

# Unveiling Progress in Sustainable Tourism Research: A Comprehensive Bibliometric Exploration

Swati Singh<sup>A</sup>, Mansoor Ahmad<sup>A</sup>, Sadaf Siraj<sup>A\*</sup>

Received: May 2024 | Accepted: January 2025

DOI: 10.5937/turizam28-50846

## Abstract

*This research aims to evaluate the contribution of studies on sustainable tourism to the existing body of literature in this field. A comprehensive analysis of 1310 literary works was conducted using bibliometric analysis. The study followed the parameters outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) framework, with a primary focus on the Scopus database. The study also emphasizes the importance of accurately identifying authors, references, and links relevant to sustainable tourism research. The analysis highlights the evolution of sustainable tourism research, with consistent publication trends and growth. Key co-citation clusters identify influential works, authors, and institutions. It reveals gaps in integrating sustainability, competitiveness, and tourism in policy development, presenting opportunities for interdisciplinary research. Dominant themes like “sustainable tourism”, “ecotourism”, and “sustainable development” are identified, alongside the underexplored area of sustainable competitiveness. These findings stress the need for stronger collaborations between developed and developing nations to foster innovative and inclusive sustainable tourism policies. This study provides a comprehensive examination of the literature on sustainable tourism, employing bibliometric analysis to fill the gap in existing research. By identifying key clusters and emphasizing the importance of research collaboration, this study offers original insights into the field of sustainable tourism.*

**Keywords:** Bibliometric analysis, sustainable tourism, systematic literature review, sustainability

## Introduction

The tourism industry has experienced substantial growth, with international tourist arrivals reaching 1.5 billion in 2019, marking a 3.5% increase from the previous year (UNWTO, 2017). However, this growth has also led to negative impacts on the environment, society, and economy. Sustainable tourism aims to mitigate these issues by promoting positive outcomes for local populations and the environment (Neto, 2003). Sustainable tourism refers to travel prac-

<sup>A</sup> Jamia Hamdard, Management Studies, Hamdard Nagar, New Delhi

\* Corresponding author: [sadafsiraj@jamiahamdard.ac.in](mailto:sadafsiraj@jamiahamdard.ac.in)

tices that prioritize environmental conservation, cultural preservation, and economic viability, ensuring that tourism benefits local communities while minimizing ecological impact (Hardy et al., 2002). This concept encompasses responsible tourism and ecotourism, which focus on ethical travel practices that promote sustainability (Baloch et al., 2023). It aims to balance the environmental impact of tourism with local economic growth. It balances the protection of natural resources and cultural heritage with the economic benefits of tourism, contributing to environmental conservation, poverty reduction, and cultural preservation (Neto, 2003).

Sustainable tourism acknowledges the role of socio-cultural factors in expanding the industry, addressing issues like congestion, cultural commoditization, and loss of traditional customs. Community-based tourism initiatives offer authentic experiences, fostering sustainable livelihoods and preserving cultural identities (Weaver, 2007). Sustainable tourism, encompassing economic, environmental, and socio-cultural aspects, aims to strengthen local economic ties by supporting small businesses, regional companies, and employment, reducing economic leakage and ensuring positive economic effects persist in host communities, according to the (UNWTO, 2017).

The public's awareness of Sustainability and the imperative of balanced economic growth is growing. This consciousness is fuelled by the realization that increasing consumption and depletion of natural resources harm the environment (Higgins-Desbiolles, 2018; Lee, 2020). Urgent action is required to address problems, examples of these challenges include the exhaustion of natural resources and the phenomenon of climate change biodiversity loss, and water and air pollution (Higgins-Desbiolles, 2018; Lee, 2020).

This study employs bibliometric to comprehensively assess the growth of research in sustainable tourism, evaluate the effective implementation of sustainable tourism policies, and elucidate outcomes, opportunities, and challenges, advocating for responsible travel that respects the environment, preserves cultural heritage, and benefits local communities, thereby paving the way for a just and environmentally responsible future in the tourism industry.

## Objective and Research Question

This study aims to offer a comprehensive overview of the growth of research in sustainable tourism using bibliometric analysis. The listed research questions are analyzed to guide this study:

- What are the authors, sources, and affiliations that are most relevant to the research issue.
- What are the main co-citation clusters in tourism sustainability to ascertain the intellectual structure.
- What are the main trends in research on sustainable tourism?
- Which study topics on sustainable competitiveness are most popular among academics?
- What are the current citation patterns of publication?
- Which country is most productive in research on sustainable tourism and development? Lastly, a research strategy for further exploration of this important topic needs to be developed and improved. A key characteristic that makes this study stand out is its attempt to give an exhaustive bibliometric analysis of tourism sustainability reported across all relevant publications. This study can add to the knowledge previously known about sustainable tourism and provide academics and decision-makers with timely, beneficial recommendations on understanding research trends and structures.

It assists in determining the key contributions and research topics that may be useful to scholars in creating upcoming research papers.

