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Article

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Missing the Forest for the Trees: Scientometric Analysis of ‘Sustainable versus Regenerative’ Tourism (1966-2023)

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Abstract

The ongoing global debate over sustainable versus regenerative tourism underscores the complex interplay between intentions and outcomes in responsible travel. Hence, the purpose of the study is to; (i) summarize sustainable and regenerative tourism research from 1966 through 2023; (ii) take into account the general context of research from the viewpoint of journal papers that have been published, in addition to co-occurrences of keywords, cluster analysis, visual mapping, and document co-citations (iii) identify the research gap in the sustainable versus regenerative tourism research, as well as emphasis on the utmost knowledge domains, and (iv) suggest future research areas in sustainable and regenerative tourism. To accomplish this objective, the study utilized the scientometric analysis approach, which involves visual mapping and reviewing the specific knowledge domain, through analytical tools, including VOS-viewer and Cite-Space. By applying the proximity investigation procedure, published studies underwent relational examination using the ‘concept matrix’ and cluster of co-existing terms. 3850 full-text research papers on sustainable and regenerative tourism published in Web of Science between 1966 and 2023, including 7052 researchers from 132 countries were examined. The present study findings highlight an up-to-date scientometric analysis from 1966 through 2023, as it identifies prominent researchers, mainstream tourism journals, publication trends, leading countries, researched areas, funding institutions and affiliations within the area of sustainable and regenerative tourism. The findings shed light on sustainable and regenerative tourism trends, challenges, and key players to inform future research and policy.

Keywords: Sustainable tourism; sustainable travel; regenerative tourism; regenerative travel; green tourism; scientometric analysis.

1. Introduction

The academic research on sustainable and regenerative tourism has gained immense significance and seen substantial growth in recent years (Cave & Dredge, 2020; Bellato, Frantzeskaki & Nygaard, 2023; Suárez-Rojas, Hernández & León, 2023; Zaman et al., 2023). This surge in interest reflects society's growing awareness of the need to strike a balance between the economic benefits of tourism and the imperative of preserving our environment and cultural heritage (Bellato, Frantzeskaki & Nygaard, 2023; Suárez-Rojas, Hernández & León, 2023). The global tourism industry needs to proactively move towards more responsible practices, where tourism not only sustains but actively contributes to regenerating and revitalizing communities and ecosystems (Suárez-Rojas, Hernández & León, 2023; Zaman et al., 2023). Travel has already ingrained itself into human existence. Global issues or the fear of terrorism cannot derail a desire to travel (Aktan et al., 2024). Of the global population, 1.4 billion traveled throughout the world in 2019 (UNWTO, 2017). By 2030, 1.8 billion tourists are predicted to visit the world (UNWTO, 2017); however, this prediction may be revised by taking into consideration the diverse effects of COVID-19 pandemic (Gössling et al., 2020). The majority of tourism is domestic, making up over 85% of all traveling, even if foreign tourism may garner the majority of media attention (Hall, 2015). Based on a study by the World Travel and Tourism Council (Council, 2018) estimates that 10.25% (about US\$7.6 trillion) of world GDP in the year 2017 was contributed by worldwide travel. The total amount spent on tourism has also increased significantly. The tourism sector stands out as one of the most dynamic and progressive sectors worldwide (Bellato, Frantzeskaki & Nygaard, 2023). However, finding a balance between the requirements of ecological, economic, and societal dimensions of society is necessary for planning and expanding tourism responsibly (Suárez-Rojas, Hernández & León, 2023). A high degree of customer satisfaction, a memorable experience, increased consumer knowledge of sustainability issues, and the dissemination of sustainable tourist practices are all requirements for the management of responsible tourism expansion (Streimikiene et al., 2021; Streimikiene & Bilan, 2015).

The extensive tourism research focusing on sustainability and regeneration highlights the global tourism's effect at different scales, given the economic significance and growth of businesses (Bellato, Frantzeskaki & Nygaard, 2023; Esfandiar et al., 2020; Gössling et al., 2018; Hall, 2015; Hall et al., 2015; Rasoolimanesh & Jaafar, 2017; Scott et al., 2016). There is an increasing concern about the sustainability and limitations of the global tourism industry expansions (Fodness, 2017; Gössling et al., 2012; Hall, 2019; Saarinen, 2015). Despite the longstanding interest in studying the impacts of tourism (Bellato, Frantzeskaki & Nygaard, 2023; Mathieson & Wall, 1982), there remains a lack of systematic monitoring and lack of clarity (Suárez-Rojas, Hernández & León, 2023). This lack of consensus on indicators and their usage has hindered the efforts to measure the effects of global tourism (Bellato, Frantzeskaki & Nygaard, 2023; Tanguay et al., 2013; Torres-Delgado &

Palomeque, 2014). Considering the importance of appropriate indicators for effective measurement and management of global tourism effects, it can have a significant impact on tourist's involvement in sustainability (Tanguay et al., 2013; Torres-Delgado & Palomeque, 2014; Manning et al., 2004). Global tourism imposes various pros and cons for the global economy, similar to other ecological sectors, including increased energy consumption and damaging environment such as climate change (Suárez-Rojas, Hernández & León, 2023). The environment is exploited as a result of tourism and travel expansions. Nature and tourist places are affected by heavy tourist traffic, which negatively affects the quality of life of local residents as well as causing potential damage to the host destination environment (Bellato, Frantzeskaki & Nygaard, 2023; Suárez-Rojas, Hernández & León, 2023).

The global debate on sustainable versus regenerative tourism highlights the complex relationship between responsible travel intentions and outcomes (Aktan et al., 2024; Zaman et al., 2023). Hence, this paper summarises sustainable and regenerative tourism research from 1966 to 2023 to address these complexities through journal publications analysis, keyword associations, cluster analysis, visual mapping, and document co-citations to examine the global tourism research landscape. The study also seeks to identify research gaps, highlight key areas of expertise, and suggest future directions for sustainable and regenerative tourism research. This study investigated 3,850 full-text Web of Science papers using scientometrics. Relational analysis was done with VOS-viewer and CiteSpace. The study also included 7,052 researchers from 132 nations. A complete scientometric analysis highlights key academics, popular journals, publication trends, leading countries, study fields, and important institutions in sustainable and regenerative tourism (Zaman et al., 2023).

2. Literature Review

2.1 Sustainable versus Regenerative Tourism

The United Nations described sustainable tourism as "*the development of tourism operations with a sufficient balance between the dimensions of environmental, economic, and socio-cultural factors to guarantee its long-term sustainability*" (UNEP, 2004; Manning et al., 2004). Despite the fact that generating predictions for future growth, it should meet the needs of travelers and tourist attractions while protecting the integrity of the area's cultural legacy, ecological system, biological variety, and life-sustaining system. Indeed, travel development should focus on sustainable growth, seeking to continually increase the happiness of tourists (Sharpley & Telfer, 2014). Green tourism is also described as "tourism activities that limit environmental impacts, reduce energy consumption, and cut carbon emission while enjoying ecology-humanity-culture integrity" by the Green Tourism Association of Taiwan. Relationship between travel actions and the environment should get special consideration when developing operational strategies for green tourism in an atmosphere of peace and dignity (Manning et al., 2004; Sharpley & Telfer, 2014).

2.2 Environmental Impact and Green Tourism

Lu and Nepal (2009) indicated that "green tourism" refers to tourism that addresses environmental issues. About 8% of the world's carbon dioxide release is associated with global tourism (Lenzen et al., 2018). As a result, sustainable tourism is very important right now. A number of offers regarding sustainable tourism have been developed, providing important environmental indicators for the tourism sector and travel, like reducing pollution, utilizing sustainable energy sources, combating climate disturbance, and eliminating waste (Lenzen et al., 2018; Lu & Nepal, 2009).

2.3 Impact of COVID-19 on Global Tourism

Severe decline in global tourism due to COVID-19 pandemic in 2020 gave people a chance to hold back and rethink, and it has reaffirmed the necessity to consider new approaches and strategies when tourism resumes. A debate hosted by UNESCO (2020) at the end of September 2020 explored it's declining " may be utilized to establish new models, strategies and approaches for a resurgence in tourism that is robust and sustainable, supports local economies, generates employment, promotes culture, protects heritage, and ensures its transfer" experts urging " regenerative tourism" as countries rehabilitate and bolster their post-COVID-19 tourism activities.

2.4 Regenerative Tourism: Concepts and Practices

While emphasizing micro-scale restoration initiatives as opposed to "large-scale" regeneration strategies, it is consistent with integrated local development techniques. Beyond sustainable tourism, regenerative tourism lays an emphasis on "giving back" and helping to actively regenerate local people, cultures, history, locations, landscapes, and other things (Zaman et al., 2023). Traditional sustainable techniques still prioritize minimizing the detrimental impact of human actions on the environment, while regenerative tourism approaches strive to go beyond these. Regenerative techniques are considered a viable path forward since they strive to improve positive outcomes rather than simply "do less harm," are systemic, and connect heritage and ecological trends (Hoxie et al., 2012; Zaman et al., 2023).

