “soil”, “air”, “space”, “water”
Environmental	“ecological”, “water”, “habitation”, “food”, “clean energy”, “open spaces”, “ecosystems”, “biodiversity”, “wild nature”, “natural resources”, “renewable clean energies”, “bio-agricultural”, “organic livestock”, “soil protection”, “climate”, “ecosystems”, “biodiversity”, “natural resources”, “ecology”
Economic	“prosperity”, “collaborative support”, “innovating”, “caring for sharing”, “social solidarity”, “green economies”, “eco-just commerce”, “ecological technologies”, “green trade”, “consumption”, “production”, “technology”, “trade”, “industry”, “justice”, “development”, “economy”
Cultural-historic	“social justice”, “cooperation”, “coherence”, “openness”, “trust”, “welfare”, “diversity”, “empowerment”, “equity”, “fairness”, “wellbeing”, “social aspects”, “health”, “education”, “services”, “infrastructure”, “institutions”, “laws”, “governance”, “politics”

The use of content analysis in the present study serves as an objective quantification of the content present within the journal articles, offering valuable insights into the prevalence of themes related to sustainability. The application of the Natural Language Toolkit’s stopwords function enhances the accuracy of the analysis by filtering out common, non-meaningful words, thereby allowing for a more precise examination of the dataset. Through a focus on specific dimensions of sustainability, this study aims to understand the balance of consideration given to these dimensions and determine which are most frequently addressed in academic literature, as well as which may be underrepresented. This approach to analysis also facilitates the identification of gaps in the existing literature, providing opportunities for future research.

4. Results and Discussion

4.1. Results of Citation Analysis

Table 3 provides the structure of citations in the relevant research area by presenting the top 10 documents with the highest number of citations until 11 February 2023. The table highlights the authors, publication year, title, and the number of citations for each document. The most cited article is “Pandemics, transformations, and tourism: be careful what wish for” by Hall et al. (2020) [24], with 521 citations, followed by “Socializing tourism for social and ecological justice after COVID-19” by Higgins-Desbiolles (2020) [25] with 431 citations. The top 10 documents reflect the impact of the COVID-19 pandemic on the tourism industry and the role of sustainability in the recovery process.

Table 3. Top 10 documents by citations (until 11 February 2023).

No.	Authors, Year	Ref.	Title	Citations
1	Hall et al., 2020	[24]	Pandemics, transformations and tourism: be careful what you wish for	521
2	Higgins-Desbiolles, 2020	[25]	Socialising tourism for social and ecological justice after COVID-19	431
3	Sharma. et al., 2021	[26]	Reviving tourism industry post-COVID-19: A resilience-based framework	272
4	Ioannides and Gyimóthy, 2020	[27]	The COVID-19 crisis as an opportunity for escaping the unsustainable global tourism path	244
5	Niewiadomski, 2020	[28]	COVID-19: from temporary de-globalisation to a re-discovery of tourism?	155
6	Higgins-Desbiolles, 2021	[29]	The “war over tourism”: challenges to sustainable tourism in the tourism academy after COVID-19	154
7	de Kervenoael et al., 2020	[30]	Leveraging human-robot interaction in hospitality services: Incorporating the role of perceived value, empathy, and information sharing into visitors’ intentions to use social robots	152
8	Chang et al., 2020	[31]	A charter for sustainable tourism after COVID-19	129
9	Wondirand et al., 2020	[32]	Stakeholder collaboration as a major factor for sustainable ecotourism development in developing countries	125
10	Hamid et al., 2021	[33]	The impact of COVID-19 on tourism industry in Malaysia	118

Table 4 presents the top 10 authors and the countries by publications in the relevant research area until 11 February 2023. The table reveals that the authors Carvache-Franco, M., and Carvache-Franco, W., are the most productive authors with 19 publications each, followed by Couto, G. with 16 publications. Furthermore, the table shows that China is the most productive country in terms of publications, with 568, followed by the United States with 385, and Indonesia with 318.

In response to the first research question, the findings of the citation analysis demonstrate that the COVID-19 pandemic has had a notable impact on the tourism industry, and numerous scholars have explored the function of sustainability in the recuperation process. Preeminent articles accentuate the importance of sustainable tourism practices for the industry’s sustained recovery. These articles espouse the need for a more sustainable approach to tourism, which takes into account social and environmental factors, in addition to economic considerations. Overall, the literature indicates that the tourism industry must adopt a more sustainable and responsible approach to ensure long-term prosperity and resilience.