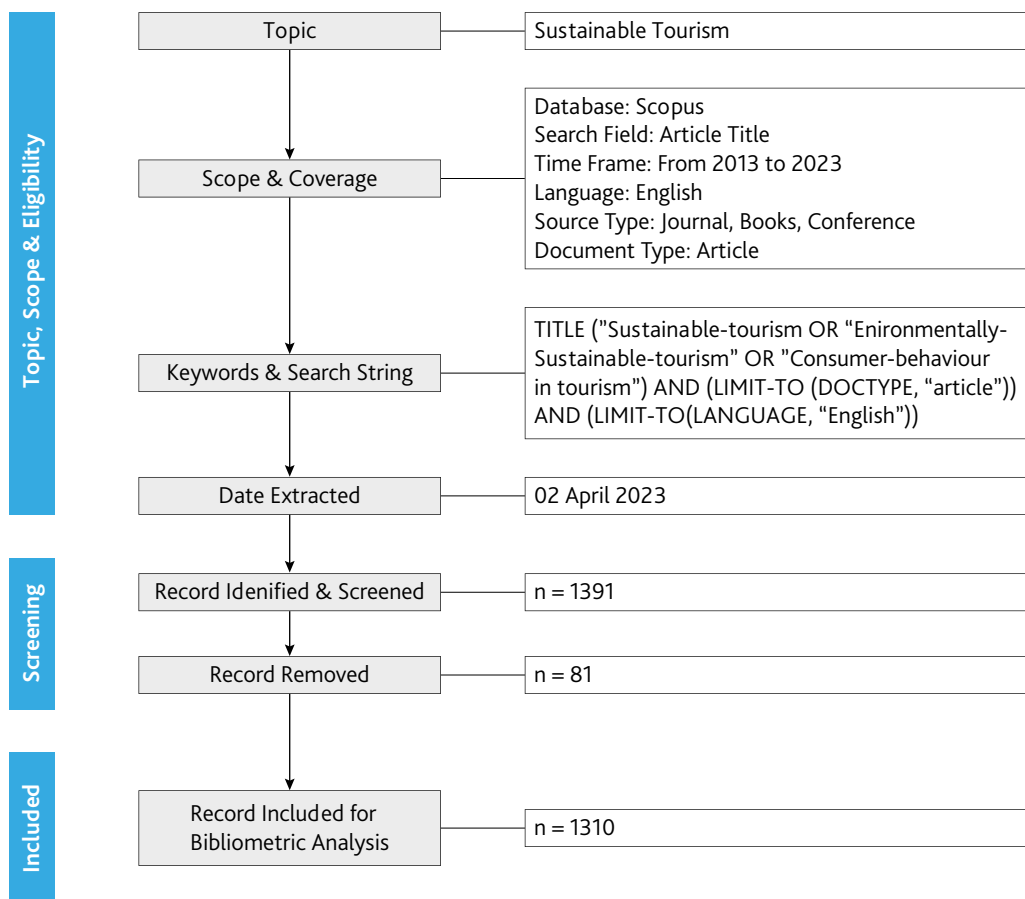
## Methods

Under the guidelines outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement (Liberati et al., 2009), this study followed a comprehensive checklist encompassing various aspects, including title, abstract, methods, results, discussion. This approach ensured a thorough and transparent reporting of systematic reviews. Furthermore, the research utilized bibliometrics, a quantitative methodology incorporating mathematical and statistical techniques, to evaluate the importance of academic journals to scholars, institutions, and nations (Pritchard, 1969). Using bibliometrics, you can get a comprehensive picture of a significant body of scholarly work (Alsmadi, Alzoubi, 2022; Van Nunen et al., 2018). Bibliometrics offers a more precise and impartial study of the material compared to other qualitative and quantitative review research approaches (Aria, Cuccurullo, 2017). The employment of relational approaches like co-authorship, co-word, and bibliographic coupling analysis is also included. Bibliometric analysis has been used to gauge the amount of scholarly output in several tourist studies subfields, such as sustainable tourism (Niñerola et al., 2019; Ruhanen et al., 2015), competitiveness and innovation (Comerio, Strozzi, 2019; Teixeira, Ferreira, 2018), and even the consequences of tourism (Burnham, 2006; Falagas et al., 2008). In particular, the tourism industry is examined in this study using bibliometrics to examine the connection between competitiveness and sustainable growth. This study utilized VOS viewer software (version 1.6.17), a widely recognized tool for visualizing bibliometric networks, to analyze and interpret the collected data. VOS viewer was employed for constructing and visualizing the following bibliometric networks: **Citation Analysis**, **Co-Citation Analysis**, Bibliographic Coupling, Co-word analysis, Co-authorship analysis. VOS viewer was used to generate visualizations, including network diagrams, density maps, and overlay visualizations. Each visualization provided insights into relationships among authors, institutions, references, and thematic areas.

## Search Strategy

This study analyzed 1310 papers, including 1324 articles and 67 review papers, published in all languages. Non-English-language papers were excluded. The Scopus database was used for data collection, as it has been a popular method for discovering information distribution and research trends in scientific domains with significant social influence. The database was chosen for its extensive single abstract and indexing databases and searchable literature search list. The search criteria included “Sustainable tourism,” “Environmentally Sustainable tourism,” and “Consumer behavior in tourism.” The search query was limited to English-written words, dates, and documents. The Scopus database was chosen for this study because of its reputation as the most extensive single abstract and indexing database (Burnham, 2006) and the most searchable reference and abstract literature search list (Falagas et al., 2008).

Figure 1 shows how collections of tourism research are used in these years to find the desired papers from the preceding ten years. The study highlights the need for more investigation into the period under scrutiny, as it is plausible that the subjects addressed in previous studies were exhaustively examined in subsequent ones (Nunhes et al., 2016). The current study just looked at several years to establish where research should go in the future and what



**Figure 1.** Flow diagram of the search strategy

Source: Zakaria et al., 2021

has to be done based on recent articles. Because there has not been much effort in bibliometric analysis to establish the cause-and-effect relationship between sustainable development and competitiveness, the publications are limited by their titles. Additionally, data is collected and shown using Microsoft Excel (Office 365 A1 Plus) and VOS viewer (version 1.6.17).

## Documents Profiles

**Table 1.** Document Type

Document Type	Total Publications (TP)	Percentage (%)
Article	1324	95.18
Review	67	4.8
Total	1391	100.00

## Literature review

The tourism industry's economic significance is well-documented, but social and environmental aspects are under-researched, especially in emerging economies (Tokmak et al., 2018) conducted a detailed literature review to explore the contributions of sustainable tourism studies. The study analyzed 143 articles, revealing key findings categorized under seven headings. Notably, the *Journal of Sustainable Tourism*, particularly in 2017, featured prominently. Qualitative and experimental methods were more prevalent, and case studies were frequently conducted in Australia, the USA, and England. (Shahbaz et al., 2021) offered a comprehensive knowledge map of tourism and environmental degradation literature, spanning 1999 to 2020.

