

Sustainability of Tourism and the Environment

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Abstract. The tourism sector faces many important sustainability challenges. Specific challenges to be addressed include CO₂ emissions, water consumption, landscape degradation and biodiversity loss. Environmentally sustainable tourism can be considered as a level of tourism that can be realised on the basis of a sustainable or stable environment. The aim of the work is to illustrate the compromises linked to the quest for sustainability in tourism in terms of the environment. The study uses a monographic method for mapping the theoretical frame, quantitative research methods. Bibliometric analysis of academic studies on sustainable tourism and the environment have been carried out. The author concludes that tourism is sustainable, taking full account of its current and future economic, social and environmental impacts in meeting the needs of visitors, industry, environment and business communities.

Keywords: environmental impact, sustainability, visitor behaviour.

I. INTRODUCTION

Sustainable tourism (ST) concept in its essence is based on the concept of sustainable development (SD). Historically SD has been defined in different ways [1], [2]. The SD term is comprised of two words "sustainability" and "development", which have been defined differently. Sustainability and SD usually have been viewed as synonyms, however SD is a process, while sustainability is the goal [3], [4].

In most cases the definition of SD by the Brundtland Commission, in which it is defined as development, that responds to the needs of the current generation, whilst not undermining the ability of future generations to satisfy their needs [5]. Respectively the SD aims at increasing the standard of living while not undermining the stability of environment and ecosystem. This relationship appears on the UN 2030 Agenda "Sustainable Development and its Sustainable Development Goals" (UNO Agenda for 2030 "Sustainable Development and its Sustainable Development Goals" (SDGs)), which highlighted, for

example, the dependence of the importance of air quality on water, cleanliness and hygiene [(SDG6), (SDG11), oceans (SDG 14) and terrestrial ecosystems [on terrestrial ecosystems] (SDG15) [6], [7].

Unfortunately, tourism was not mentioned in the original SD concept. The fact that tourism provides economic benefits while preserving diversity in the environment was based only at the Johannesburg World Summit in 2002 [8], because previously the ST relation with environment was focused on exclusively in UN Rio Earth Summit that was held in 1992 [9].

ST was defined as tourism that takes full account of its current and future economic, social and environmental impacts, addressing the need of visitors, the industry, the environment and host communities" per The United Nations Environment Program and World Trade Organization [10].

The relevance of sustainable tourism to climate change, ecotourism, carbon emissions, economic growth and energy consumption are topical in academic literature. Bibliometric analyses techniques for sustainable tourism have been used by researchers mainly in terms of climate [11] and ecotourism [12], but the contribution of research to sustainable tourism in terms of the environment and its problems (STE) is insufficient.

This work provides an overview of studies on how sustainable tourism is part of a sustainable environment and in itself serves as a driving force when it is balanced with the environment and those involved in the process. The study contribution is innovative in analysing 397 Scopus STE documents published during 2013-2022. This research aims to cover four Research Questions (RQ):

- RQ1: What are the STE research trends?
- RQ2: How STE is associated with other industries?
- RQ3: What countries, organizations and which researchers have more generated STE publications?

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RQ4: Who has the the highest number of documents and the most cited source?

RQ5: What problems have been identified in STE publications and how to overcome them?

II. MATERIALS AND METHODS

The study included monographic study method for framework mapping, quantitative research methods and through bibliometric analysis techniques analyzed academic studies on sustainable tourism in terms of environmental problems and compromises to address them. The data of this study are derived from the most widely recognised international database Scopus, which includes the most dedicated high-standard journals [13]. The suitable publications were allocated by using Scopus TITLE-ABS-KEY (sustainable AND tourism AND environment AND problems). Since the bibliometric analysis allows you to identify research trends over a given period, the author limited her search to ten years. The publication search restrictions were imposed to document type article (ar), conference paper (cp) and English language (“English”).

The criteria based search results including publications authors, country, institution, journals, keywords, and bibliography information was downloaded in the “CSV Excel” format. The visual map of the names resulting from these analyses and the publications quoted was obtained using the VOSviewer software [14], a tool widely used in bibliometric literature, as it is suitable for exploring large datasets [15], [16].

In order to identify environmental problems caused by tourism or its indirect effects, the texts of the articles were read and analysed on the basis of a qualitative analysis of content and a method of recursive abstraction [17], [18]. Content was collected under topics without encoding, the relevant information was re-collected based on keywords and phrases. An in-depth analysis of the text of the articles was carried out to identify problems and compromises, grouping problems by geographical breakdown (coast; islands; cities; country; parks) and social, economic and other environmental problems.