Table 4. Top 10 authors and countries by publications (until 11 February 2023).

No.	Author	Number of Documents	No.	Country	Number of Documents
1	Carvache-Franco, M.	19	1	China	568
2	Carvache-Franco, W.	19	2	United States	385
3	Couto, G.	16	3	Indonesia	318
4	Castanho, R.A.	15	4	United Kingdom	280
5	Han, H.	14	5	Spain	270
6	Pimentel, P.	14	6	Australia	245
7	Carvache-Franco, O.	13	7	Malaysia	201
8	Hall, C.M.	13	8	Italy	198
9	Sousa, A.	13	9	South Africa	188
10	Woosnam, K.M.	12	10	India	174

4.2. Results of Co-authorship Analysis

Figure 1 presents an author co-authorship map derived from the analyzed dataset, which represents the cooperative relationships between authors in the field of sustainability and tourism research. The connections between points on the map represent the co-authorship between authors, while the distance between clusters indicates the strength of the co-authorship relationship.

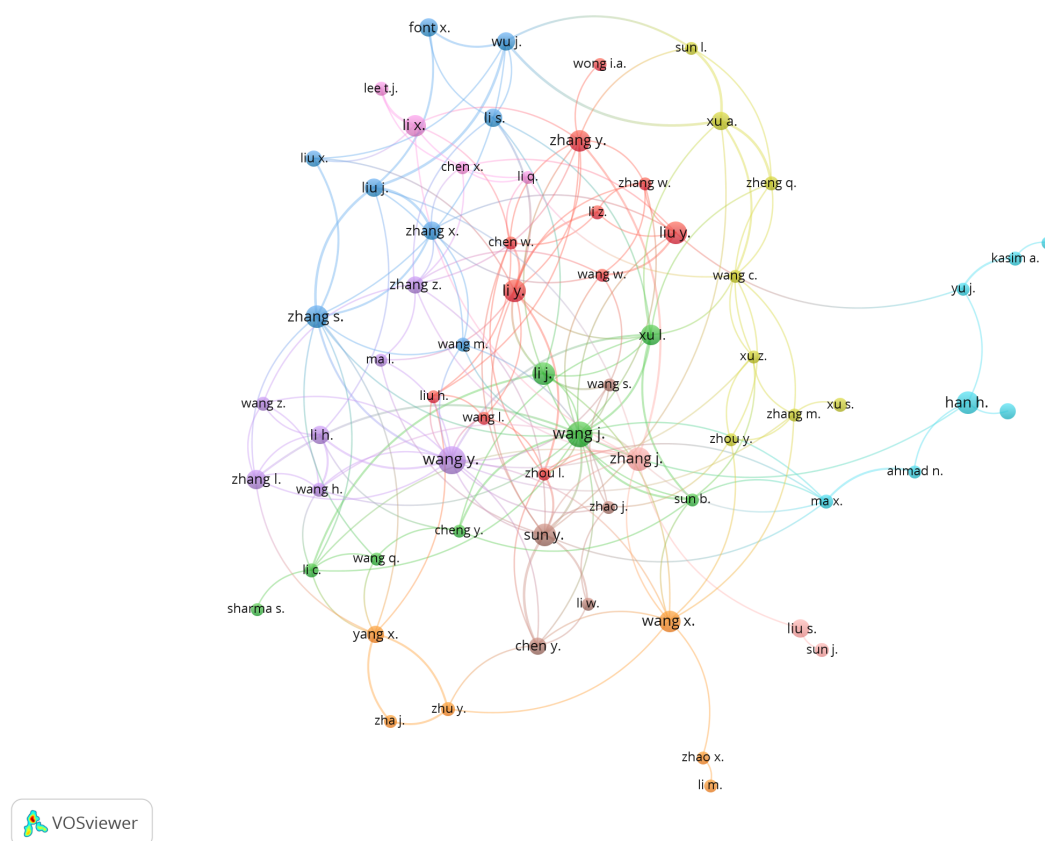


Figure 1. Co-authorship analysis by author.