Study of Cavalcante et al. (2021) aims to analyze research on environmentally friendly tourism practices using the Web of Science platform. This study, which used a sample of 694 materials, highlights research gaps and opportunities in Sustainability and tourism marketing while offering insight into the current state of the art (León et al., 2014) used the STIRPAT analytical methodology on a sample size of panels from industrial and emerging economies. They concluded that tourism affects carbon emissions in data panels. Miller et al. (2015) explore sustainable tourist destinations in urban Melbourne, Australia, focusing on pro-environmental behaviors such as recycling, green transportation, sustainable energy and materials, and eco-friendly cuisine through a quantitative online survey. Harun et al. (2018) analyzed the attitudes and perceptions of rural residents in the Kurdistan Regional Government's Sulaimani and Halabja Governorates, Iraq, from March to May 2016, focusing on the development of tourism in these areas. Carvache-Franco et al. (2021) conducted study in Costa Rica's Arenal National Park and Caño Negro National Wildlife Refuge, and found six distinct motivational elements within ecotourism, using a sample size of 246 real-time questionnaires and factor analysis and stepwise multiple regression techniques. The study aims to improve tourism expansion and administration in the 21st century.

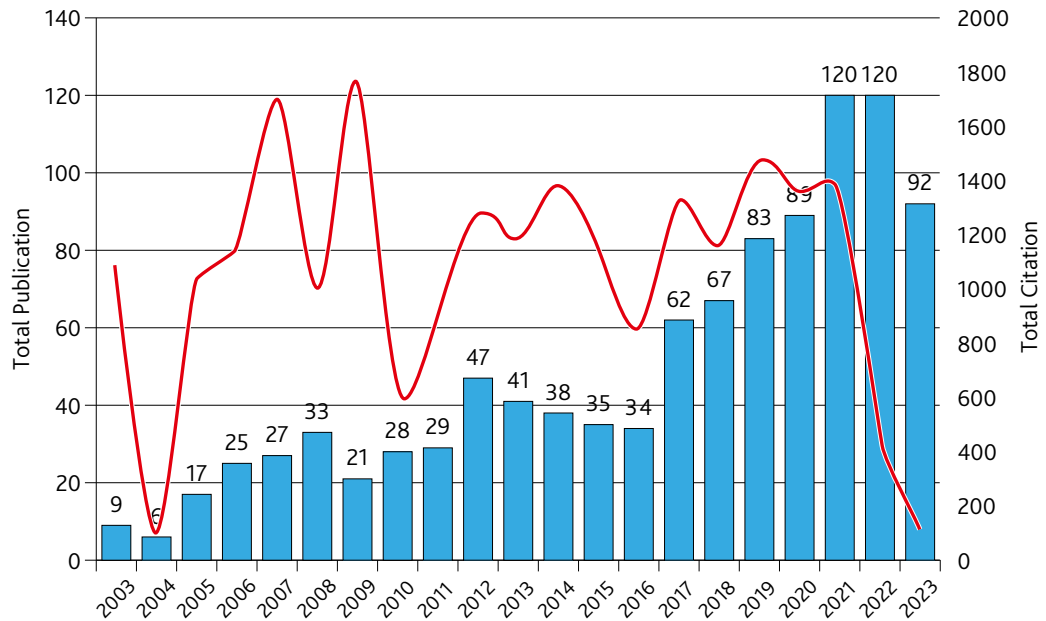
## Results and Discussion

The sections of the academic works listed below have been examined to respond to the research questions regarding analyzing current trends, making connections about sustainable competitiveness, and forecasting future trends in tourism. The analysis of this publication took into account the document type, publishing output, citation analysis, journal analysis, geographical distribution analysis, and keyword network analysis. The most popular paper is "Sustainable Tourism Development: A Critique" by Liu (2003). It has been cited 609 times and has 14 links (network connections). Table 3 below lists the top 20 publications, the name of the journal they were published in, and the year they were published.

**Table 2.** *Bibliometric data (Top 20 Publications on Sustainable Tourism (Based on Citation Analysis))*

Author	Article Title	Journal Name	Citations	Publication year
Liu, 2003	Sustainable Tourism Development: A Critique	Journal of Sustainable Tourism	609	2003
Hunter, 1997	Sustainable tourism as an adaptive paradigm	Annals of Tourism Research	573	1997
Byrd, 2007	Stakeholders in sustainable tourism development and their roles: applying stakeholder theory to sustainable tourism development	Tourism Review	373	2007
Bramwell, Lane, 1993	Sustainable Tourism: An Evolving Global Approach	Journal of Sustainable Tourism	330	1993
Briassoulis, 2002	Sustainable tourism and the question of the commons	Annals of Tourism Research	303	2002
Clarke, 1997	A Framework of Approaches to Sustainable Tourism	Journal of Sustainable Tourism	267	1997
Hunter, 1995	On the need to re-conceptualize sustainable tourism development	Journal of Sustainable Tourism	240	1995
Gibson et al., 2012	Small-scale event sport tourism: A case study in sustainable tourism	Sport Management Review	233	2012
Weaver, 2011	Can sustainable tourism survive climate change?	Journal of Sustainable Tourism	208	2011
Hunter, Shaw, 2007	The ecological footprint as a key indicator of sustainable tourism	Tourism Management	208	2007
Cater, 1993	Ecotourism in the third world: problems for sustainable tourism development	Tourism Management	207	1993
Higgins-Desbiolles, 2018	Sustainable tourism: Sustaining tourism or something more?	Tourism Management Perspectives	198	2018
Rivera, 2002	Assessing a voluntary environmental initiative in the developing world: The Costa Rican Certification for Sustainable Tourism	Policy Sciences	198	2002
Twining-Ward, Butler, 2002	Implementing STD on a Small Island: Development and Use of Sustainable Tourism Development Indicators in Samoa	Journal of Sustainable Tourism	196	2002
Høyer, 2000	Sustainable Tourism or Sustainable Mobility? The Norwegian Case	Journal of Sustainable Tourism	184	2000
			171	2005
Hunter, 2002	Sustainable Tourism and the Touristic Ecological Footprint	Environment, Development and Sustainability	167	2002
Bramwell et al., 2017	Twenty-five years of sustainable tourism and the Journal of Sustainable Tourism: looking back and moving forward	Journal of Sustainable Tourism	161	2017
Garrod, Fyall, 1998	Beyond the rhetoric of sustainable tourism?	Tourism Management	160	1998
Simpson, 2001	Strategic Planning and Community Involvement as Contributors to Sustainable Tourism Development	Current Issues in Tourism	149	2001
Budeanu, 2005	Impacts and responsibilities for sustainable tourism: a tour operator's perspective	Journal of Cleaner Production	147	2005

