

Article

Economic Development and Mountain Tourism Research from 2010 to 2020: Bibliometric Analysis and Science Mapping Approach

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Abstract: Due to hectic city lives and the growing health concerns in light of the global pandemic, mountain tourism has become increasingly popular worldwide, which has increased the related research. Based on traditional bibliometric laws, such as those authored by Price, Bradford, Lotka, and Zipf, this study acquired 1413 mountain tourism journal articles via bibliometric analysis and identified the most influential journal articles, researchers, and countries in mountain tourism research as indexed in the Web of Science (WoS) database during 2010–2020. The keyword analysis revealed mountain tourism's emerging research topics, including climate change, sustainable development, sustainability, sustainable tourism, protected areas, rural tourism, and conservation. The most influential journal was *Sustainability* in the mountain tourism. The research results showed that China, the U.S., and Romania produced the most significant mountain tourism articles indexed in the WoS. Most developed countries in Europe had the highest average and average normalized citations, which indicated that they may have more influence in this field as compared to other countries. Some developing countries, such as India, Nepal, and China, had higher citations, average citations, and/or average normalized citations than other countries. The main research trend was the sustainable development aspect of mountain-based tourism during the COVID-19 pandemic. We identified the research gap in WoS; although there is some research shedding light on tourism via bibliometrics, mountain tourism bibliometric analysis and science mapping via VOSViewer is scarce. The paper summarizes the critical aspects of the current discussion of sustainable mountain tourism, such as transport and cooperation (i.e., combining with cooperation and competition) in mountain tourism areas. The results indicated that government agencies and destination managers need to strike a balance between sustainable mountain tourism development and environment and natural landscape conservation after COVID-19.

Keywords: mountain tourism; sustainable development; science mapping; scientometric analysis; bibliometric analysis



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1. Introduction

1.1. Ecological, Cultural, and Economic Characteristic of Mountain Tourism

The United Nations World Tourism Organization (UNWTO) (<https://www.unwto.org/news/new-covid-19-surges-keep-travel-restrictions-in-place>, accessed on 19 December 2021) has indicated that one out of five destinations continues to have their borders closed as new surges of COVID-19 impact the restart of international tourism. Therefore, mountain tourism has become a pertinent topic, considering the travel restrictions to the flatlands during the ongoing COVID-19 pandemic [1]. Mountain tourism challenge to the tourism

industry due to tourists' behavior and preferences [2]. It refers to tourist activities in mountainous environments characterized by distinct elements of the landscape, climate, wildlife, types of activities, traditions, and local communities [2,3]. Mountain-related attributes and socio-cultural environment enhance mountain tourism's attractiveness to prospective tourists [4,5]. The unique natural environment of mountains [6], fresh air [7], and landscapes [8] motivate tourists to "get closer to nature" and seek health-conscious tourist destinations [9]. The religious and cultural traditions of mountain-based communities, the precipitous peaks and snowy terrain make these locations ideal for mountaineering and skiing [10]. Tourism professionals create and market their products by combining activities designed to suit the destination attributes along with other auxiliary services [11]. According to UNWTO (<https://www.unwto.org/mountain-tourism>, accessed on 19 December 2021), mountain tourism encompasses a broad range of outdoor leisure and sports activities. These economic activities vary in terms of the availability period, location, focused destination attributes, physical fitness demands, and travel length and requirements [11,12], and they can provide significant benefits for local communities, managers, and governments.

1.2. Mountain Tourism as a Safe and Health Activity

Mountain tourism may be safer than other forms of tourism because it has the potential to minimize the spread of COVID-19. Complex tourist interests, as well as the variety of natural and cultural resources in remote and often unexplored geographic environments [13], provide a haven in which the pandemic impact has been lessened compared to urban areas. It increasingly attracts wellness tourists. Mountain tourism includes sociocultural tourist activities as well as climbing, trekking, adventuring, cycling [14], sightseeing, touring, or relaxing, among other activities.

Compared to other tourism sectors (e.g., spa tourism, heritage tourism, sightseeing tourism), mountain tourism offers an opportunity for tourists to pursue wellness and related interests. For example, mountain bike tourism is a niche of cycle tourism and is a growing sector in mountain tourism [14], which attracts many wellness tourists seeking both an adventurous and fitness experience during the COVID-19 pandemic. As a result, mountain tourism is sought after by tourists and has gradually become a popular tourist preference. The continued development of mountain tourism has been largely due to these diverse opportunities found in mountainous regions that appeal to a broad range of tourists [13].