2.5 Operational Strategies in Regenerative Tourism

Operationally, post-capitalist or alternative economies/markets that prioritize goals other than growth and profit are acknowledged by regenerative methods. Regenerative tourism strategies may "deconstruct tourism economic practices"by not merely treating tourism-related activities as "business as usual" in the industry (Cave & Dredge, 2020; Zaman et al., 2023) and instead of focusing on economic growth, choosing holistic development: "*Destinations with a more broad offer, less reliance on one specific market, and a preference for qualitative over quantitative criteria will be more attractive in the face of an uncertain future that tend to be less vulnerable and more resilient (i.e., development instead of growth)*"(Romagosa, 2020).

In this situation, broad community engagement is essential for highlighting and appreciating each place's individuality and for crafting the stories that emerge from the native past and folktales of the society. Collaboration-based community engagements reinforce shared values and ambitions, enable communication across various sectors, and help foster a stronger sense of belonging, community empowerment, and long-lasting ownership (Duxbury et al., 2020).

2.6 Global Tourism's Socio-Economic Influence

In the modern world, global tourism greatly influences society, the global economy, and the environment. As a result, all of these three sustainable elements are connected to the expansion of the tourism business. Achieving sustainable growth of tourism, it is crucial to examine the distinctive natures of approaches that exist in global economics, community advancement and practical processes (Agyeiwaah et al., 2017; Madhavan & Rastogi, 2013). It focuses on interaction, sharing business results and complementing each other to place businesses and geographical facilities in the network, one of which is organized into engaged clusters, and its importance grows. It is projected that the developments would result in worldwide breakthroughs, which might change how the industry is run under effective corporate organizations that specify ideas, give them modest advantages, and also present new prospects in tourism (Agyeiwaah et al., 2017). Consequently, topics related to sustainable tourism growth are associated with competitiveness, resulting in increased innovation across every sector that is critical to business operations. Additionally, it is mentioned that the tourism industry is unique in its enormous diversity, integrity, and multifaceted approach. A strong relationship between the structural factors that affect tourism particularly leads to the assumption that tourism service providers will work with each other to improve the tourism industry (Madhavan & Rastogi, 2013).

2.7 Global Tourism Industry's Economic Significance

Important economic sectors in various advanced countries have been known for tourism. Travel and tourism sector report (WTTC, 2020) exceeded by more than 3.9% in 2018, more than 3.2% annual growth average of the global economy for eight years in a row. The governments along with travel sector generates one in five jobs in last five years. Consequently, tourism is the foremost world's economic division, contributing 319 million jobs globally and 10.4% to worldwide GDP. Although global tourism depends heavily on a healthy environment and good health, too often, working together has harmful results. Accordingly, environmental concerns and more consideration should be given to enhancing tourism, as extensively discussed in various publications. (Lu & Nepal, 2009; Pjerotic et al., 2017; Waligo et al., 2013; Zaman et al., 2023).

2.8 Challenges in Sustainable Tourism Adoption

Sustainable development and tourism are increasing popularity, although neither the tourism industry's service providers nor the actual tourists have fully adopted the practices. For example, systematic education of businesses, consumers, and other stakeholders is

needed to become sustainable and responsible tourism (Streimikiene et al., 2021; Zaman et al., 2023). Focusing on specific consumers such as disabled and older people as well as green tourist services, it brings new perspectives on the development of sustainable tourism in relation to goods and facilities. Over the past two decades, travel has become more accessible as a result of globalization, especially for people with average living conditions, making tourism the most demanding industry. One effect that tourist services have on host locations is the local ecology, local communities, and production of work opportunities. Tourism must endorse sustainable buying ways in order to maintain the lasting vastness of destinations (Streimikiene et al., 2021).

It is commonly acknowledged that sustainable tourism includes sustainable consumerism. Since tourists are now observing sustainable tourism facilities and accountable usage, they are eagerly choosing the packages of sustainable tourism services given by various tourism companies. Recent research emphasizes the supportable usage practices, emerging travel industry facilities regarding disabled, older people, and concentrating on sustainable advancement priorities of tourist destinations. It is possible that competition, ecological issues, and social matters regarding sustainable tourism expansion can be considered altogether (Streimikiene et al., 2021).

2.9 Significance of Sustainable and Regenerative Tourism

In reality, compared to other sectors, the quantity of CO₂ discharges from the tourism industry, as well as transportation, including the rapid rise of tourists, makes it a major addition to changing weather (Bows et al., 2009). A 30-year forecast model was initially developed by Peeters and Dubois (2010) using publication lists developed for 2005. The steps they took to reduce CO₂ emissions through their own technological advancement were not enough. Future travel systems will not be able to significantly reduce CO₂ emissions to avert severe climate change without significant changes (Hui et al., 2023). In other words, there has to be a drastic change in the destinations and the mode of transportation (Koo, Anjam & Zaman, 2022; Peeters and Dubois, 2010).

The study of tourism has placed a significant emphasis on sustainability (also known as sustainable development) since the late 1980s (Kolaventi et al., 2019) (Hall, 2010). During this period, the idea of "alternative tourism," evolved which connects tourism activities with the environment, was introduced and developed (Aall, 2014). The Sustainable Development Agenda 21 (Agenda 21) of the United Nations (UN) was approved during the Rio Conference in 1992. The UNWTO then expressed their viewpoints on sustainable travel. UNWTO, the World Travel & Tourism Council (WTTC), and the Earth Council (EC) collaborated to issue and create a unique Agenda 21 for tourism in 1996. Following the release of this statement, the World Ecotourism Summit in 2002 saw Quebec Declaration referring "Ecotourism," Davos Declaration on "Climate Change and Tourism Responding to Global Challenges" followed in 2007. The Rio+20 result paper "The Future We Want" up to that conference's 2012 iteration heavily emphasized the contribution of

tourism in relation to the establishment of a green economy of long-term sustainability and the eradication of poverty. Although there are many stakeholders in the tourism sector, including supporters, businesses, and visitors, there are currently few scholars who are interested in sustainable tourism (Buckley, 2012; Lopes et al., 2021).

The UNWTO proposed that tourism should be built upon five key pillars on which tourism may stand in order to create a lifelong involvement in achieving sustainable expansion, paying particular attention to “the Sustainable Development Goals” (SDGs) and the wider 2030 Development Agenda (UNWTO, 2017, 2014): (i) economic growth that is inclusive and sustainable and connected to SDGs 8, 9, 10, and 17; (ii) “resource efficiency”, “environmental protection”, “climate change”, associated to SDGs 6, 7, 8, 11, 12, 13, 14, and 15; (iii) heritage, aesthetic habits and distinctiveness, related to SDGs 8, 11, and 12; (iv) peace, mutual understanding and security, which are connected to SDGs 18. The role of the travel industry in the UN Millennium Development Goals, including eradicating poverty, was reviewed by Saarinen and Rogerson in 2013 (Uche et al., 2024; UNWTO, 2017). The application of sustainable tourism may be viewed as a green strategy, particularly in developing nations, to address issues of employment, economic diversity, and poverty (Hoxie et al., 2012). It is reported that the global tourism sector contributed 47% to developing nations' economies in 2011 and, in an optimistic scenario, 57% by 2030, which equates to more than one billion foreign visitor visits (UNWTO, 2005). It is essential to meticulously examine current developments and emerging trends remaining in the circle of sustainable tourism with the intention of promoting future studies, fresh ideas and activities (UNWTO, 2017).

3. Research Methodology

The visualization review of a specific knowledge area was achieved by the study and application of the scientometric analysis technique. The Web of Science database includes published literature on sustainable tourism, sustainable travel, regenerative tourism and regenerative travel from January 1966 to December 2023 for the scientometric analysis. Web of science is considered as the largest rigorous database in the world. It indexes journals and articles that are the highest quality journals in a particular field (Nghiem et al., 2020; Song et al., 2016). The purpose of the research was to take note of all the published literature in the top journals; therefore, there was a need to gather as much as possible of all the published literature on sustainable tourism. To achieve this goal, the literature search was divided into two sections. First, the literature search was conducted using the following keywords: "sustainable travel or “stainable travel" in the “title of the publication” AND "Regenerative Tourism”, or "Regenerative Travel” are TITLE-ABS-KEY terms. Examination recovered 3850 written data, including 2377 documents, 602 proceeding papers searches, 259 book chapters, 195 book reviews, 154 editorial material, 91 early access documents, 23 books, 80 review articles, 12 meeting abstracts, and others (as shown in Figure 1). Of the 3850 documents, 1410 were published in journals that were indexed in the Social Sciences Citation Index (SSCI), 965 documents were indexed in the

Emerging Sources Citation Index (ESCI), 707 were Science Citation Index Expanded (SCI-Expanded), and 443 were indexed in conference proceedings citation index- social sciences & humanities (CPCI-SSH), the remaining documents were indexed in Book citation index – social sciences & humanities (SCI-Expanded), book citation index (BKCI), Arts & humanities citation index (A&HCI) etc.

The second phase included the deletion of useless data by a manual screening process. The 3450 publications on tourism led to further study, which met the inclusion principles (as shown in Figure 2). A sample of literature was collected, and a scientometric analysis was used. Advancements in technology have made it possible to utilize modern approaches to analyze scientometrics. VOS-viewer was used for map generation because they work in large systems and are exceptional by having text mining features (Mabey et al., 2020). Several scholars at present use VOS-viewer and Cite-Space to produce scientific maps of sustainable tourism (Borges-Tiago et al., 2022; Fang et al., 2018). The researchers recommend the utilization of these software for scientometric research in a vast range of areas (Pestana et al., 2020; Yu et al., 2019; Zhang et al., 2015).