## Data Analysis



**Figure 2.** Graphical representation of Publication trend in sustainable tourism

**Table 3.** Chronological Trend of publication

Row Labels	Sum of TP	Sum of TC
2003	9	1069
2004	6	97
2005	17	1017
2006	25	1154
2007	27	1689
2008	33	992
2009	21	1757
2010	28	626
2011	29	923
2012	47	1264
2013	41	1184
2014	38	1375
2015	35	1142
2016	34	847
2017	62	1312
2018	67	1155
2019	83	1463
2020	89	1358
2021	120	1363
2022	120	473
2023	92	110
Grand Total	1023	22370

## Analysis Findings

Figure 2 shows the trend of publications on sustainable tourism and consumer behavior. From Table 3, It has been observed that from 2012 to 2013, there was a significant increase, with 2012 being the year with the most publications. The academic community is passionate about the study concept. The highest decrease was in 2016, but since then, there has been a consistent increase in publications, indicating a growing interest in sustainable tourism and consumer behavior.

The citation trend of a particular publication is one of the most critical performance indicators to show the importance of research (Aksnes et al., 2019). Over the decade, the citation distributions in Table 3 remain very stable. This indicates that academics still keep up with current research in pertinent fields. Others contend that although the quantity has declined after 2015, the papers' scholarly value and impact have not changed because they still acquire many citations yearly. Citation analysis is covered in more detail in the following portion of this essay.

## Citation Analysis

Table 3 shows the citation patterns of 1023 documents in academic works, identifying the most influential articles and journals from the Scopus database. The study includes metrics for citation, a comprehensive analysis of citations, a compilation of the top 20 frequently cited publications, and a catalogue of the 20 most actively referenced source titles. The 22370 citation metrics obtained over many years are considered the industry standard for evaluating research effectiveness and impacts. The average number of citations per article is another helpful metric to assess the normal influence of a journal or author. With an average of more than 21 citations per publication in 2003-2023 ( $C/P = 21.86$ ), it is evident that performance improved during this time period (Al Husaeni, Nandiyanto, 2022). According to (Nandiyanto, Al Husaeni, 2021), the VOS viewer may provide bibliometric mapping in three visualizations: network, overlay, and density. A colourful circle identifies each publication. A colored circle identifies each publication, with a positive correlation between the circle's size and the publication's citations.

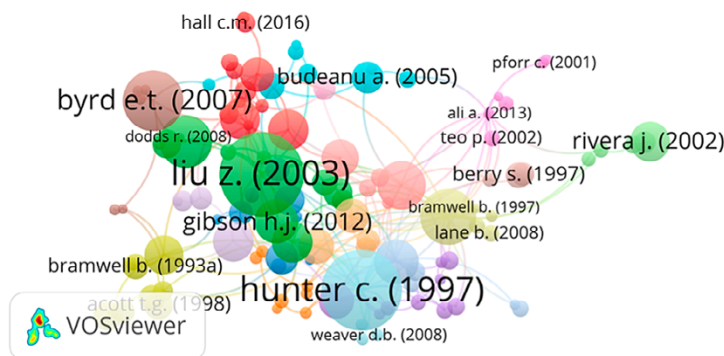


Figure 3. Citation Analysis



## Co-citation analysis

This investigation begins with an examination of co-citations. The study's nodes represent the connections between the numerous publications and the various research topics in WT. Hall, c.m., and Gossling, s., which were cited 656 and 417 times, respectively, dominated the ranking, as shown in Figure 4. In terms of link strength, these publications ranked first and second with scores of 19562 and 14847, respectively.

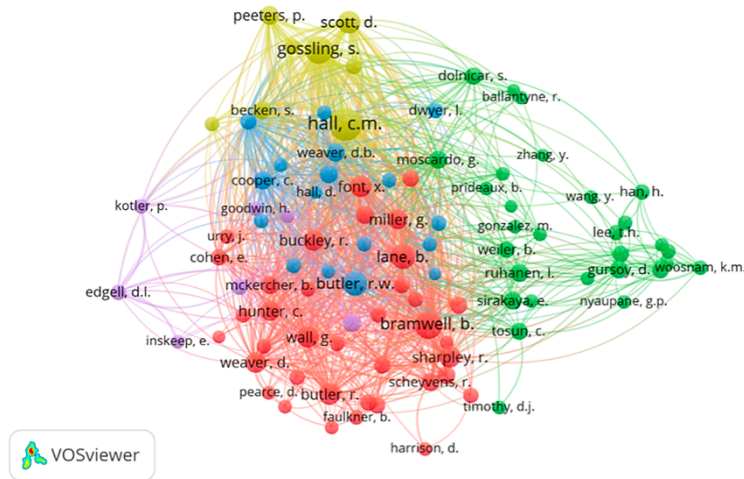


Figure 4. Network of authors who have been cited together

## Bibliographic Coupling with Sources

It describes the mapping of bibliographic Coupling on consumer behaviour towards sustainable tourism publications based on source-based network visualization. Five hundred fifty-eight prolific sources produced research articles, but only 48 sources met the minimum threshold of five using the full counting procedure. For each of the 48 sources, the cumulative strength of the bibliographic coupling links with other sources was determined (figure 5). The greatest total link strength (TLS) calculated from this study's sources were 1,402 TLS, with 6 clusters containing 48 items. Cluster 1 (16 items), Cluster 2 (11 items), Cluster 3 (10 items), Cluster 4 (5 items), Cluster 5 (4 items), and Cluster 2 (5 items) were the seven clusters present.