1.3. Increasing Popularity of Mountain Tourism

According to UNWTO (<https://www.unwto.org/mountain-tourism>, accessed on 19 December 2021), mountain tourism has the potential to stimulate local economic growth and social change due to its complementarity with other economic activities, and its contribution to GDP and job creation as well as its year-round appeal (i.e., its lack of an "off season") provide significant benefits. However, the increasing popularity of mountain tourism can damage the natural environment. Overcrowded destinations as well as tourism professionals that are only interested in economic benefits negatively contribute to destination competitiveness [15]. The competitive market fails to allocate resources efficiently to mitigate these negative factors. Hence, international coordination is necessary to sustain mountain tourism as a savior of the tourism industry during a global pandemic. According to the 2021 Annual Conference of International Mountain Tourism Alliance (<http://www.imtaweb.net/ywb/ywsy/>, accessed on 22 December 2021), most tourists think that the tourist flow and concentration of mountain tourism areas and the risks are low; travel restrictions and remote office work are not good for the business tourism market, but they provide development opportunities for rural tourism and mountain tourism. In the short to medium term, leveraging the resilience of the international market will be a key driver of tourism recovery.

Mountainous areas account for approximately 27% of total global land area, and 54% of the global mountainous area is located in developing countries [16]. According to

the World Tourism Organization statistics, mountain tourism accounts for approximately 20% of global tourism and plays an important role in global tourism development [9], especially considering the continuing COVID-19 pandemic. In addition, mountainous areas are important but vulnerable centers of biodiversity [17]. They also have important impacts on global climate change [18]. Since the capacities of mountain ecosystems can be limited [19,20], excessive economic activity such as tourism in mountainous areas has been regulated and limited by governments [19,21]. Sustainable mountain tourism has raised much concern regarding its impact on the cultural and natural environments as well as the enforcement of environmental laws [19]. Mountain tourism destinations should consider their responses to the changing market, environmental, and social conditions when expanding and enhancing their offerings [19]. Based on government coordinating research in sustainable tourism, sometimes tourism replaces mining activities in mountain areas. Abandoned mines in mountain areas can not only pose a major environmental hazard but may also bring an end to a local economy [22]. Thus, tourism often coexists with mining in mountain areas under governments' and managers' support. This kind of *mountain tourism* is also ecologically developed and planned, such as the Jiufen in Taiwan [23] and the Kopaonik Mountain area [22], which also have a high level of natural characteristics and bring economic benefits to local communities [22,23].

1.4. Research Significance and Structure

This study assessed the status of international mountain tourism and analyzed the current research focus on mountain-based tourism using a bibliometrics approach. The significance of this study is as follows:

- (1) We applied a scientific mapping approach that consisted of a bibliometric literature search and scientometric analysis [24] to minimize the subjectivity and bias in review-based studies concerning mountain tourism.
- (2) The results indicated that government and industry professionals need to maintain the relationship between sustainable mountain tourism development and environmental conservation. Due to the COVID-19 pandemic, mountain tourist destination management should collaborate with other competitors in the market to develop novel and innovative sustainable methods to maximize their economic benefits that align with ecological conservation and the social values of the local community [19,20].

The remainder of this paper is structured as follows: Section 2 presents the previous research on mountain tourism while Section 3 describes the research method; Section 4 provides the results and findings; Section 5 offers the discussion; and Section 6 presents the conclusion.

2. Literature Review

The mainstream research topics of mountain tourism have focused on climate change, sustainable mountain tourism development, rural and landscape attributes. Given the abundance of research on mountain tourism, we chose a focused approach considering the most recent published studies.

2.1. Climate Change in Mountain Tourism Areas

Agriculture (42%), tourism (12%), hydropower (8%), and health and safety (4%) have been the leading sectors affected by hydrological and cryospheric changes [25]. Climate change and tourism have a dynamic relationship, wherein environmental changes impact tourist destinations and tourist travel produces emissions that impact the climate [26]. Thus, the relationship between tourism, including mountain tourism, and climate change has become a prevailing research topic. Palomo reported that negative impacts caused by climate change such as those on food and animal feed, water availability, natural hazards regulation, spirituality and cultural identity, aesthetics, recreation, infrastructure, accessibility, and ecosystem services are a direct threat to the livelihoods and cultures of mountain peoples and mountain tourism [27]. Mountain tourism is closely related