Scientometric analysis is excellent for this research since it allows for systematic and unbiased analysis of large amounts of bibliometric data. This strategy helps identify sustainable and regenerative tourism patterns, study domains, and authors. Scientometric analysis creates research network maps using complex algorithms and visualisation tools, unlike literature reviews (Pestana et al., 2020; Yu et al., 2019; Zhang et al., 2015). This helps identify hidden patterns and themes. The Web of Science (WoS) was chosen over Scopus because of its strict indexing criteria, which ensure peer-reviewed, high-quality publications, and its comprehensive social science and humanities coverage. The decision was made because the Web of Science is an ideal database source for interdisciplinary tourist studies (Nghiem et al., 2020; Song et al., 2016).

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Figure 1: Documents by Type

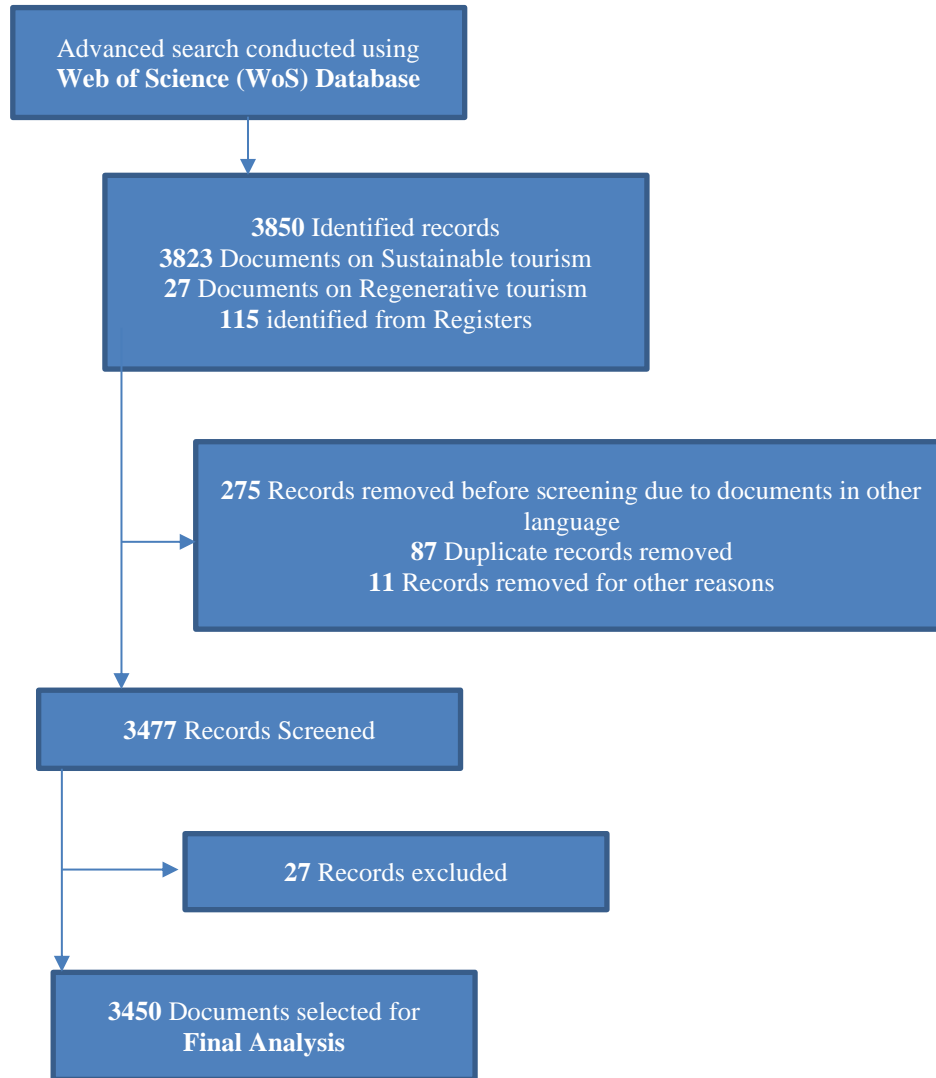


Figure 2: Documents by Selection Criteria

Concepts of relational analysis in studies were shown utilizing the proximity analysis approach. This procedure shows the interaction of certain points and the fellow neighboring. "Concept matrix" and a group relating terms suggesting great sense can be approached by this method. VOS-viewer software having "text mining capabilities was

used to design a co-occurrence network of related terms recovered from an amount of scientific literature. Examination of 3434 documents was done from 7 different angles, with “co-authorship, co-occurring keywords, sources/ journals, article citations, locations, documents by affiliation, and funding sponsor”. The core element for preceding the study is these 7 essentials. Reviewing articles is the main source of knowledge for writing and publishing research on sustainable tourism. (Ganbat et al., 2018). Important variables of key research are the greatest number of citations, years of publication and authors with the most citation and funding ways (Li et al., 2017).

4. Results

4.1 Documents by Publication Year

There were 3450 papers published between 1966 and 2023, according to the sequential arrangement of the data (as indicated in Figure 3). The year 2021 saw the most publications—381—followed by 2019 with 345 and 2020 with 332. In 2013, at least 163 documents were published.

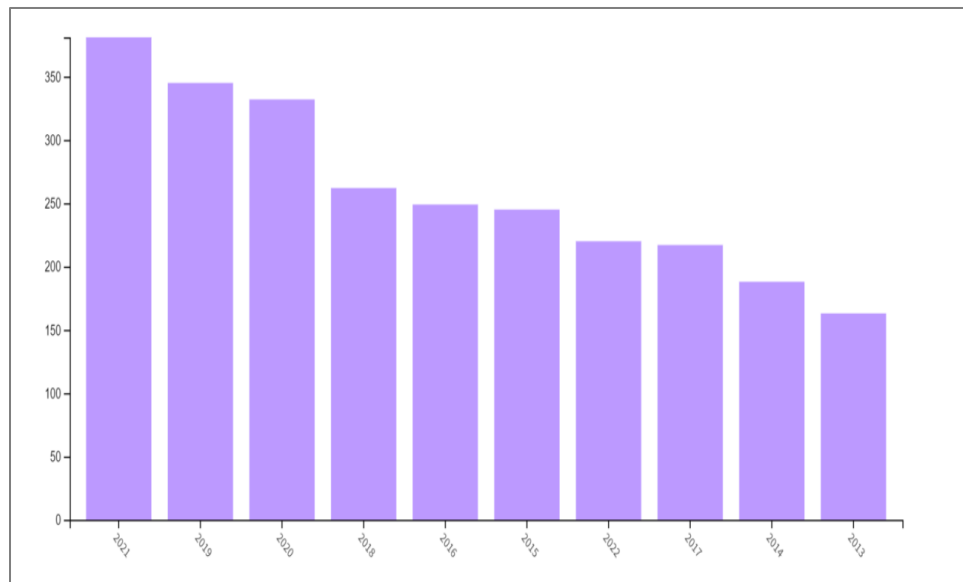


Figure 3: Documents by Publication Year

4.2 Documents by Subject Area

The documents are presented according to the Web of Science (WoS) subject categories (as in Figure 4). The most 1536 documents were from the field of “hospitality leisure sport tourism”, 826 belonged to green sustainable science technology researches, 711 were in the field of environmental studies, 630 were from environmental sciences, and 334 were

from the field of management, as per web of science indexed subject area categorization. The total number of articles referring to Figure 4 is more than the total of 3450 documented data retrieved. It is due to the overlapping of published studies which were interdisciplinary or multidisciplinary in nature.



Figure 4: Documents by Subject Area

4.3 Top Author's Contribution

The citations received on the research articles is utilized as a metric access to the impact on a particular field (Saez et al., 2013). "Type of analysis" was agreed as "bibliographic coupling" and "unit of analysis" as "author" in order to identify the most productive author in the VOS-viewer. To determine the most cited author, the "type of analysis" was set as "citation" and "unit of analysis" as "author". The minimum criteria for authors were kept at 5, and only 72 out of 7052 writers were able to meet the threshold in the list of the most productive authors. When it comes to the information that was searched for in the Web of Science database, the article writers who have the highest number of citations and papers published are displayed in Figure 5 and Figure 6, as well as Table 1 and Table 2, respectively.

Five top authors, depending on the number of published articles, are 'Zelenk, Josef' (25 publications), 'Paskova, Martina' (25 publication), 'Hall, C. Michael' (19), 'Bramwell,

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Bill’ (19 publications), Kusova, Drahomira, and Tesitel, Jan (14 each). Hall, C. Michael tops the list of authors with 12821 citations, followed by ‘Bramwell, Bill’ with 984 citations and ‘Ruhanen, Lisa’ with 640 citations. (Table 2, Figure 6).