The author's co-authorship map provides a visual representation of cooperative relationships, enabling a better understanding of the collaboration patterns and the strength of relationships. Out of the 10,624 authors included in the dataset, 144 authors met the threshold of at least five documents, and the largest set of connected items consists of 67 items, which formed 10 distinct clusters. The higher total link strengths are for Couto, G. (48), Catanho, R.A. (46), Pimentel, P. (46), Sousa, A. (44), Cavache-Franco, M. (38), Cavache-Franco, W. (38), Cavache-Franco, O. (32), Wang, J. (25), Carvalho, C. (24), and Wang, Y. (20).

Figure 2 presents a country co-authorship map derived from the analyzed dataset, which represents the cooperative relationships between countries in the field of sustainability and tourism research. The connections between points on the map represent the co-authorship between countries, while the distance between clusters indicates the strength of the co-authorship relationship. The country authorship map provides a visual representation of cooperative relationships, enabling a better understanding of the collaboration patterns and the strength of relationships. Out of the 179 countries included in the dataset, 75 countries met the threshold of at least 10 documents, which formed seven distinct clusters. The highest link strength is for the United Kingdom (437), United States (410), China (344), Australia (297), South Africa (216), and Spain (213).

The first cluster comprises countries Austria, Croatia, Cyprus, Czech Republic, Greece, Hungary, Iran, Italy, Kazakhstan, Lithuania, Poland, Portugal, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Switzerland, Turkey, Ukraine, and the United Kingdom. The second cluster includes countries Argentina, Belgium, Brazil, Chile, Colombia, Costa Rica, Ecuador, Ethiopia, Fiji, France, Germany, Mexico, Netherlands, Peru, Spain, and the United States of America.

The third cluster encompasses the countries of Australia, China, Ghana, Hong Kong, Japan, Macau, Nepal, Singapore, South Korea, Taiwan, Thailand, and Vietnam. The fourth cluster is composed of countries Botswana, Canada, Denmark, Finland, Norway, Qatar, South Africa, and Sweden. The fifth cluster includes countries Bangladesh, Egypt, India, Indonesia, Malaysia, Oman, Pakistan, Saudi Arabia, and Sri Lanka. The sixth cluster consists of countries Ireland, Jordan, Nigeria, Tanzania, and the United Arab Emirates. Finally, the seventh cluster includes countries like Israel, Kenya, and the Philippines. The results of the co-authorship analysis also

show that collaboration is prevalent in this field of research, with many authors forming connections with other researchers in different countries.