The findings revealed that scientific research in tourism sustainability and competitiveness is frequently published in non-specialist journals. This may be due to the transversal character and multifaceted nature of tourism competitiveness and Sustainability. These topics may be covered in various scholarly disciplines, so the publications are diverse. The maximal number of total link strengths was 3782, with 90 articles and 5359 citations by the source journal "Journal of Sustainable Tourism," which ranked first, followed by "Sustainability" (Switzerland), which ranked second with 1928 and 39 research articles. It demonstrates that the two source journals worked closely together to publish scholarly articles. The journal's interdisciplinary nature, which examines Sustainability and competitiveness from various perspectives, including economics, social contexts, culture, and the environment, has prompted an increase in the number of highly cited articles.

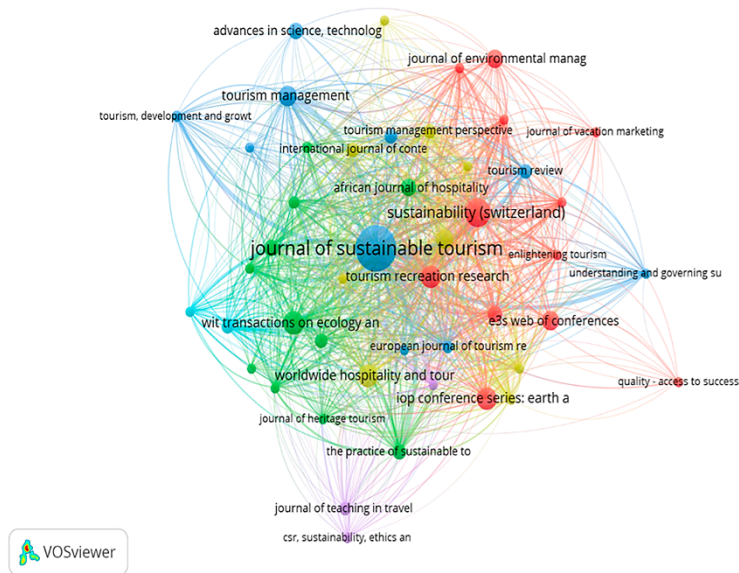


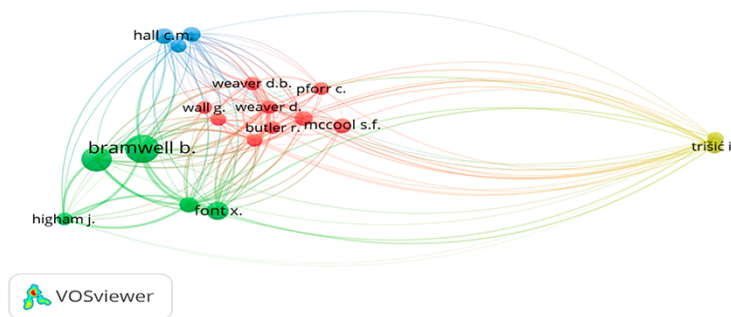
Figure 5. Bibliographic Coupling with Sources

Table 4. Citations link analysis

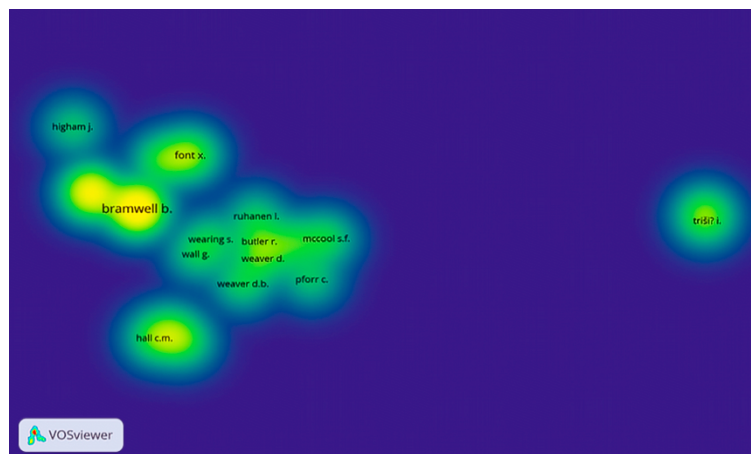
Source	Documents	Citations	Total Link strength
Journal of Sustainable Development	90	5359	3782
Sustainability (Switzerland)	39	476	1928
Worldwide Hospitality and Tourism	26	145	579
Tourism Recreation Research	25	267	994
IOP conference series: Earth and environment	25	28	226
Wit transactions on ecology on ecology and	24	84	742
Tourism management	20	1247	550
Tourism planning and development	18	260	1484
E3s web of conferences	18	22	124
Journal of Environment Management	17	40	158
African Journal of Hospitality and Tourism	16	47	373
Tourism and hospitality research	13	211	630
Springer proceedings in business	13	15	350
The practice of sustainable tourism	12	55	607
Tourism Management perspectives	11	467	914
Proceedings of international conferences	11	4	232
Advances in Science and technology	11	9	46
International Journal of Contemporary	10	318	562
Tourism review	10	480	432
e-review of tourism research	10	20	247

## Bibliographic Coupling with Authors

The graph below (figure 7) illustrates the authors' density visualization mapping of bibliographic Coupling on consumer behaviour and sustainable tourism. Two thousand seven hundred twenty-two prolific authors produced research papers, and the minimum number of 5 was selected using the full counting method; however, only 19 authors met the thresholds. There were a total of 10638 link strengths and four clusters with a total of 19 items: cluster 1 (9 items), cluster 2 (5 items), cluster 3 (3 items), and cluster 4 (2 items). Figure 6 displays the total strength of the bibliographic coupling connections between the 19 authors and the other authors. Table 5 and figure 7 demonstrate that 26 articles by (Bramwell, Lane, 1993) are coupled 1258 times, representing the total link strength, followed by 20 research publications by Lane B.(2011) connected 947 times. Therefore, the authors mentioned above collaborated when generating research publications. The inception of the Journal of Sustainable Tourism (JOST) in 1993 reflected the increasing scholarly interest in conducting research and contributing to developing theoretical frameworks and practical implementations within sustainable tourism. The first editorial of the Journal of Sustainable Tourism (JOST), written by Bill Bramwell and Bernard Lane, outlined a comprehensive framework consisting of four core Sustainability principles. These principles emphasized the importance of addressing social well-being, which recognized four key stakeholders: the tourist sector, host communities, government bodies, and visitors.