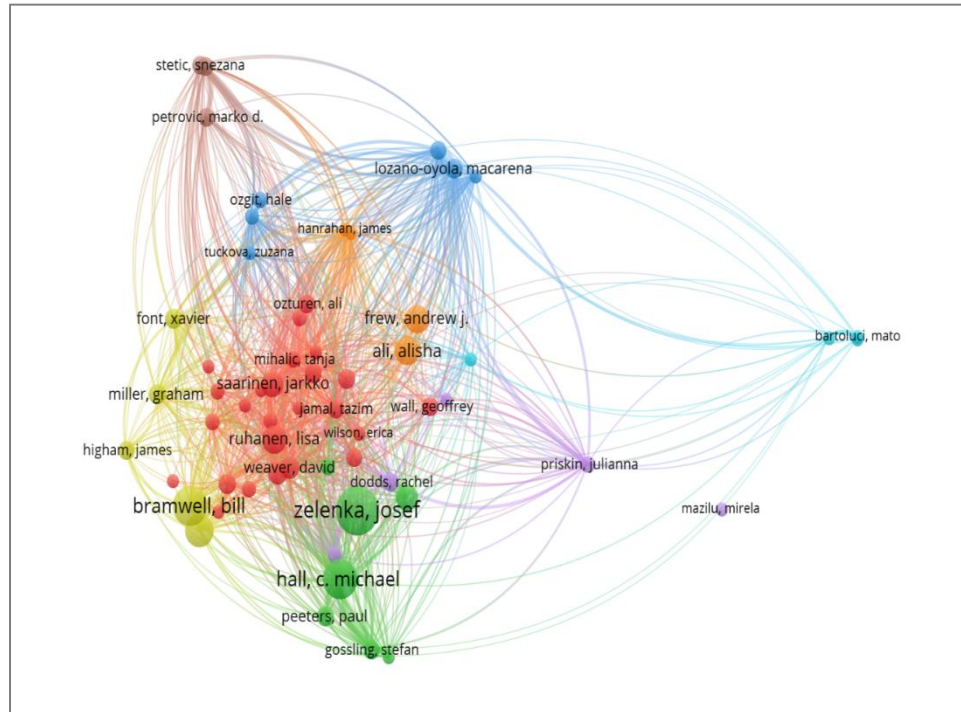


Figure 5: Top Contributing Authors

Table 1: Most Productive Authors in Sustainable Tourism

Authors	Documents	Citation	Total Link Strength
Zelenk, Josef	25	3	13
Paskova, Martina	25	0	0
Hall, C. Michael	19	1281	3710
Bramwell, Bill	19	984	1921
Kusova, Drahomira	14	0	0
Tesitel, Jan	14	0	0
Ruhanen, Lisa	12	640	2767
Saarinen, Jarko	11	242	2940

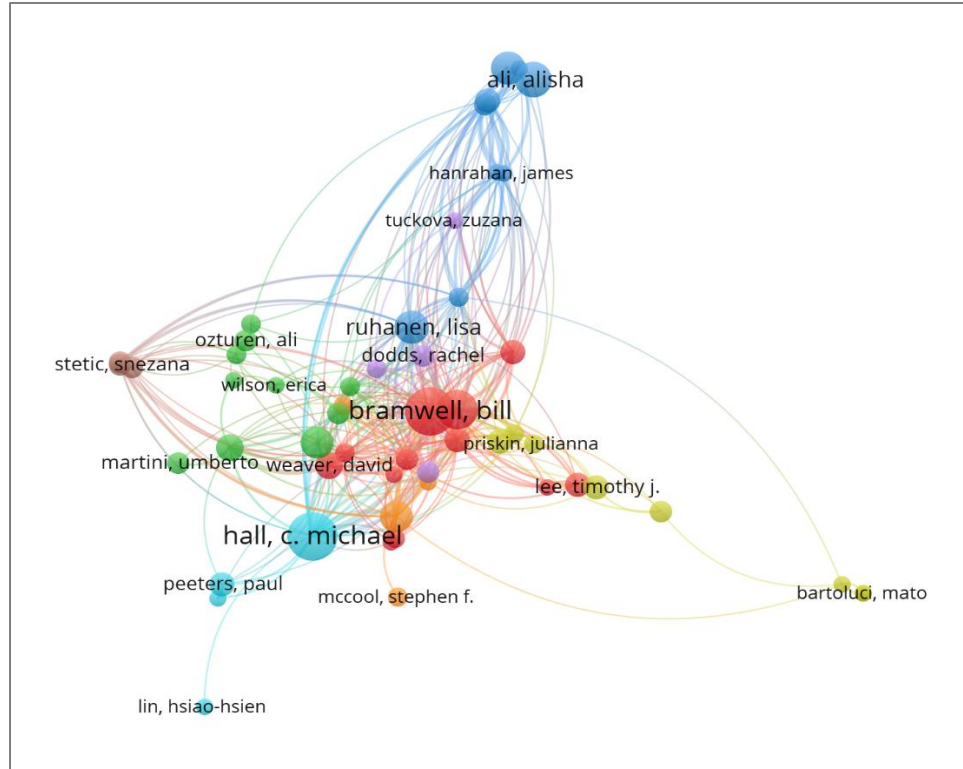


Figure 6: Most Cited Authors

Table 2: Most Cited Authors in Sustainable Tourism

Authors	Documents	Citation	Total Link Strength
Hall, C. Michael	19	12821	134
Bramwell, Bill	19	984	149
Ruhanen, Lisa	12	640	97
Lane, Bernard	15	603	120
Miller, Graham	8	541	87
Lozano-Oyola, Macarena	8	450	109
Jamal, Tazim	7	417	31
Higgins-Desbiolles, Freya	6	396	31
Javier Blancas, Francisco	7	367	106
Scout, Daniel	5	351	39

4.4 Co-authorship Pattern

There were 7052 authors who participated out of 3450 papers that were published between 1966 and 2023. Seventy-two authors out of seven hundred and fifty-two writers meet the criterion for co-authorship by having a minimum of five current study publications. According to the findings of the co-authorship analysis, Hall and Michael have collaborated on 19 documents, which have received a total of 1281 citations. Following them are Bramwell and Bill, who have also contributed 19 documents, with 984 citations, and Lane and Bernard, who have contributed 15 documents and 603 citations. The patterns of co-authorship are displayed through the color schemes. Weaver and David, Hall and Michael, and Dwyer and Larry are the authors of research articles on co-authorship, and the color green indicates where they are located. As can be seen in Figure 7 and Table 3, the color blue indicates that Priskin and Julianna, Dodds and Rachel, and Carlo Aall had limited contributions to the co-authored articles.

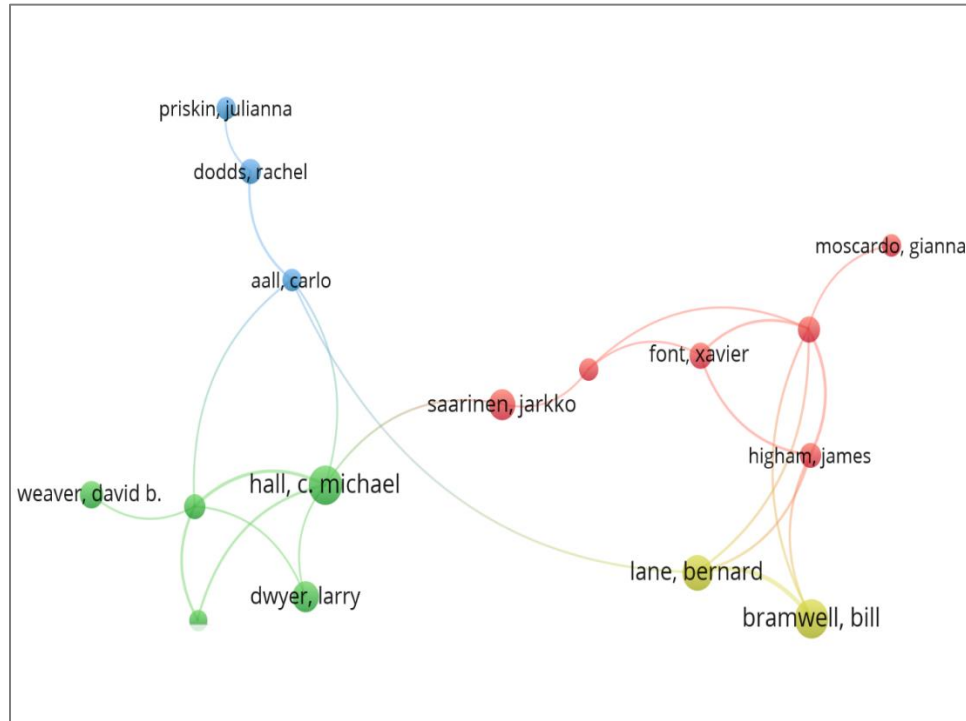


Figure 7: Co-Authorship Patterns

Table 3: Co-Authorship Patterns

Authors	Documents	Citations	Total Link Strength
Hall, C. Michael	19	1281	9
Bramwell, Bill	19	984	14
Lane, Bernard	15	603	15
Miller, Graham	8	450	12
Jamal, Tazim	7	417	2
Scott, Daniel	5	351	5

4.5 Top Cited Articles

The impact of a research journal on a particular research field might reflect the amount of citations received. In this study, research papers with the most citations are known as milestones. To study citations-based documentation ‘Citation’ was set as ‘analysis type’ and ‘analysis of unit’ as ‘document’. To be considered, a document has to have at least 50 citations. Out of 3450 documents, only 202 met the threshold of at least having 50 citations (Table 4).