to changes in the climate, as resorts rely heavily on snow sports activities in winter and glacier tourism in summer [28,29]. The impact of climate change on mountain tourism has been seen in the following aspects: (1) climate change can lead to a variety of extreme weather conditions such as reduced snowfall, the retreat of glaciers, freezing conditions, heavy rainfall, increased temperatures, and a reduction in overall precipitation [27,30]. For example, in the European Alps, the Hindu Kush Himalayas, and the tropical Andes, many of these changes in snowfall and glaciers have been reported [31]. (2) Climate change also leads to declining snow cover, melting glaciers, and thawing permafrost, which negatively impact recreational activities and winter sports such as glacier viewing, mountaineering, skiing, snowboarding, and cross-country skiing [18,30]. (3) With climate change, the risk of new infections due to melting glaciers in the mountains may be increased. According to Zhong et al. (2020), there are various microorganisms in glaciers, such as “Glacier ice archives fifteen-thousand-year-old viruses”, but related viruses and their effects on glacier microbial communities have not been explored [32].

Many researchers have recognized that climate change has become a serious threat to mountain tourism [33], and the very activities it promotes can contribute to the environmental harm in mountainous regions. Probstl-Haider et al. reported that climate change may lead to extended seasons, an advantage for tourist destinations [34]. However, climate-induced phenomena strongly impact mountain tourism activities, such as mountaineering, hiking, biking, swimming, fishing, and golf, as well as water and air sports [34]. The mountain ecosystem is fragile, and species diversity and social development are affected by climate change [35]. In Kashmir Himalaya, Dar et al. studied the high-altitude temperature trends that were increasing and may result in snowmelt, which would pose a severe threat to the local and global climate as well as impact the sustainability of winter tourism in the region [30]. Wang and Qin’s research showed that most of the local residents in the Mount Yulong Snow regions believed that climate change had seriously affected the economy, lifestyle, and spiritual world of mountain tourism [36]. Mountainous regions at lower altitudes in Europe have experienced rapid climate changes that influence social-ecological systems [37]. Wolfle and et al. indicated that lower-altitude mountain ranges could be attractive winter destinations if they adapted their tourism products to promote environmental responsibility and appeal to prospective tourist desires [38].

From the perspective of conservation, overpopulated locales exceed the sustainable capacity of the ecological environment [18]. According to the 2020 Intergovernmental Panel on Climate Change (IPCC) report, the increased exposure of humans and infrastructure to geological hazards was attributed to increasing populations, tourism, and socioeconomic development, which have decreased the stability and integrity of the natural landscape features such as mountain slopes. Within the context of environmental hazards in the Himalayas, the key driver of climate change has been commercialization. Other factors have included the increased mobility and access of tourists who may be unaware of or ill-prepared to cope with hazards as well as a lack of regulations concerning overcrowding, safety, and building codes [39].

Thimm et al. (2019) presented adaptation strategies as alternatives for snow tourism, such as the implementation of hiking hostels, since climate change will make winter tourist activities in the Black Forest impossible in the long run [40]. Vij et al. (2021) suggested that main adaptation methods could involve wetland protection, the adaptation of planting and cultivation cycles, tree species management, and snowmaking techniques [37]. From the perspective of Salim et al. (2021), a strategy involving the installation of safety equipment, the renovation of access points, or the development of new structures was reactive. However, the adoption of new specializations for workers was a transformative strategy [29]. Willibald et al. (2021) showed that technical snow production was an appropriate adaptation strategy to counter the risks of climate change and internal climate variability. It drastically reduces the uncertainties related to internal climate variability [41].

2.2. Sustainable Mountain Tourism Development

In terms of the COVID-19 pandemic, the crisis highlights the need for local communities that rely on mountain-based tourism to enhance their resilience and sustainability to the risks simultaneously generated by the pandemic and the accelerating impacts of climate change [42]. Milicevic et al. (2021) reported that sustainable tourism emerged as a logical outcome of preventing the uncontrolled and excessive use of mountain tourism resources and attractions in Sumadija and Western Serbia [43]. The Tourism Sustainability Group (2007) suggested that sustainable tourism should embrace “concerns for environmental protection, social equity, and the quality of life, cultural diversity, and a dynamic, viable economy delivering jobs and prosperity for all” (p. 2). Dornier and Mauri (2018) indicated that a “sharing economy”, “marketing perspectives”, “sustainability and transportation”, and “the institutional, legal, and socioeconomic aspects” of sustainability are four key points that contribute to mountain tourism [44]. The market has to allocate and use resources efficiently under the ecosystem conservation regulated by governments when mountainous regions become popular tourist destinations. Therefore, the ecological, social, and economic aspects have to be considered [45].