**Figure 6.** Authors network visualization of bibliographic coupling



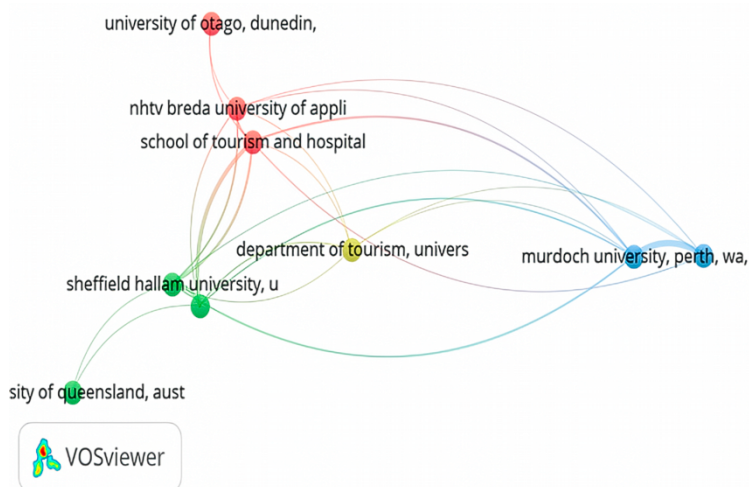
**Figure 7.** Author's density visualization of bibliographic Coupling

**Table 5.** *Bibliographic Coupling with Authors*

Author	Documents	Citations	Total Link
Bramwell b.	26	1247	1258
Lane b.	20	1146	947
Font x.	11	312	581
Miller g.	8	505	738
Hall c.m	8	228	527
Gosling s	7	407	613
Saarinén j	7	158	409
Mccool s. f	7	69	103
Trisi i	6	36	956
Steti? S	6	36	956
Weaver d.	6	276	554
Weaver d.b.	6	246	486
Peters p.	6	333	134
Higam j.	5	266	336
Ruhanen l.	5	147	309
Butler r.	5	273	233
Pforr c.	5	59	115
Wearing s.	5	85	97
Wall g.	5	65	44

### Bibliographic Coupling with Organizations

The mapping of bibliographic Coupling with institutions about consumer behaviour and sustainable tourism. There were a total of 2167 institutions involved in producing research output; the minimum number of four organizations was selected, and nine institutions met the criterion. In this mapping, there were a total of 139 link strengths and four clusters containing



**Figure 8.** Bibliographic Coupling with Organizations

36 documents, with cluster 1 containing three items, cluster 2 containing three items, cluster 3 containing two items, and cluster 4 containing one item. The total strength of bibliographic coupling connections between the nine institutions has been determined. The preponderance of the four articles from the “Department of Tourism, University of Otago, Dunedin, New Zealand” coupled eight times and demonstrated total link strength, followed by the four research articles from “Sheffield Hallam University, United Kingdom,” which coupled forty-two times (Figure 8). In terms of scholarly publications, both institutions had a positive relationship.

### Bibliographic Coupling with Countries

Table 6 and Figure 9 illustrate the mapping of bibliographic Coupling with nations of consumer behaviour and sustainable tourism. A total of 124 countries participated in the publication of publications, and the minimal number of five documents was chosen; 61 countries met the minimum requirement. Cluster 1 contained 17 items, cluster 2 comprised 14 items, cluster 3 had 12 items, cluster 4 composed nine items, cluster 5 contained seven items, and cluster 6 contained two items. The total strength of bibliographic coupling connections between each of the 61 countries has been determined. More than 3120 (Japan) total link strengths are contrasted to 23081 (United Kingdom) total link strengths in the table below. It appears 23081 times alongside 156 documents containing 6335 citations in the United Kingdom, followed by 21405 instances alongside 150 documents containing 2905 citations in the United States. In addition, it is measured by the nations with the strongest total link strength, which has been calculated to be 24287. It has been determined that both countries have cited more papers to strengthen their relationship regarding consumer behaviour and sustainable tourism.

**Table 6.** *Bibliographic Coupling with Countries*

Country	Documents	Citations	Total link strength
United Kingdom	156	6335	23081
USA	150	2905	21405
Australia	103	2476	16507
Italy	71	355	8297
China	63	276	5604
Indonesia	59	108	3492
Spain	54	547	7012
India	53	112	6046
Malaysia	46	510	7207
Canada	45	805	8280
South Africa	36	356	7856
Russian Federation	32	145	4056
New Zealand	31	966	6080
Portugal	29	185	3923
Thailand	29	130	5023
Turkey	29	133	4292
Germany	29	478	2913
Netherlands	28	817	4341
Greece	26	490	4063
Japan	25	249	3120