Visualization of the most cited author on the topic of this study shows a high number of linked study articles referring to citation, and density of connected articles (as in Figure 8). The Buckley article published in year 2012 received the most 482 citations, followed by Hunter publication in 1997 received 399 citations, and Miller publication in year 2001 received 328 citations, and in the year 2010 received 245 citations. The Bramwell publication in the year 2011 received 316 citations (Figure 8, Table 4).

Table 4: Most Cited Documents in Sustainable Tourism

Bibliographic Information	Citation	Total Link Strength
Buckley, R. (2012). Sustainable tourism: Research and reality. <i>Annals of tourism research</i> , 39(2), 528-546.	482	37
Hunter, C. (1997). Sustainable tourism as an adaptive paradigm. <i>Annals of tourism research</i> , 24(4), 850-867.	399	22
Miller, G. (2001). The development of indicators for sustainable tourism: results of a Delphi survey of tourism researchers. <i>Tourism management</i> , 22(4), 351-362.	328	20
Bramwell, B., & Lane, B. (2011). Critical research on the governance of tourism and sustainability. <i>Journal of Sustainable Tourism</i> , 19(4-5), 411-421.	316	10
Waligo, V. M., Clarke, J., & Hawkins, R. (2013). Implementing sustainable tourism: A multi-stakeholder involvement management framework. <i>Tourism management</i> , 36, 342-353.	251	12
Miller, G., Rathouse, K., Scarles, C., Holmes, K., & Tribe, J. (2010). Public understanding of sustainable tourism. <i>Annals of tourism research</i> , 37(3), 627-645.	245	12
Lu, J., & Nepal, S. K. (2009). Sustainable tourism research: An analysis of papers published in the Journal of Sustainable Tourism. <i>Journal of sustainable Tourism</i> , 17(1), 5-16.	196	14

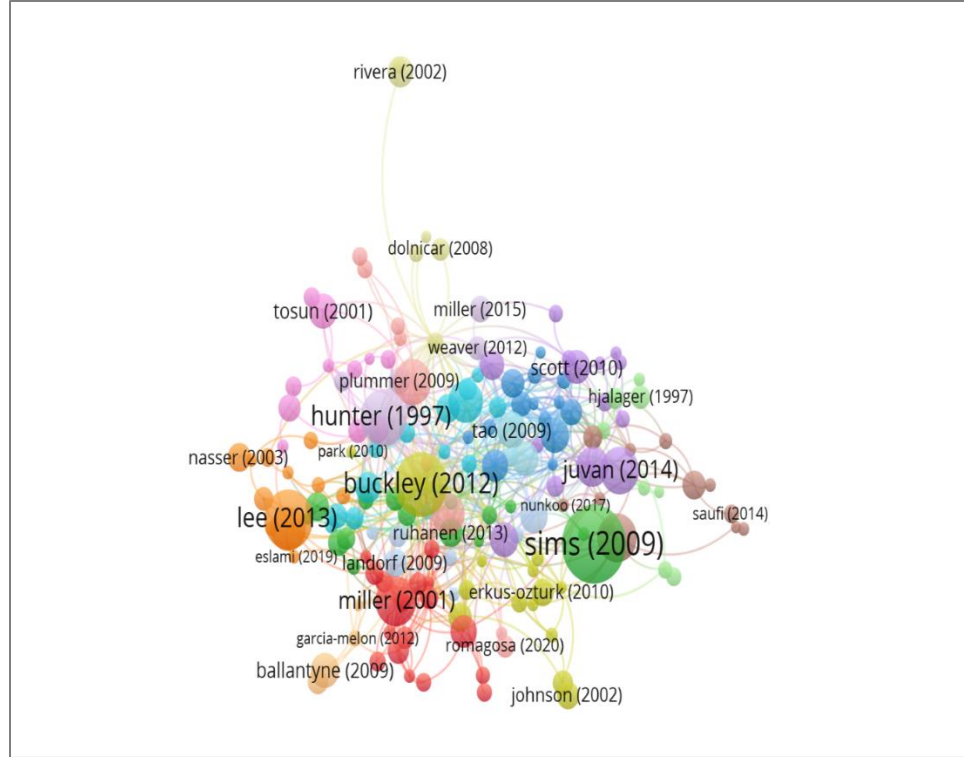


Figure 8: Top Cited Articles in Sustainable Tourism

4.6 Top Contributing Countries

In today's scientific field, over time, some countries have contributed more than others. A visual grid was made to allow article-reading persons to see the dedication of the county to sustainable tourism. In this study, the place of the country is shown as "unit of analysis" and "bibliographic coupling" as "type of analysis." The least count of 5 was decided for all the production of studies on sustainable tourism for each country. According to the current study, countries with the most publications and citations are shown (as shown in Figure 9 and Table 5). Overall, authors from 132 countries contributed publications in the field of sustainable travel. However, only 79 countries met the thresholds of a minimum number of five documents of a country. Of the 79 countries that published research papers, only 29 countries made more contributions, with 50 research studies on sustainable tourism. The top three articles from the most researched articles were China, United States and United Kingdom, with 384,289 and 266 articles, respectively (Figure 9, Table 5).

The following countries have received the highest number of citations for research papers: Australia, which has received the most (7399 citations), followed by England (5937 citations), and the United States of America (5306 citations). With a total of 2465 citations, China has received the most documents, totaling 384. A significant number of high citations, publications published, and connections are evidence that the nation is interested in the research that is currently being conducted. The overall power of the relationship is a reflection of the interest that other countries have in the research conducted by the particular country. Australia has the highest link strength, with a total of 134171, followed by the United States of America with 114146 and China with 109252. The conclusion is that these nations had a substantial influence on the development of environmentally responsible tourism (Figure 10, Table 5). According to the density chart, countries that have a greater number of articles published have a somewhat higher density. Through the use of the graphical illustration (Table 5, Figure 9 and 10), researchers from the nations that are participating in the research will be directed in the process of preparing scientific collaborations, producing reports of joint ventures, and exchanging advanced methods and concepts.

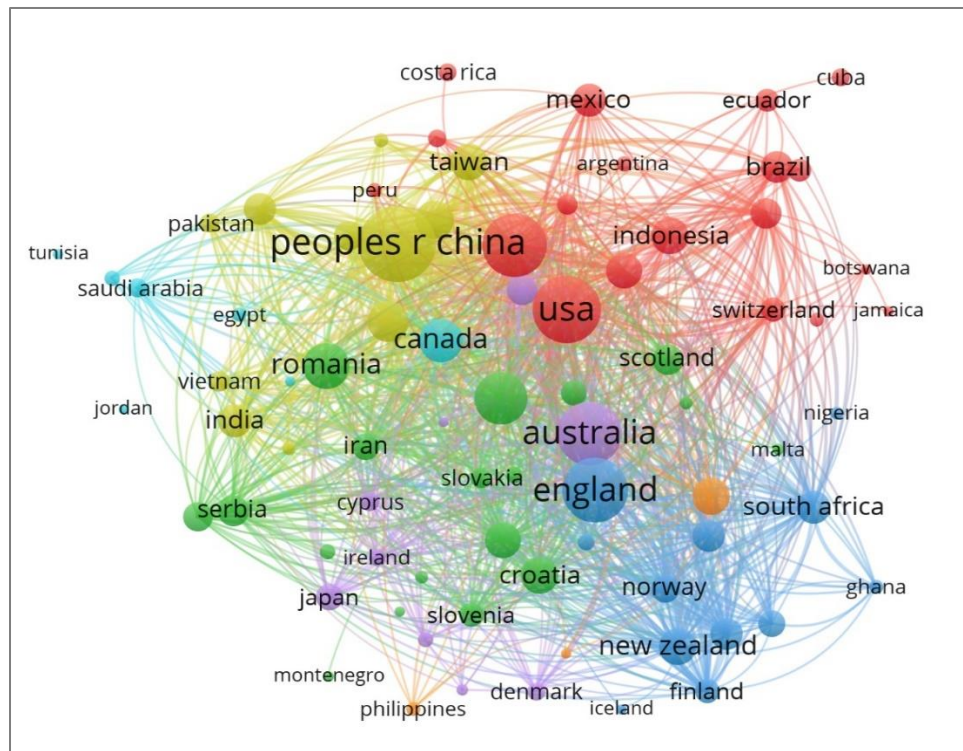


Figure 9: Top Contributing Countries in Sustainable Tourism

Table 5: Top Contributing Countries

Country	Documents	Citations	Total Link Strength
Australia	255	7399	2343
England	266	5937	1926
USA	289	5306	1610
Spain	255	3102	1432
China	384	2465	1234
New Zealand	82	2314	920
Italy	166	1655	887
Canada	111	2765	824