III. RESULTS AND DISCUSSION

The monographic method for theoretical framework mapping, quantitative and bibliometric analysis are based on a March 2023 dataset comprised of 726 documents. Further 397 publications published from 2013 to 2022 on the topic of STE were selected. These publications make up nearly half (54.7%) of 726 documents. Of which Articles allocate for 66.5% and Conference papers for 21.4%. After 2015, only a few articles were published on the subject of STE (Fig .1). After 2000, the number of publications on the subject of STE showed a growing trend in response to RQ1. Fig. 1 shows the trend curve with a good degree of fit ($R^2 = 75.3$).

Publications from 2015 to 2022 accounted for 72% of the amount of documents for 2013-2022, unfortunately in 2022 a decrease of 12% in number of articles compared with 2021 was observed, possibly related to the Covid pandemic [19].

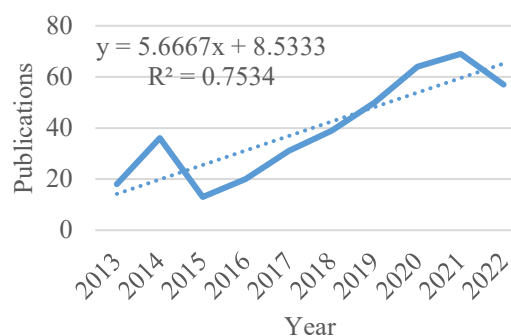


Fig. 1. Search string for sustainable tourism and environment problems.

In response to RQ2, Table 1 shows the top 10 categories with STE articles. Investment in Environmental Sciences (22.5%), followed by “Social Sciences” (15.5%) and “Earth and Planetary Sciences” (11.9%).

TABLE 1 CATEGORIES WITH THE HIGHEST NUMBER OF PAPERS ACCORDING TO SCOPUS (2013-2022)

Ranking	Category	Paper
1	Environmental Sciences	186
2	Social Sciences	128
3	Earth and Planetary Sciences	98
4	Business, Management and Accounting	90
5	Energy	69
6	Engineering	65
7	Computer Science	44
8	Agricultural and Biological Sciences	39
9	Economics, Econometrics and Fofnance	27
10	Mathemathics	15

In view of the association of the tourism sector with a large business which is energy-intensive, the number of links to engineering and computer sciences studies is still insufficient and accounts only for 7.9-10.9% of all documents by subject area.

The author analysed the STE publications most produced by countries and researchers (RQ3). Top 10 countries with STE publications: China (114); Indonesia (26); Russian Federation: (23); Spain (21); Italy (18); United States (17); Australia (14); Taiwan (14); Poland (12); India (11). Fig. 2 show clearly, that China's PR has maintained a leading position in academic research with its largest contribution to academic research in recent years. Chinese Academy of Sciences, Sichuan University and Institute of Geographical Sciences and Natural Resources Research Chinese Academy of Sciences are the three leading education institutions that hold leading positions in STE Research.

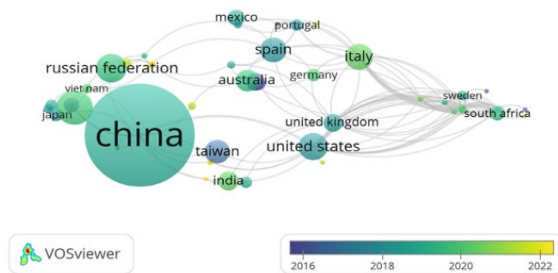


Fig. 2. Top countries with sustainability of tourism and the environment problems publications, Scopus, 2013–2022.

Chinese researcher contribution in terms of publication citations: Li, Y. cited 30 times, Wang, Y. 11, but Liu, H. 4 times.

Of the total number of 190 with a minimum number of documents of a source 5, the author selected and analysed 11 with the highest number of documents and the most quoted source (RQ4). The largest number of documents 19 is of IOP conference series: *Earth and Environment* and E3S web of conferences, while *Sustainability (Switzerland)* 11 documents and *Journal of sustainable tourism* 9 documents. The latter is with the highest number of citations – 216, *Ocean and coastal management* 216 times and in third place is the *Sustainability (Switzerland)* 125 times cited from 2013-2022.

The study analysed environmental problems and trade-offs identified in the articles for tourism (RQ5). An in-depth analysis of the text of the articles was carried out to identify problems by geographical breakdown (coast; islands; cities; fields; parks) and social, economic and other environmental problems.

Coastal environment. Suffering from the erosion caused by human behaviour: The solution is to promote better knowledge of coastal sustainability based on the results of past human actions to avoid such errors in the future. Coastal load problem: solution to create an alternative to spatial planning based on capacity building for the sustainability of the coastal zone. Lack of awareness of the main problems related to their physical functioning and the inability to resolve them, related to the complex administrative system whereby the coastal system is regulated inefficiently. Option: An integrated approach to full and efficient management of the coastal environment.