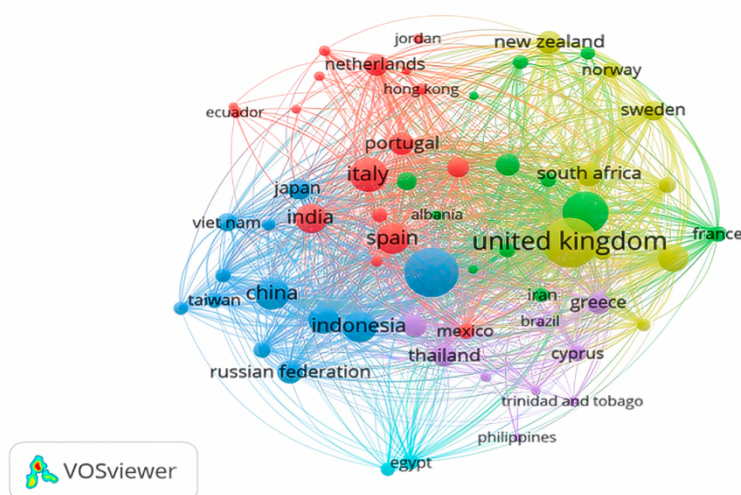


Figure 9. Bibliographic Coupling with Countries

### Co- words analysis

As seen in Figure 9, the most common keyword is sustainable tourism, which is utilized in most articles. Sustainable tourism is a popular research theme, with ecotourism and sustainable development appearing in over 200 papers. However, scholars often focus on sustainable competitiveness rather than sustainable competitiveness, especially in the context of tourism. A network visualization map was created using clusters from the VOS viewer application to provide insights into current research trends and future research paths. The map includes travel destinations, ecotourism, sustainability, tourism economics, tourism management, ecology, tourism industry, environmental impact, conservation, environmental protection, protected areas, and cultural legacies.

There are 3366 keywords, and 24 of them show up at least 15 times (Nandiyanto, Al Husaeni, 2021) say there must be at least two links between terms for the VOS viewer to work. VOS viewer can show bibliometric maps in three ways: network visualization, overlay visualization, and density visualization (Figures 10 and 11) (Nandiyanto, Al Husaeni, 2021). A coloured cir-

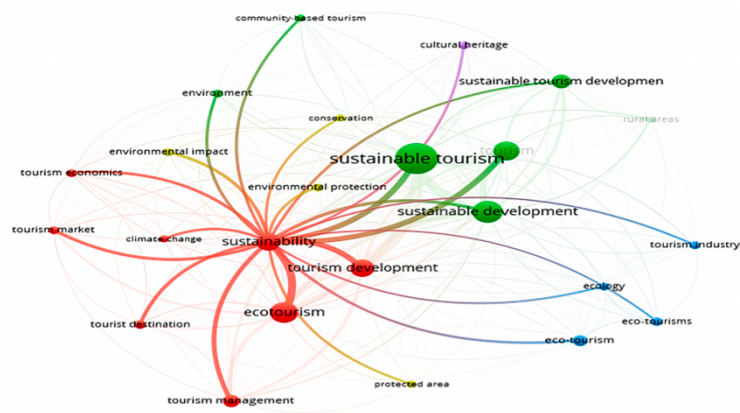


Figure 10. Co-wards Analysis

cle is next to each phrase. There is a strong link between the size of the circle and the number of times keywords appear in the title and description. So, the number of times the circle shows up determines how big it is. The circle will get bigger the more times the term is used. Figure 10 shows how the terms are linked. A network or line that connects one word to the next in network visualization displays the connections between terms (Al Husaeni, Nandiyanto, 2022). Figure 10 shows the clusters for each of the topics that were studied. The keyword for this study, “sustainable tourism,” is in cluster 2, marked in green with seven items. “Sustainable tourism” is the term for the study, which has 23 links. The total link value for this keyword is also 456.

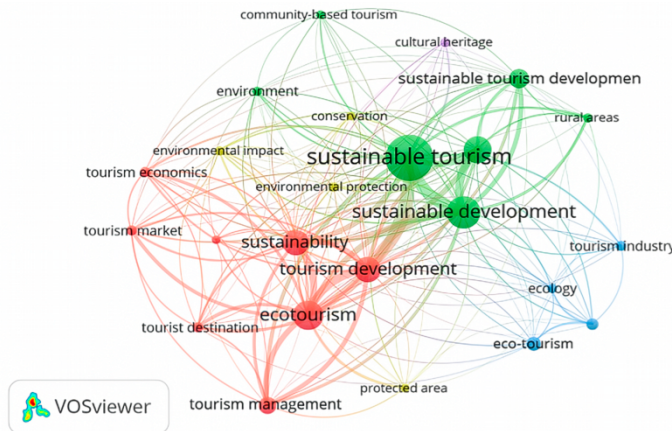


Figure 11. Network Visualization

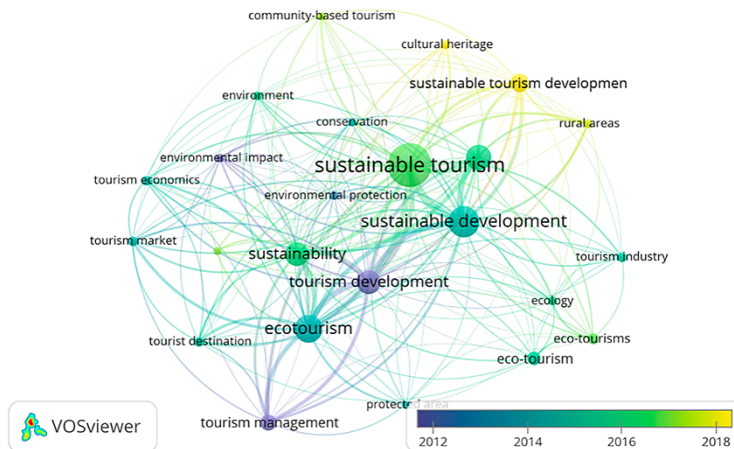


Figure 12. Overlay Visualization

The form of the Density Visualization is shown in Figure 12. Using the colour, we can tell if the keyword is used or studied in Density visualization. The less often a term is studied, the lighter it is.