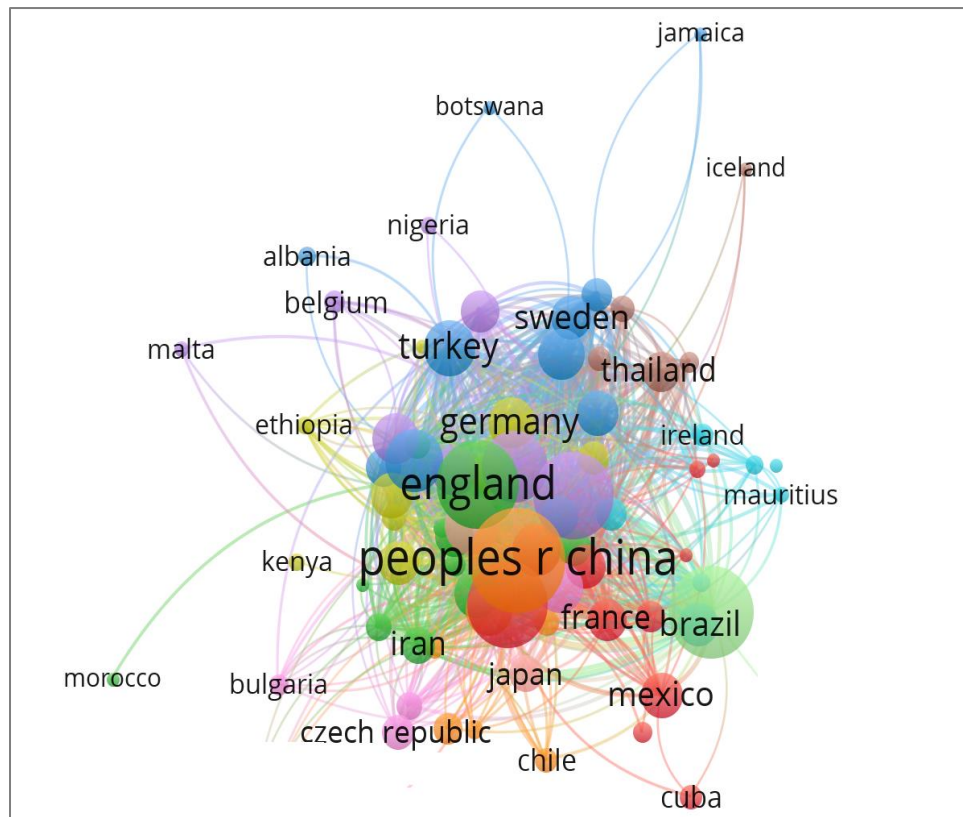


Figure 10: Top Countries with Highest Citations in Sustainable Tourism

4.7 Sources of Top Publications

The map for publication sources was prepared using the VOS-viewer. The source of the publication helped as "analysis unit" and "analysis type" was "bibliographic coupling". In analysis, least count for publications to publish was 5, and of the total 1115 documents, 119 documents met the threshold (Figure 11). Table 5 displays 'top sources/journals' having all together their count of citation and link strength and the least of 5 articles on sustainable tourism. With 349 published articles, "Sustainability" is the top source in relation to articles publication in sustainable tourism, followed by "Journal of Sustainable Tourism" with 240 documents, "Tourism Management" with 85 documents, "Worldwide Hospitality and Tourism Themes" with 58 publications, and "Annals of Tourism Research" with 56 publications.

Figure 11 shows the journal's representation network, with less than five research papers to be seen in a journal. Amount of articles in the journal is determined by the size of the node, and the larger sized node, greater involvement in the count of article. "Sustainability", "Journal of Sustainable Tourism" and "Tourism Management" shows higher impact on the existing studies articles indicating large node size. In addition, nodes (sources/journals) of the same color specify a cluster of interacted journals found by the use of VOS-viewer analysis. The red, green, blue, and yellow colors show for detected clusters accordingly.

The number of researches that are shared in relation to the existing field can be determined by linking research sources with each other. Additionally, the link strength provides an indication of the number of times two different journals are cited within the same article. The cluster demonstrates that nodes that are located in close proximity to one another are more powerful than nodes that are located further apart. As an illustration, "Tourism Management" has a stronger connection to "Annals of Tourism Research," and "Sustainability" has a stronger relationship with "Tourism Management," "Land," and "Annals of Tourism Research" (Figure 11). Both of these connections occur when other concepts are associated with one another.

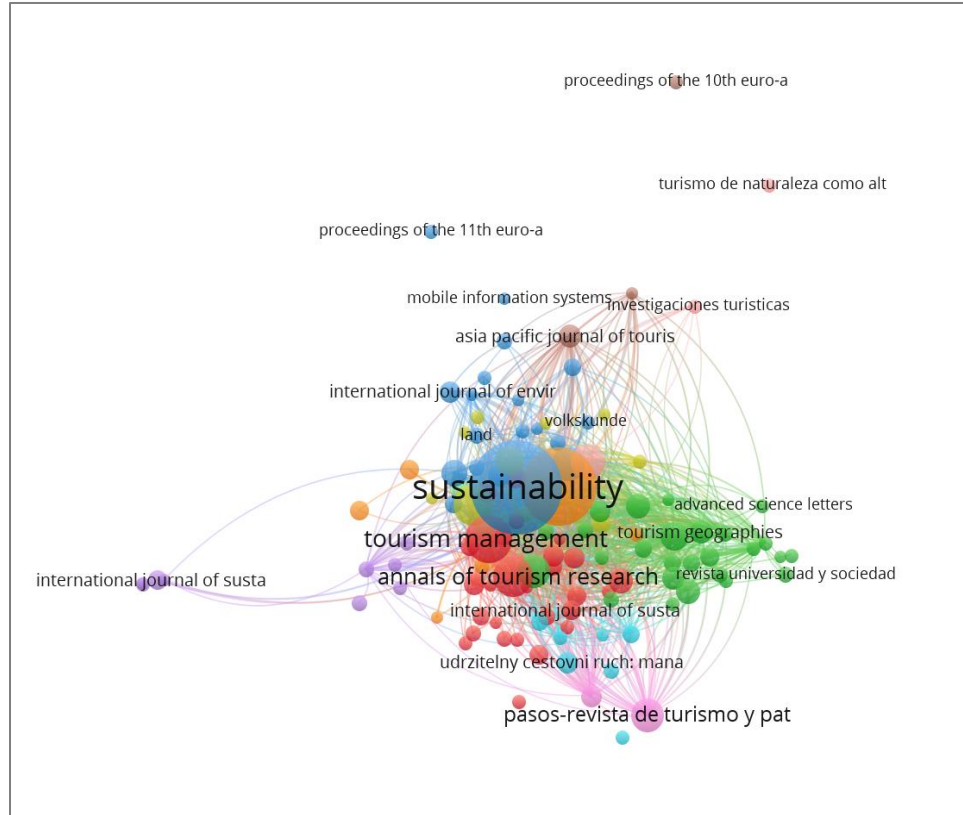


Figure 11: Top Publication Source

4.8 Mostly Used Keywords

Keywords provide the main ideas in studies, indicating by what means the core study subjects have altered gradually. Figure 12 indicates the keyword co-occurrence network, which has 3450 nodes. Report availability was accessible for the 10 years from 1966 through 2023. The nodes in this network indicate terms that appeared more than five times in each of the 3450 documents that were chosen for this research. It indicates how the core study themes have altered over time. Figure 12 shows the keyword co-occurrence network, which comprises of 3450 nodes. The report is available from 1966 through 2023, with a time slice of 10 years. The words that appeared more than 5 times in 3450 researches were decided to be studied and shown as the nodes in the network. Keyword’s magnitude is recognized by its frequency. Prominent keywords contain ‘sustainable tourism’ (occurrences: 740 times, link strength= 1592)’ ‘sustainable development’ (occurrence: 504

times: link strength=897’, ‘tourism’ (occurrences: 399 times, link strength=870), ‘sustainability’ (occurrences: 345 times: link strength=820; ‘management’ (occurrences: 300 times; link strength 1108). The other commonly used keywords were: perceptions (occurrences: 138 times), attitudes (occurrences: 121 times), ecotourism (occurrences: 162 times), indicators (occurrences: 141 times), impact (occurrences: 142 times), governance (occurrences: 115 times), and rural tourism (occurrences: 166 times), etc. Keywords frequency of these is significantly more than those of other keywords, affecting how related keywords in Figure 8 are perceived (the relationship between a keyword's size and frequency) (Figure 12).

The terms that occurred more indicate the magnitude of the work that has been done in that area. For instance, the volume of the research studies on the perceptions, attitudes, impact, ecotourism, indicators, governance, and rural tourism is higher than the work on policy, satisfaction, conservation, and modeling (Figure 12).