Mountains are invaluable ecologically and recreationally and, therefore, need to be managed sustainably [46]. Sustainable economic development, ecological sustainability, and environmental protection are essential for the development of mountain-based tourism and its potential benefits to the local population, such as improvements to infrastructure for access and communication and the creation of jobs and businesses [47]. A participatory approach to mountain tourism planning is vital. It should be conducted in consultation with local, key stakeholders to monitor the ecological effects, such as waste disposal and wildlife conservation, and social indicators, such as affordable housing, fair wages, and employment levels [48]. In terms of local tourism income and employment opportunities, local investment in local tourism is essential to ensure the long-term sustainability of mountain tourism [2]. However, in the interests of sustainability, mountain communities should look beyond supply and demand issues and consider how tourism can be managed effectively [49]. The management of recreational land use and related resources requires a long-term plan, especially if these resources, similar to the mountains themselves, are to be protected. Tourism is not a panacea to the poverty found in some mountainous regions, but tourism planning and development should be carried out according to sustainable tenets to improve life for local residents [50]. Mutana and Mukwada (2017) concluded their report with general appreciation for tourism sustainability among tourism professionals and enterprises, although shortcomings were evident in both the environmental and socioeconomic indicators [51]. When evaluating research opportunities concerning sustainable mountain tourism, Havlikova et al. (2019) found significant issues to consider, including excessive and inappropriate infrastructure and housing as well as insufficient legislation and environmental education [52]. Therefore, Duglio et al. (2019) suggested that tourism professionals and agencies should consider three aspects of their promotion: local food and product marketing, territorial cross-promotion, and collaboration among destination managers to develop integrated tourism packages and activities [53].

2.3. Mountain Tourism in Rural Areas

Dax et al. (2019) suggested that current estimations report approximately 380,000 rural villages in China being abandoned in 2000–2016, particularly in its mountainous regions where local initiatives focused on migration and economic concerns were insufficient [54]. Ernawati et al. (2018) concluded that tourism could be a solution for the misuse of the natural environment in mountainous regions by promoting sociocultural and economic benefits in the Pohsanten and Bistra communities, such as improving the quality of accommodation facilities as well as the quality of additional rural tourism opportunities [55]. In a case study of the Valbona Valley National Park, Kortoci (2017) indicated that mountain tourism in rural areas may promote the protection of the natural, social, and cultural environments [56].

Considering the COVID-19 pandemic, Linca and Toma (2021) indicated that an increasing number of tourists were choosing rural mountain tourism destinations to rent private villas, mountain huts, apartments, or holiday homes for the purpose of social distancing [57]. Rural regions with agricultural, ecocultural, and cultural tourism destinations provide the opportunity to enjoy closer contact with nature and untouched landscapes [58]. Rural tourism has grown, and the demand for products and experiences has gradually expanded, especially as an alternative source of employment in mountainous regions [59]. The unique resources allow tourists to enjoy the scenery and delicious food, to purchase locally produced products, and to experience the life and activities; these resources also give tourists the cornerstone of a free experience [58]. Most tourists have been choosing mountain tourism in rural areas over suburban rural tourism, and mountainous areas that exist just outside suburban areas have gained in popularity [55]. With the acceleration of urbanization in various places, the industrial atmosphere in the suburbs has dramatically increased [55]. The natural environment and organic food found just outside suburban areas have become great attractions for tourists just as mountain tourism destinations far from the urban environment have also increased in demand [55]. Using spatial and statistical analysis and field surveys, Savulescu et al. (2019) confirmed that mountain tourism changed the traditional agricultural landscape by generating potential environmental conflicts that thereby indicated the sustainability impact on the Romanian Carpathians [60].

Although rural mountain tourism has many advantages, including the development of suburban rural tourism, many problems inevitably appear that slow its development [61]. Case studies of mountainous regions in Germany, Italy, Romania, Ukraine, and Poland have shown that mountain tourism may act as an essential driver for rural development in peripheral mountain communities that often face serious economic, social, and environmental challenges [62]. Therefore, retail trade, transportation, and communication strategies should focus on more effectively conserving natural and cultural resources, and, with increased employment opportunities in developing mountain tourism destinations, a sufficient local, employable population is crucial [63].