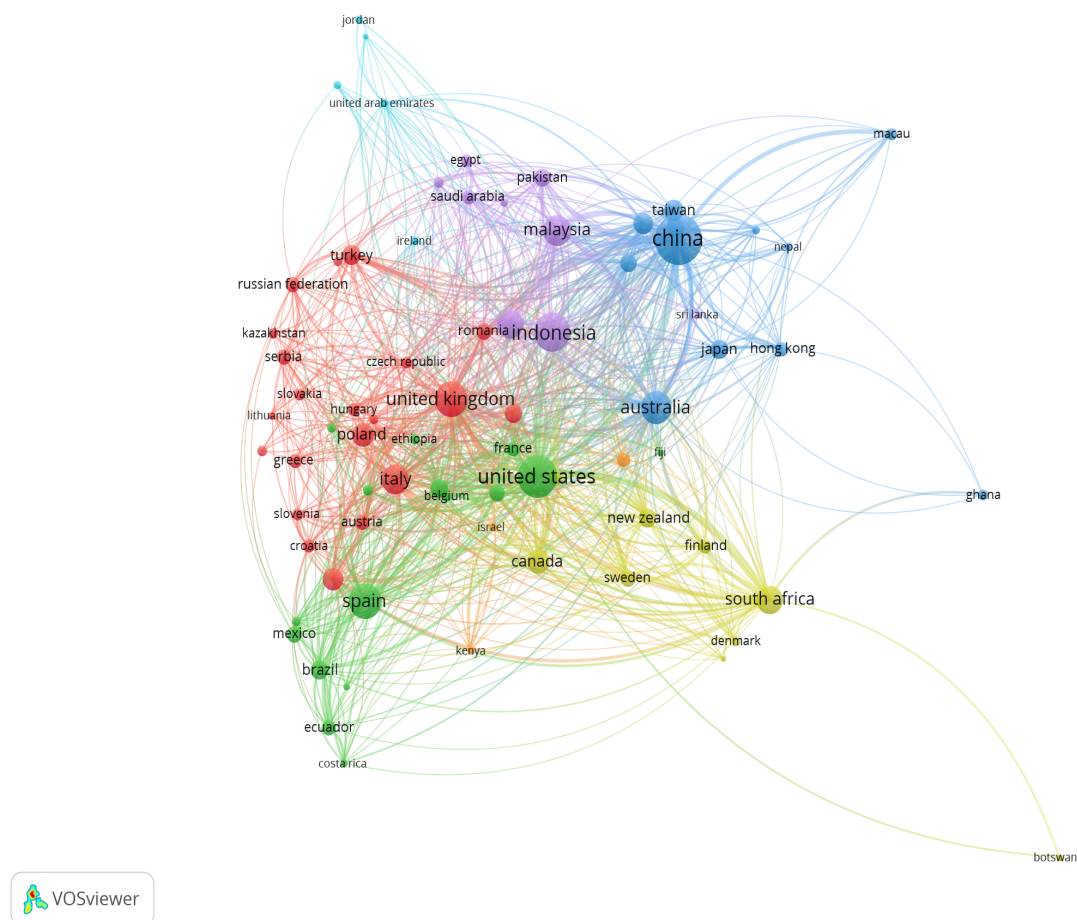


Figure 2. Co-authorship analysis by country.

4.3. Results of Co-occurrence Analysis

Figure 3 displays a co-authorship map of all keywords (authors and indices) in the dataset. The map is based on a threshold of 50, and only 71 out of the 15,026 keywords meet this threshold. The higher total link strengths are for ecotourism (6266), tourism development (2776), tourism (2603), sustainability (2501), sustainable development (2347), sustainable tourism (2143), tourist destination (1795), tourism management (1223), and China (1132). The four clusters identified in the map are described as follows.

Cluster 1 (red), entitled “Tourism Development and Sustainability”, encompasses 29 keywords related to tourism development and sustainability, including “conceptual framework”, “COVID-19”, “cultural heritage”, “ecotourism”, “heritage tourism”, “Italy”, “literature review”, “marketing”, “over-tourism”, “perception”, “public attitude”, “questionnaire survey”, “research work”, “responsible tourism”, “rural tourism”, “social media”, “Spain”, “strategic approach”, “sustainability”, “sustainable tourism”, “tourism development”, “tourism economics”, “tourism management”, “tourism market”, “tourist attraction”, “tourist behavior”, “tourist destination”, “travel behavior”, and “United States”.

Cluster 2 (green), entitled “Conservation and Environmental Protection”, consists of 24 keywords related to conservation and environmental protection, including “animals”, “article”, “biodiversity”, “conservation”, “conservation management”, “conservation of natural resources”, “environmental protection”, “human”, “humans”, “national park”, “natural resource”, “nature conservation”, “protected area”, “protected areas”, “recreational activity”, “South Africa”, and “willingness to pay”.

Cluster 3 (blue), entitled “Sustainable Development and Climate Change”, encompasses 10 keywords related to sustainable development and climate change, including “carbon emission”,

“China”, “climate change”, “economic development”, “economic growth”, “environmental impact”, “India”, “spatiotemporal analysis”, “sustainable development”, and “tourism”.

Cluster 4 (yellow), entitled “Community-based Tourism and Livelihood”, comprises eight keywords related to community-based tourism and livelihood, including “community-based tourism”, “development”, “Indonesia”, “livelihood”, “local participation”, “Malaysia”, “stakeholder”, and “sustainable tourism development”.