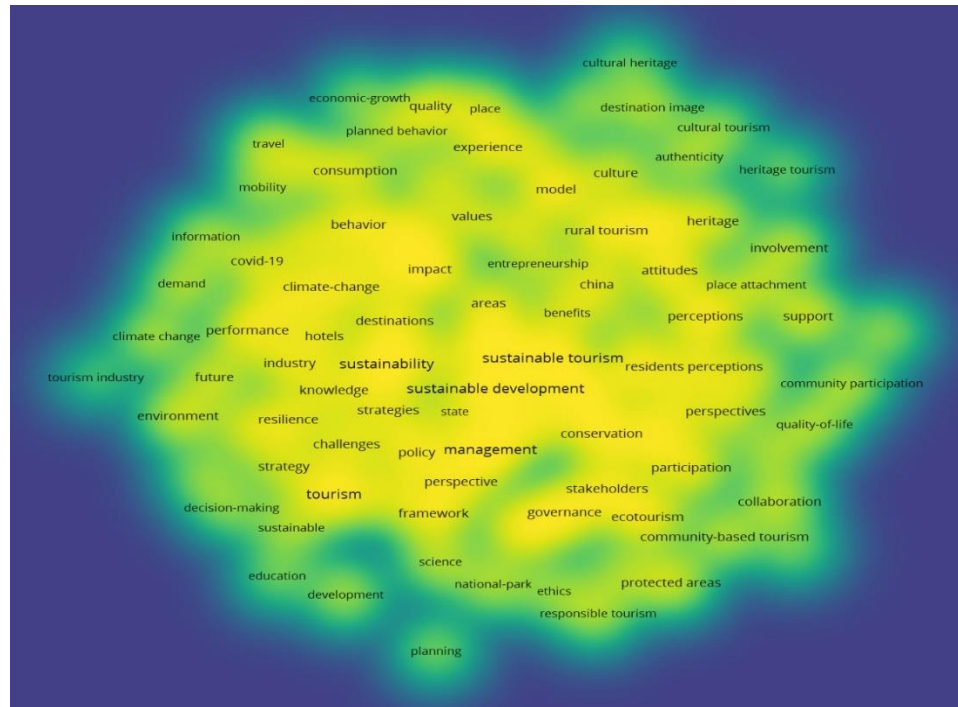


Figure 12: Keywords Density Visualization

4.9 Documents from Funding Sponsors

Figure 13 represents the documents from the funding sources. The 45 published studies were sponsored by “National Natural Science Foundation of China, 39 studies were

sponsored by the European Commission, 10 studies were sponsored by the Ministry of Science and Technology Taiwan, and 10 were sponsored by the UK Research Innovation.



Figure 13: Documents by Funding Sponsors

4.10 Documents by Affiliations

The authors from the 2916 organizations contributed to sustainable tourism. The inclusion criteria for organizational analysis were that less than 5 files of a company should be published. Of the 2916 organizations, 210 meet the thresholds. The Griffith University, with 61 documents and 2005 citations, were the most productive organization with a large number of link strength of 25771, followed by Sheffield Hallam University with 34 publications and 934 citations; the University of Johannesburg, with 32 documents and 744 citations with second-highest total link strength 23293, and University of Queensland with 32 documents, 803 citations and 10843 total link strength (as shown in Figure 14).

Scientometric Analysis of 'Sustainable versus Regenerative' Tourism

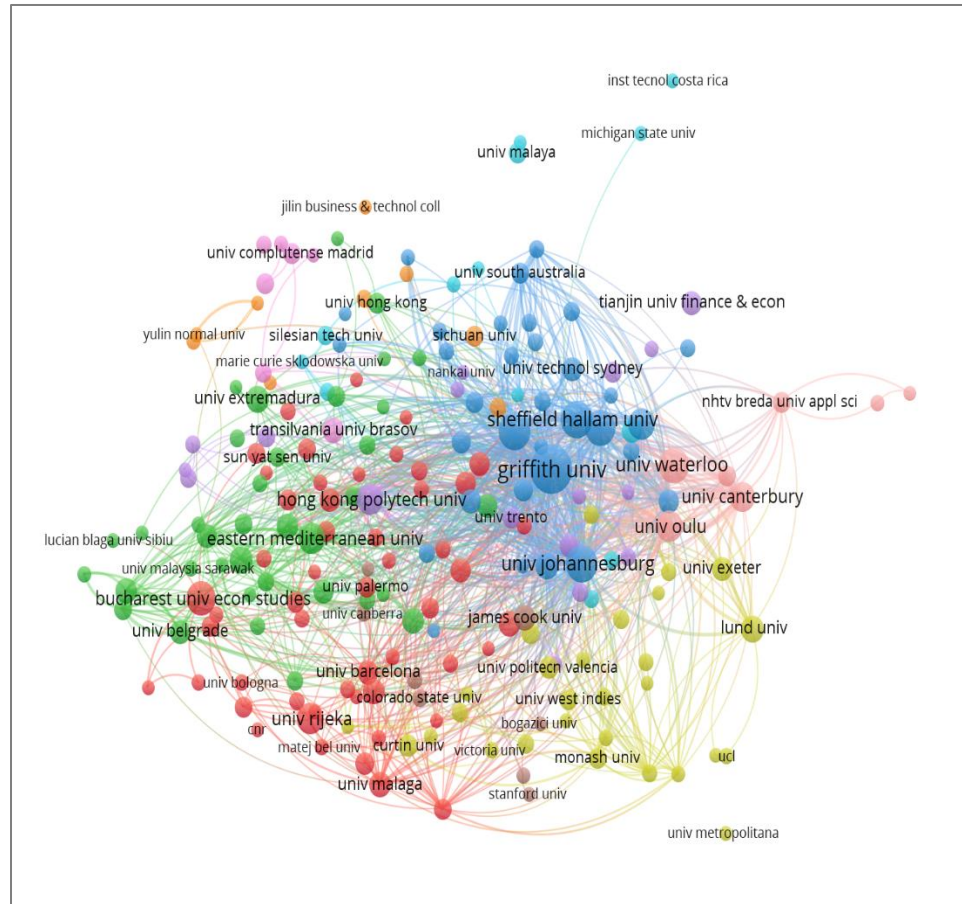


Figure 14: Documents by Affiliations

4.11 Findings related to Regenerative Tourism

Surprisingly, only 27 documents were found on 'regenerative tourism (21 documents), and 'regenerative travel' (6 documents) which were published from 1966 to 2023 in the Web of Science-indexed journals. Of the 27 documents, 13 documents were published recently in 2023, three articles in 2021, two articles in 2020, one article each in a years 2017, 2007 and 2000. Of the 27 documents, 19 were full-text articles, 02 were preceding papers, only one was editorial material.

A research article by Cave et al., (2020) on the title "Regenerative tourism needs diverse economic practices" published in the *Tourism Geographies* was the most cited research paper in the area of regenerative tourism with 61 citations, followed by a research article by "Duxbury et al., (2020) on the title "Creative tourism development models towards

sustainable and regenerative tourism” published in the Sustainability journal that received 18 citations. Bellato and Loretta were the best creative authors in the area of regenerative tourism with 03 published articles, followed by Cave, Jenny; Grantzeskaki, Niki; Ateljevic, Irena, and Booske, John H, with 02 publications each.

The most 15 research papers were from the studied area of “hospitality leisure sport tourism”, and two studies each published in the “environmental studies”, “green sustainable technology”, and “urban studies” according to web of science subject categories. Most 10 research papers were published in the “Journal of Tourism Future” a journal by Emerald Publishing.

4.12 Results Summary

In summary, this research has found that WoS has 3,850 documents indexed from 1966 to 2023. This indicates a huge increase in sustainable tourism articles during 2019. Co-authorship analysis showed that Hall and Michael were the most cited and Zelenk and Paskova the most prolific. Many materials were from "hospitality leisure sport tourism" and "green sustainable science technology." Buckley's 2012 essay had the most citations, with terms relating to sustainable tourist expansion and administration prevalent. The publication in "Sustainability" journal had the most influence, while China, the US, and England contributed the most. The study suggested more research into regenerative tourism, which has not been well studied (Zaman et al., 2023).

5. Discussion

The achievement of environmental sustainability and economic viability, including ethical and social equality, in sustainable tourism attempts to reduce the negative impact of tourism on society, the environment, and the economy. A sustainable, appealing, and politically correct tourism should be established in order to be recognized internationally. Activities that promote sustainable tourism primarily address the development's social, cultural, economic, and environmental facets. Only few studies have been conducted using bibliometric and scientometric methods. For example, Fang et al. (2018) conducted a scientometric analysis to find an interaction between tourism activity and reason for changing climate in the reported literature, (Liu et al., 2019) carried out scientometric evaluation on tourism foretelling research, (Pestana et al., 2020) limited its scientific review on the published studies on senior tourism from 1998 to 2017. Yu et al. (2019) led a scientometric analysis of the published research on pro-poor tourism between 2002 and 2018. Borges-Tiago et al. (2022) led a scientometric analysis on smart tourism, and (Zhang et al., 2015) conducted a scientometric analysis covering tourism-themed research. The main database of all of these studies was utilized to retrieve the literature through the Web of Science (WoS).

The findings of the present study show a noticeable increase in sustainable tourism research outputs since 2019. This finding confirms that of earlier scientometric studies, for example

(Fang et al., 2018; Liu et al., 2019; Pestana et al., 2020; Zhang et al., 2015), that showed an increase in tourism-related research publications, demonstrating that tourism research is currently at a moment of rapid advancement and development stage, and become interdisciplinary research (Fang et al., 2018). Our findings show that the most productive journals for tourism research are "Sustainability", "Journal of Sustainable Tourism", "Tourism Management," and "Annals of Tourism Research." Our finding validates a previous study's finding (Zhang et al., 2015) that "Annals of Tourism Research" and "Tourism Management" were the topmost journals for the study of tourism. Our findings validate the findings of other studies that Griffith University (Zhang et al., 2015) and University of Queensland (Pestana et al., 2020) were among the most productive institutions in terms of publishing research papers on sustainable tourism. However, contrary to the findings of (Zhang et al., 2015), our study identified Sheffield Hallam University, and University of Johannesburg as the most productive institutions.