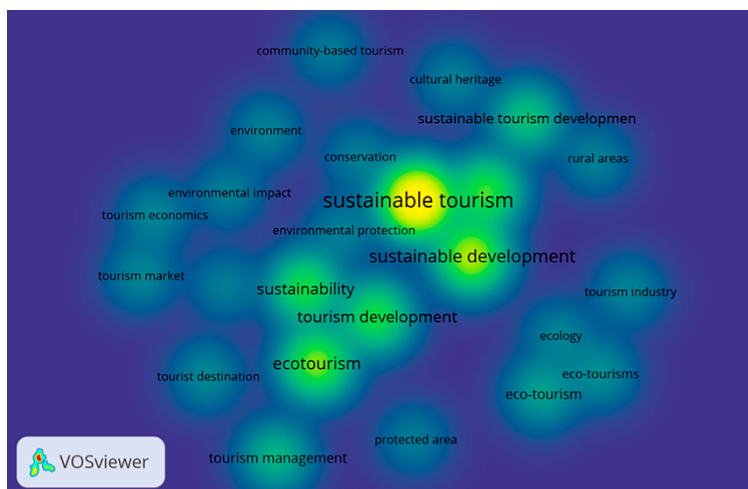


Figure 13. Density Visualization

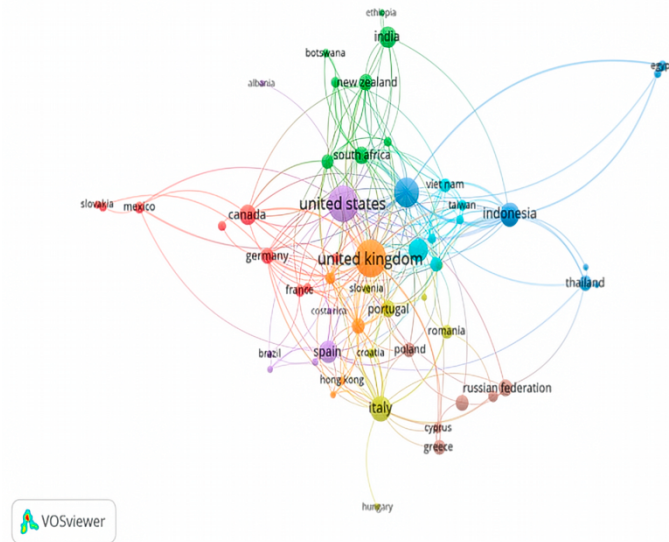
### Co-authorship analysis

The VOS viewer software has calculated the full co-authorship network based on the data. A circle on a map symbolizes each nation, and the size of the circle corresponds to the number of nephrology-related research publications the nation has produced. The circle separation denotes the degree of co-authorship between the two countries. The co-authorship link between two countries is more vital the closer two circles are together.

The data from the participating countries in this study are shown in Table 6 and Figure 13 using complete enumeration records. With a maximum of 25 per document, 124 different countries were represented. At least five countries had to be chosen, and 58 countries did so. In this mapping, there were eight clusters with a total of 61 items: Cluster 1 had nine, Clusters 2, 3, and 4 had eight, Cluster 5 had seven, and Clusters 6, 7, and 8 had six. In contrast to the United States, which had just 150 papers and 77 total connection strengths, the United Kingdom had 156 papers and 92 total link strengths. The findings showed that the UK has the most articles written in collaboration with other academics and scientists. This suggests that they worked together on this investigation.



## Co-authorship network with countries



**Figure 14.** Co-authorship network with countries

## Conclusion

This study employed bibliometric analysis to map the current state of the art in sustainable competitiveness, particularly in the tourism sector, through identification, grouping, gap analysis, and research trend evaluation. The findings reveal how sustainability and competitiveness intersect, demonstrating that these concepts work most effectively in tandem, especially within tourism. This relationship represents one of the most cutting-edge topics in the industry, offering opportunities to advance the boundaries of sustainable competitiveness. However, the limited integration of sustainability, competitiveness, and tourism in decision-making and policy development highlights a critical gap in the literature, calling for more interdisciplinary research to address this challenge.

The results underline the robust academic interest in sustainable tourism, with consistent publication and citation patterns over two decades. Notable trends, such as the increase in publications from 2012 onwards and the stabilization of citation metrics, affirm the enduring relevance of foundational works. Influential articles, such as Liu's "Sustainable Tourism Development: A Critique" (2003), and key journals like the *Journal of Sustainable Tourism* highlight the pivotal role of interdisciplinary approaches. Furthermore, keyword analysis underscored its dominant themes, including "sustainable tourism," "ecotourism," and "sustainable development," reflecting the sector's focus on environmental, cultural, and economic dimensions.

Strong international collaborations, particularly from the United Kingdom and the United States, emphasize the global nature of this research domain. However, the clustering of keywords indicates that sustainable competitiveness remains an underexplored niche, presenting opportunities for researchers to delve deeper into how sustainability and competitiveness can coexist and inform policymaking. Integrating computational tools for data mining and anal-

ysis could further enhance the capacity for bibliometric studies to identify emerging patterns and connections.

This analysis not only sheds light on the progress of sustainable tourism research but also serves as a comprehensive roadmap for future investigations. By addressing the scientific gaps identified and exploring novel intersections between sustainability, competitiveness, and tourism, researchers can push the limits of sustainable development. Advancing this discourse will contribute to innovative policies and practices that balance tourism growth with environmental preservation, cultural enrichment, and economic resilience.

## Limitations of the study

Despite the paper's benefits, one of them is that it relies on a selected database for information retrieval rather than various sources. However, we think Scopus has a sizable collection of materials that could summarise the total well. Utilizing different databases always provides a better solution to the problem. However, while employing the search approach, restricting the search by using simply the title. The database yielded promising results, many of which had nothing to do with the tourism sector. This is the strongest argument against Scopus' Title-abstract-Keywords option, excluding them. As has been stated repeatedly throughout this evaluation, this topic crosses several disciplines, and we did not want to detract from the focus of the study by taking into account works that were not directly related to the field. The third limitation concerns the type of articles that are reviewed. We eliminated books, PhD theses, conference proceedings, and unpublished working papers from the body of literature on sustainable tourism. Additionally, we ignored studies conducted in other languages because we only considered English-language sources.

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