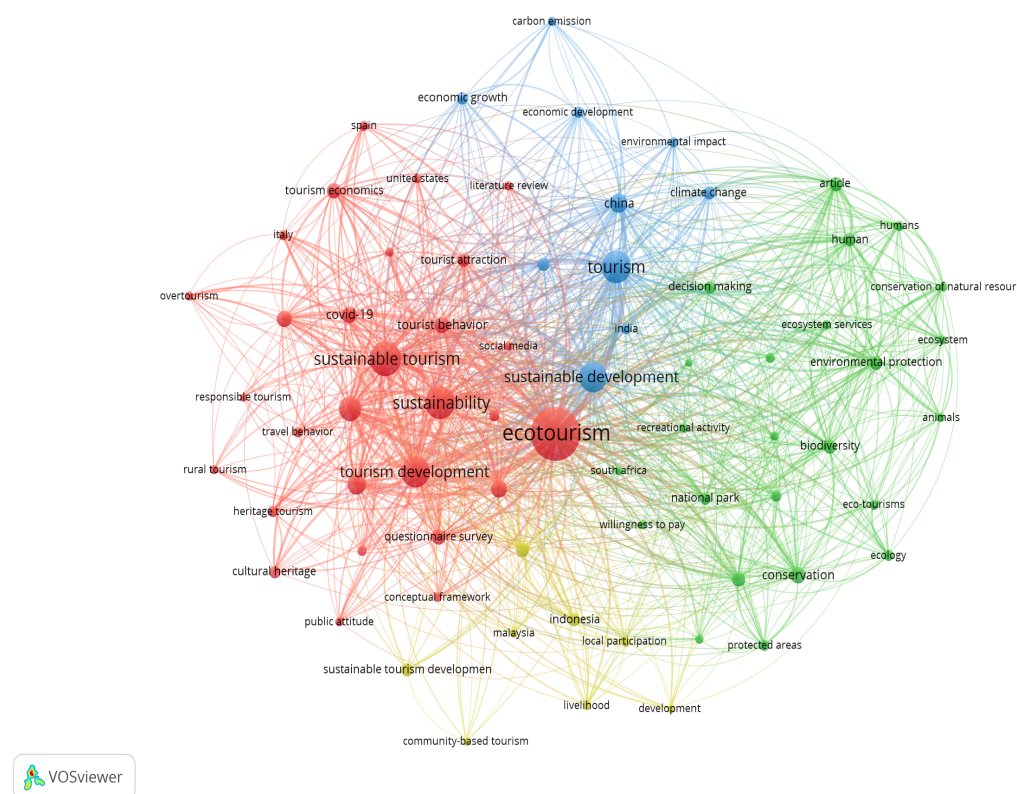


Figure 3. Co-occurrence analysis by all keywords.

4.4. Results of Content Analysis

The outcomes of the content analysis are exhibited in [Tables 5 and 6](#). [Table 5](#) displays the aggregate number of occurrences of keywords in each dimension of sustainability, namely social, environmental, economic, and cultural-historical. The corresponding count of occurrences for each dimension is 3,927,317, 4,486,060, 9,838,865, and 3,901,318, respectively.

Table 5. Top 10 documents by citations.

Social	Environmental	Economic	Cultural-historical
3,927,317	4,486,060	9,838,865	3,901,318

[Table 6](#) displays the 15 journals with the highest frequency of keywords associated with sustainability. The journals are ordered by the total number of keyword occurrences across all sustainability dimensions, and the columns indicate the different sustainability dimensions, along with the corresponding number of keyword occurrences for each journal. As an illustration, “Tourism and Hospitality Research” records 5626 keyword occurrences in the social dimension, 6384 keyword occurrences in the environmental dimension, 14,050 keyword occurrences in the economic dimension, and 5588 keyword occurrences in the cultural-historical dimension.

Table 6. Top 10 journals by citations.

No.	Journal	Social	Environmental	Economic	Cultural-historical
1	Tourism and Hospitality Research	5626	6384	14,050	5588
2	Journal of Sustainability Science and Management	5626	6384	14,047	5588
3	Business Strategy and the Environment	5625	6384	14,044	5587
4	Pacific Conservation Biology	5625	6384	14,044	5587
5	Sustainable Development	5625	6384	14,044	5587
6	Tourism Geographies	5625	6384	14,042	5587
7	International Journal of Tourism Research	5625	6384	14,041	5587
8	Journal of Ecotourism	5624	6384	14,040	5587
9	Ocean and Coastal Management	5623	6384	14,040	5585
10	International Journal of Social Ecology and Sustainable Development	5623	6380	14,038	5581
11	Marine Pollution Bulletin	5623	6372	14,037	5581
12	Fisheries	5623	6372	14,036	5581
13	Tourism Management Perspectives	5622	6372	14,035	5579
14	Biological Conservation	5622	6372	14,034	5579
15	Journal of South American Earth Sciences	5622	6372	14,031	5579

The third research question pertains to the dimensions of sustainability that have garnered significant attention in tourism research. Social and environmental sustainability have received the most research attention, followed by economic sustainability. Scholars underscore the need to balance economic growth with social and environmental sustainability to secure the tourism industry's long-term viability. However, the findings suggest a dearth of research on cultural and political sustainability in the tourism context. Cultural sustainability is crucial in preserving the unique cultural heritage of destinations, while political sustainability is essential to ensuring that tourism development aligns with local communities' interests and needs. Future research may delve deeper into these sustainability dimensions to advance a more comprehensive understanding of sustainable tourism.