According to the results of our study, customer perceptions, attitudes, and behavioral intentions were the most extensively researched topics. In addition, ecotourism, sustainable tourism indicators, impact, good governance, and rural tourism were often studied during the past ten years. The results are consistent with those of other research (Liu et al., 2019; Yu et al., 2019; Zhang et al., 2015), which found that customer perceptions and behavioral intentions were among the topics that received the most citations in the tourism literature.

Study on sustainable tourism indicates China, USA and England were the top productive countries. These findings can be compared by other researchers (Fang et al., 2018; Pestana et al., 2020; Zhang et al., 2015) who reported the USA, UK and Australia as the most productive countries. Our findings also indicated that the research from Australia, USA and China had a substantial impact on sustainable tourism. The outcome of the study showed a lack of literature on regenerative tourism (Zaman et al., 2023). During the period of 1966 to 2023, only 27 documents were published in top-quality journals and of which 13 (almost 50%) documents were published in just the year 2022. This demonstrates how regenerative tourism has become one of the new areas of study and application for sustainability in the tourism industry. It places more emphasis on how tourism serves as a scheme for local sustainability and well-being than on sustainable tourism (Zaman et al., 2023).

Scientometric analysis, which systematically evaluates published literature to identify key subjects, influential authors, and emerging areas of interest, will help future scholars comprehend global sustainable and regenerative tourism trends. Expert databases like Web of Science, VOSviewer, and CiteSpace let researchers visualize and map study subjects. It helps them uncover knowledge gaps and patterns. This strategy highlights the most prolific regions, institutions, and publications and provides a more objective and data-driven assessment of the subject's evolution. The scientometric analysis implies future research will combine sustainable tourism with regenerative concepts. Avoiding harm and actively revitalizing local communities and habitats will be stressed. Interdisciplinary approaches—

combining environmental science, society, economics, and technology to solve complex problems—will be highlighted. Expect more consumer behavior, community engagement, heritage tourism, and tourism's implications on biodiversity and climate change. Data shows that sustainable tourism in underrepresented regions and non-English-speaking nations will be explored more. This should raise global understanding of sustainable and regenerative tourism (Zaman et al., 2023).

5.1 Theoretical and Practical Implications

Studying sustainable tourism provides considerable input to the knowledge by providing a detailed summary of current studies in the domain of sustainable tourism. Both academicians and practitioners can utilize the study as an interdisciplinary reference to correlate existing research topics to potential future advances. Academicians will find it easier to locate the best journals and researchers for future cooperation or publication opportunities with the help of this scientometrics study. The study also identifies possible funders and international donors that may assist with research endeavors by providing financial support as well as other working opportunities for collaboration and research of sustainable tourism. To properly know the investigation issue in sustainable tourism, the data studied will definitely aid in recognizing existing regions and trends. Practitioners can also obtain assistance implementing best practices into action and investigating other options in the tourism sector. Government can also get help in developing the proper rules and strategies to promote the expansion of sustainable tourism.

5.2 Limitations and Recommendations

The methodology used in this study to acquire the data may have an impact on the results. This is something that should be thought about. Even with the application of a scientometric data recovery technique, grouping keywords does not ensure that all pertinent papers were found. The arrangement of keywords alone is inadequate. When "green tourism" is used in place of "sustainable tourism," many people may be left out as probabilistic thinking underlies this. Results could be impacted by the database's capacity to store and retrieve massive volumes of data. The Web of Science database is smart, but it may be made better by including non-English papers and expanding the search terms available. Database coverage would increase as a result. VOSviewer groups and shows frequently occurring terms more effectively and efficiently. Though it offers no insights, this clustering displays the nodes within the groupings. Because it focuses on universal terms from many cultures, the study is vulnerable. It's uncertain if these limitations will materially affect the study's findings.

The exploratory character of scientometric analysis, which concentrates on the state of tourism research now without addressing its dynamic progress, is another drawback. Furthermore, the study is still limited in scope. Rather than doing in-depth study, the researchers employed machine learning. Due to language limitations and different paper

kinds, the investigation was limited to English-language publications. For further analysis, future research should incorporate the literature from all languages into Scopus. Future research ought to concentrate on this approach, which may offer a more comprehensive understanding of sustainable and regenerative tourism research by fixing any missed details, strengthening the study's theory, and improving the methodology. Hence, it would ultimately offer a more comprehensive and/or holistic viewpoint.

6. Conclusion

Based on the indexing of the Web of Science (WoS) databases, the number of sustainable tourism-related publications has grown dramatically since 2019. Between 1966 and 2023, a total of 3850 documents were published and indexed on the Web of Science (SCI, SSCI record). The most common sort of document, an academic research article and conference proceeding paper, were among the ten types of documents on sustainable tourism indexed in the WoS. The following conclusion is drawn from the conclusions of the study;

- I. The discoveries of co-authorship analysis concluded that Hall and Michael coauthored 19 documents, and they received 1281 citations in total. They were followed by Bramwell and Bill, who coauthored 19 documents and received 984 citations, and Lane and Bernard, who co-authored 15 documents and received 603 citations.
- II. The highly productive authors in the area of sustainable travel were 'Zelenk, Josef' and 'Paskova, Martina' with 25 publications each, 'Hall, C. Michael' and Bramwell Bill were the second on the list of top productive authors with 19 publications each, and 'Kusova, Drahomira', and 'Tesitel, Jan' shared the third place with 14 publications each. However, Hall, C. Michael was the most cited author with 12821 citations, followed by 'Bramwell, Bill' with 984 citations and 'Ruhanen, Lisa' with 640 citations.
- III. The research of the study concluded that the most documents (1536) came from the area of "hospitality leisure sport tourism," 826 came from the field of "green sustainable science technology," 711 came from the field of environmental studies, 630 came from the field of environmental sciences, and 334 came from the field of management, as per the Web of Science indexed subject area categorization.
- IV. The Buckley article, which was published in 2012, garnered the most citations (482), followed by Hunter's publication from 1997, Miller's publication from 2001, Hunter's publication from 2010, Miller's publication from 2010, and Miller's publication from 2001, which earned 328 citations.
- V. The document mostly used keywords suggest that the hot topics on sustainable tourism (1966-2023) are mainly sustainable tourism growth, and managing

sustainable tourism. Majority of the research is carried out on consumer perceptions, attitudes and behavioral intentions. Ecotourism indicators of sustainable tourism, the impact, good governance, and rural tourism were among the main areas that were researched during the last ten years. The areas that had significantly little research were heritage tourism, cultural tourism, the environment, responsible tourism, sustainable tourism education, community engagement, and community-based tourism. Therefore, the study recommends that there is a need for researchers to step forward and explore these areas of research in different populations, cultures and countries.

- VI. In all, researchers from 132 different countries have published research in the Web of Science-indexed journals referring to sustainable tourism. The number of countries with more than 50 research articles on sustainable tourism is just 29 out of 79. China, the United States, and England were the top three contributing countries, with 384, 289, and 266 research papers, respectively. Additionally, the countries that received the most number of citations for their research articles, were Australia having the highest number (7399 citations), followed by England (5937 citations), and the United States (5306 citations). China got the most papers, 384 and received 2465 citations. However, Australia, USA and China were the countries with significant findings on sustainable tourism that had a substantial influence.
- VII. The top research journals with highly published research articles on sustainable tourism is "Sustainability," with 349 articles published. Journal of Sustainable Tourism is second, with 240 documents published, and followed by "Tourism Management," with 85 documents, "Worldwide Hospitality and Tourism Themes," with 58 publications, and Annals of Tourism Research, with 56 publications.
- VIII. The "National Natural Science Foundation of China, the European Commission, the Ministry of Science and Technology Taiwan, and the UK Research Innovation were among the main funding agencies for the investigation of sustainable tourism.
- IX. All the findings concluded that authors from 2916 institutions conducted their research about the sustainable tourism industry, which is indexed in the Web of Science. The Griffith University, with 61 documents having 2005 citations was the utmost creative establishment, followed by Sheffield Hallam University, with 34 publications and 934 citations, University of Johannesburg with 32 publications and 744 citations, and University of Queensland with 32 documents, 803 citations.

- X. The conclusion of the study highlights that ‘regenerative tourism’ is still a rarely explored topic by researchers (Zaman et al., 2023). Only 27 documents were published in the Web of Science-indexed journals from 1966 to 2023. Therefore, the study recommends that there is a need to explore this area at local and international level. The study recommends two major contexts where renewing tourism can be highly beneficial: (1) the renewal of tourist destinations that have been negatively impacted by mass tourism (and addressing them); and (2) the use of tourism to revitalize a neglected community or landscape and other locations that aren’t still a popular tourist spot but strong enough to do so. Nevertheless, reformative methods might be beneficial add-ons to different contexts for sustainable tourism growth.

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