Islands. Waste treatment problem: integrated processing programme approaches and composting methods. Mass tourism: an efficiency-oriented green growth approach, proposes a unique mitigation strategy resulting from the use of natural rest.

Cities. Uncontrolled tourism development: the problem was tackled through tourism ecvinocracy. Sustainable tourism management capacity: preparing a sustainable development plan for the tourism sector.

Country. Rural areas against urbanisation. Sustainability of livelihoods: the answer is the development of rural tourism.

Parks. Lack of funding, the need to change behaviour at both national and local level of governance, challenges related to park attendance and transport: using a five-pillar system that includes economics, the environment, society, good governance and reasonable science.

Social challenges. Awareness of the growing global environmental challenges leads to changes in consumer behavior: students perceive negative demand for sustainable tourism in Slovakia. Differences of opinion between the sexes and the level of education. Social concerns: diagnosing the challenges facing local populations, offer management opportunities so to limit the impact on the environment. Educating actors and stakeholders in relation to the introduction of responsible and sustainable tourism practices. Young people's wishes to collect natural souvenirs: demarketing activities. Overcoming the traditional “business as usual” approach: setting up an effective governance framework, effectively distributing the benefits of tourism among local and key stakeholders, thereby promoting sustainability. Gray Business: Introducing a model of private accommodation. Building a private accommodation association.

Economic challenges. Conflict between the development of eco-tourism and economic benefits: a tool designed to assess the interactive effectiveness of the economy and the ecological environment.

Environmental problems. Problems with infrastructure and accessibility: The compromise is to develop a destination management model. Cooperation and coordination have been highlighted as key functions. Major consumer behaviour challenges of a sustainable environment: a systematic review and a theory perspective established in tourism and environmental psychology

On the one hand, there are reports of social vulnerability caused by excessive land use, intrusion of external crops, and air and water pollution due to traffic, accumulation of solid waste, waste water and carbon emissions, environmental and landscape degradation, tourist intervention in local society lifestyles. On the other hand, the results of the study revealed that people perceive socio-economic benefits, infrastructure development from tourism development and growth, as indicated by O.B. Baloch, et al. [20]. However, as has been identified in the analysis of the articles, there have been compromises and ways to address the environmental problems caused by tourism.

IV. CONCLUSIONS

This article uses monographic, quantitative and bibliometric methods to review relevant literature in the field of STE, clarify what compromises related to sustainability tourism in terms of the environment need to be overcome and anticipate further research.

A total of 726 articles derived from the Scopus database are being examined. Selecting the most relevant for the STE topic, with selection criteria defined by the author, tested 397 articles obtained for scientific mapping analysis. On the basis of the results of the analysis, the following conclusions have been reached:

From 2013-2022, the number of articles on the subject of STE shows a growing trend ($R^2 = 75.3$), overcoming the decline of articles due to the Covid pandemic.

The most popular articles on STE are 'Environmental Sciences', 'Social Sciences' and 'Earth and Planetary Sciences', but not enough studies with engineering and computer sciences.

In terms of number of STE documents the leading state is China, followed by Indonesia and Russian Federation. The leading three institutions in the PR education are from China: Chinese Academy of Sciences, Sichuan University and Institute of Geographical Sciences and Natural Resources Research Chinese Academy of Sciences. The Chinese scientist with the highest document citations is Li, Y., Wang, Y., and Liu, H.

The largest number of documents is IOP conference series: Earth and Environment and E3S web of conferences, and Sustainability (Switzerland). The highest citation is for Ocean and Coastal Management. The Sustainability journal (Switzerland) has been cited 125 times from 2013-2022.

The analysis of articles identified certain remedy solutions to given environmental problems caused by tourism as follows: (1) legal framework and quality standards; (2) imposing restrictions on excessive tourism; (3) promoting the preservation and protection of social cultural, historical, antique and natural resources; (4) providing budget support for the preservation of ecosystems and biodiversity; (5) an integrated approach; full and efficient environmental management; (6) changes in behaviour of tourists and local populations; (7) training of participants, including young people and all stakeholders responsible and sustainable tourism; (8) diagnosis of problems; (9) effective planning and management; (10) cooperation between all those involved in tourism, communities and organisations in sustainable tourism development.

This research indicates the insufficient focus of research activity on the topic of sustainability of tourism especially in solving the problems related to the sustainability of tourism and the environment.

The author's recommend focusing the future research on the topic of tourism and environmental sustainability whilst paying attention to the change in tourist behavior in solving environmental sustainability problems.

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