2.4. Landscape Attributor for Mountain Tourism

In the tourism industry, the resources are the destinations, in which the “raw material” is the natural landscape [64]. As for mountain tourism characteristics, landscape aesthetics and features attract tourists and “amenity migrants”, or those interested in relocating primarily for improved quality of life [65]. The balance of aesthetics and diversity of activities is vital when planning mountain tourism products so as to prevent exceeding a destination’s carrying capacity. The superior aesthetic qualities of a mountainous landscape attract the young and vigorous, the adventurous, the spiritually exhausted, and potential amenity migrants. Therefore, conserving and improving the exceptional aesthetic qualities of the natural landscape is a customary concern of tourism planning.

The contextual sociocultural experience in mountain-based tourism destinations can include symbolic landscape features that attract tourists [66], such as ambient conditions, spatial layout, and functionality as well as signs, symbols, and artifacts. Mountain-based tourism drivers convert the natural landscape into tourist destinations where hot springs, huts, facilities, convenient transportation, hotels, and broader walkways attract tourists [31]. The characteristic project created by mountain tourism involves the mountainous landscape [67]. In Japan’s mountain tourism, Chakraborty suggested that these landscapes were under renewed threat, such as the depletion of natural ecosystems, a trivialization of place, and increased pollution caused by visitors and global environmental change [68]. Zheng provided a reliable basis to monitor the green development of the ecological environment surrounding popular scenic spots due to the impact of pollution on the ecosystems of natural, mountainous landscapes [69].

3. Bibliometrics and the Science-Mapping Research Method

Mountain tourism research employs various methodologies, such as interviews [70], questionnaire-based surveys [55], case studies [71], computer simulations (e.g., Web GIS, GNSS) [72], field surveys [73], data analyses [74], descriptive statistical analyses [75], model analyses [76], index analyses [77], regression analyses [61], cluster analyses [78], and other experimental approaches [79]. There is also some research shedding light on tourism bibliometrics, such as coastal tourism [80], rural tourism [81], eco-tourism [82], etc. Although María and et al. (2018) studied mountain tourism bibliometrics [6], they did not combine it with a science mapping approach. However, science mapping and bibliometrics have rarely been used in the relevant literature of mountain tourism.

Professor Hall (2006) raised concerns over “the use of bibliometric tools for purposes for which they were not originally designed” [83]. He noted that “tourism studies have recently been subject to increasing debate regarding journal and research rankings. This debate is reflective of broader concerns over the use of bibliometric tools for purposes for which they were not originally designed” [83]. Therefore, he used Google Scholar citations as an alternative means of accessing the citation impact of tourism publications in comparison with the Clarivate (formerly Thomson Reuters) Institute of Scientific Information (ISI) databases. However, Google Scholar results include only those sources that are available on the Internet, whereas ISI includes journals that do not yet have digital versions [83]. Clarivate Analytics’s Web of Science (WoS) is the world’s leading scientific citation search and analytical information platform, which supports a broad array of scientific tasks across diverse knowledge domains and a dataset for large-scale data-intensive studies [84]. Some researchers, such as Li et al. (2021), have employed a scientometric review of tourism research from WoS’s core collection database from 2001–2020 [85]. None of these threw light on mountain tourism, though. Thus, in this study, we used the WoS database. We evaluated the latest research in mountain tourism published during 2010–2020 in the WoS database using the science mapping approach that consisted of a bibliometric search and a scientometric analysis. Scientometric analysis can quantitatively measure documented events similarly to the evaluation of economic activities using bibliometric laws and indicators [86].

3.1. Bibliometrics

The bibliometric search of mountain tourism publications was performed using the WoS. We used keywords to refine the results of searches performed in the WoS Core Collection: “mountain tourism” or “mountain-based tourism”, for example. Using this tool, we could search all authors and author affiliates. We used the citation report function to track and identify citation activity and trends; finally, we analyzed the search results to determine research trends and publication patterns. Thus, we obtained information including the publication year, journal, etc., to analyze trends and characteristics [9] based on methods used in prior research.