This analysis provides a comprehensive understanding of the prevalence and distribution of keywords associated with sustainability across different academic journals. The results of this analysis identify the journals that are most active in publishing research on sustainability, as well as the specific dimensions of sustainability that are most frequently addressed in these journals. The economic dimension of sustainability has received significant attention in the literature, while the social and cultural-historical dimensions have received little attention. This highlights the areas where more research is needed to address emerging sustainability issues in the tourism industry.

5. Conclusions

The comprehensive analysis presented in this paper offers critical insights into the current landscape of research on sustainable tourism and identifies avenues for future study. Utilizing a combination of citation analysis, co-authorship analysis, co-occurrence analysis, and content analysis, the findings of this research provide a nuanced understanding of the most widely cited papers, the dominant authors and countries contributing to the field, the collaborative relationships among researchers, the interconnections among keywords, and the dimensions of sustainability that receive the greatest research attention. This analysis constitutes a valuable contribution to the advancement of knowledge in the area of sustainable tourism and serves as a roadmap for future research endeavors. The study uses a different set of keywords to identify trends and patterns in the literature and identifies specific areas where more research is needed, which can help to guide future research agendas and inform policy decisions.

The analysis of the most cited articles and authors has revealed several key insights into the current state of research on tourism sustainability. The top-cited article, "Pandemics, Transformations, and Tourism: Be Careful What You Wish For" by Hall et al. (2020) [24], demonstrates in this way the significant impact of the COVID-19 pandemic on the tourism industry and the crucial role of sustainability in the recovery process. This is further reinforced by the second most cited article, "Socializing Tourism for Social and Ecological Justice After COVID-19" by

Higgins-Desbiolles (2020) [25]. The top 10 documents reflect the current trends in research on tourism sustainability and the ongoing effects of the pandemic on the industry.

An examination of the most productive authors and countries showed that Carvache-Franco, M. and Carvache-Franco, W. were the most productive authors, while China was the most productive country in terms of publications, followed by the United States and Indonesia. The authorship analysis also revealed the higher total link strengths among authors Couto, G., Catanho, R.A., and Pimentel, with the highest link strength among countries being the United Kingdom, United States, and China. The resulting clusters of countries can be grouped into seven distinct clusters, including European and Central Asian Countries (cluster 1), American and Western European Countries (cluster 2), Asian Pacific Countries (cluster 3), Northern and Western Countries (cluster 4), South Asian and Middle Eastern Countries (cluster 5), African and Middle Eastern Countries (cluster 6), and Southeast Asian and African Countries (cluster 7).

The results of the co-occurrence analysis in conjunction with the content analysis yielded important and revealing insights. The “Tourism Development and Sustainability” cluster (red) emerged as the dominant cluster according to the co-occurrence analysis. This cluster aligns with the economic dimension of sustainability, which, as evidenced by the content analysis, is the subject of the greatest research interest in the field of tourism sustainability. The other two clusters identified by the co-occurrence analysis, “Conservation and Environmental Protection” (green) and “Sustainable Development and Climate Change” (blue), correspond to the environmental dimension of sustainability, which, as determined by the content analysis, is the second main area of research focus in the field of tourism sustainability. Finally, the “Community-based Tourism and Livelihood” cluster (yellow) primarily aligns with the social and cultural-historical dimensions of tourism sustainability and received the least amount of research interest, as determined by the content analysis.

While the study provides valuable insights into the current state of research on sustainable tourism, it is not without limitations. One limitation is that the study only analyzed articles indexed in the Scopus database, which may not be representative of all research on sustainable tourism. Future studies could expand the scope of analysis to include other databases. Additionally, the study focused on the analysis of research output and did not examine the impact of sustainable tourism research on policy and practice. Future studies could explore the translation of research into action and identify gaps between research and practice in the tourism industry.

Data Availability

The data used to support the results reported in this paper is available from Scopus and there is access to the data with the parameters of Table 1. If further assistance is needed, please contact the author.

Conflicts of Interest

The author has no conflict of interest to declare.

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