Previous researchers have applied Price’s law to initiate bibliometric analysis, such as the research into global trends in coffee agronomy by Madrid-Casaca et al. (2021) [87]. In the context of Price’s law, the square root of all contributors in a subject area produce half of the publications [88].

In order to identify a concentration of journals where authors offered in-depth discussions regarding mountain tourism, Bradford’s law was applied [89]. According to Bradford’s law, adjustment of the journal concentration zones to a geometric series is possible [90–93]. Bradford’s law was employed to estimate and identify the journals with the most frequent publications concerning mountain tourism so the journal concentration zones could be fitted to a geometric series [90–93].

Zipf’s law on words was applied to empirically determine words with the highest frequency of occurrence within the set of studied articles [94]. Researchers have applied Zipf’s law for keywords analysis [95]. The number and connections of keywords obtained from the titles and the summaries of articles can indicate possible research hotspots in an academic field [96]. In accordance with Zipf’s law, the bibliometric analysis produced a

topical thematic result from related keywords and refined with “mountain tourism” in the WoS database [94,97].

Applying Lotka’s Law, which is based on the unequal distribution of scientific publication among authors [98], our research established and estimated the principal WoS category and its temporal trends, the prolific authors [99,100], and the level of co-authorship between authors and their collaborators [101,102], using VOSviewer and Pajek [88,103]. When analyzing researchers and their cooperation network, the node’s size represented the number of articles posted by the author, and the number and thickness of lines represented the collaborative relationship and its intensity. Analyzing the number of posts issued from various countries can suggest the dominant countries studying mountain tourism [104].

3.2. Science Mapping

Scientometric analysis was an instrument used in the social sciences during a period of accelerated scientific progress where large-scale, government-funded projects were launched to achieve global scientific leadership [86]. VOSViewer, a text-mining tool developed by Van Eck and Waltman (2010), was adopted in this study for analyzing and visualizing bibliometric networks. VOSViewer provided distance-based visualizations of the bibliometric network; the distance separating two nodes approximately indicates the relation between them [103]. VOSViewer is suitable for visualizing more extensive networks with special text-mining features. Some research studies have adopted VOSViewer to assist with literature reviews of various topics, such as climate change, sustainability, protected areas, landscapes, etc. The present study adopted VOSViewer to (1) load the downloaded literature from WoS; (2) visualize, compute, and analyze the influence of journals, scholars, publications, and countries in mountain tourism research; and (3) study common research keywords and their inter-relationships.

4. Results of Scientometric Analysis

4.1. An Overview of the Literature Review

The keyword-based bibliometric search of the WoS included 1413 mountain tourism articles. Figure 1 shows the number of papers published annually during 2010–2020. Excluding the incomplete data in 2020, the annual number of publications had increased from less than 100 total articles in 2010 to over 140 in 2015. This indicated that research interest in mountain tourism had increased in recent years.

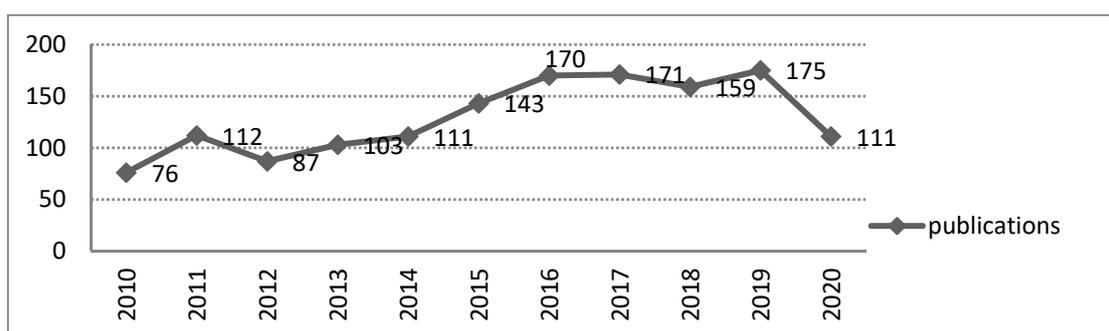


Figure 1. Yearly publications during 2010–2020.

4.2. Science Mapping of Published Sources

The minimum number of documents and the minimum number of citations were set at 10 and 80, respectively, in VOSViewer. A total of 11 out of the 719 journals met the threshold. Figure 2 presents the clusters of research sources and their inter-relationships. Applying Bradford’s law, the scientometric analysis identified a core of 11 journals (Figure 2) where the academic debate and discussion regarding mountain tourism was the focus. In Figure 2, the font and node size visually represent the number of publications from the given journals, with larger font and node sizes indicating a higher number of publications [5]. The clusters

represented by different colors and connection lines indicate the closeness among journals in terms of mutual citations. Citations have been used as a measurement of a scholarly work's influence in a domain [103]. Table 1 lists the number of documents, the average and the total number of citations, and the average number of normalized journals. The results quantified the impact of the journals in mountain tourism. The top three journals with the most prominent mountain tourism publications were Sustainability, the Journal of Mountain Science, and Mountain Research and Development. These publications have been considered authoritative sources of tourism research, and the search results suggested a developing trend of mountain tourism research.

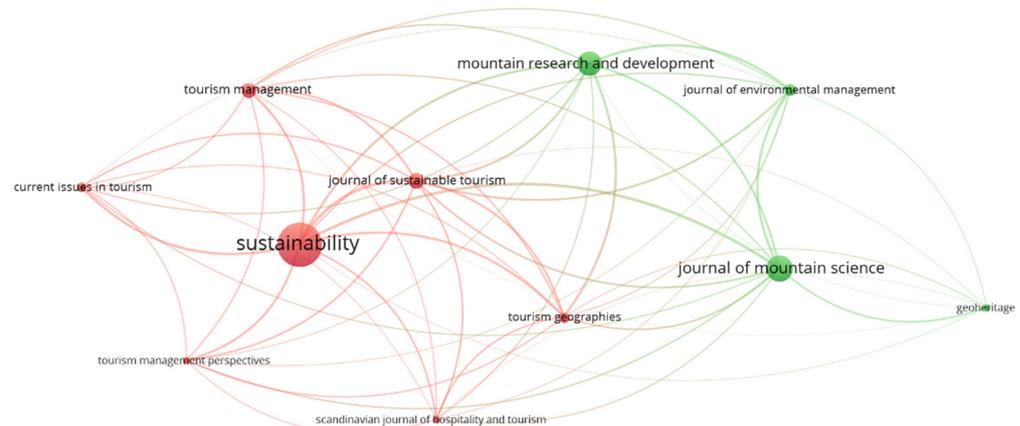


Figure 2. Mapping of mainstream journals in the domain of mountain tourism.

Table 1. Quantitative measurements of publications of mountain tourism research.

Country	Number of Documents	Number of Citations	Average Publication Year	Average Citation	Avg. Norm. Citation
Sustainability	59	236	2018	4	1.221
Journal of Mountain Science	35	121	2017	3.4571	0.7382
Mountain Research and Development	32	489	2014	15.2812	1.565
Journal of Sustainable Tourism	21	300	2016	14.2857	2.2101
Tourism Management	20	405	2016	20.25	2.8559
Journal of Environmental Management	16	560	2015	35	3.462
Tourism geographies	15	144	2017	9.6	1.4735
Current Issues in Tourism	13	82	2015	6.3077	1.8304
Geoh heritage	11	118	2017	10.7273	1.8142
Scandinavian Journal of Hospitality and Tourism	11	123	2014	11.1818	1.1132
Tourism Management Perspectives	10	101	2017		

Figure 2 and Table 1 present the most productive journals, namely Sustainability and the Journal of Mountain Science, although these journals had the lowest average number of citations. Tourism Management and the Journal of Environmental Management had the highest average number of citations. Table 1 displays journal citation data.

4.3. Co-Occurrence of Keywords

Keywords represent the main content of the research topics [105]. They can be analyzed systematically to provide future directions for research [106]. Therefore, keywords of articles published over the last decade were analyzed using VOSviewer.

A network of keywords displayed the relationships and the organization of research themes, following the method used by Van Eck and Waltman (2014). In addition, following

the recommendations of Jin et al. (2019), we used “author keywords” and “fractional counting” in the VOSViewer analysis. Applying Zipf’s law, the minimum occurrence of a keyword was set at seven. Initially, 65 out of the 4341 keywords met the threshold, from which some general items were then removed, e.g., “mountain tourism”, “tourism”, “development”, “mountainous regions”, “mountainous areas”, “mountain”, and “mountains”. Some other keywords with the same semantic meanings, such as “protected areas” versus “protected area”, and “national parks” versus “national park”, were combined in the second round of the keyword analysis. Finally, a total of 56 keywords were selected, as shown in Figure 3 and Table 2.

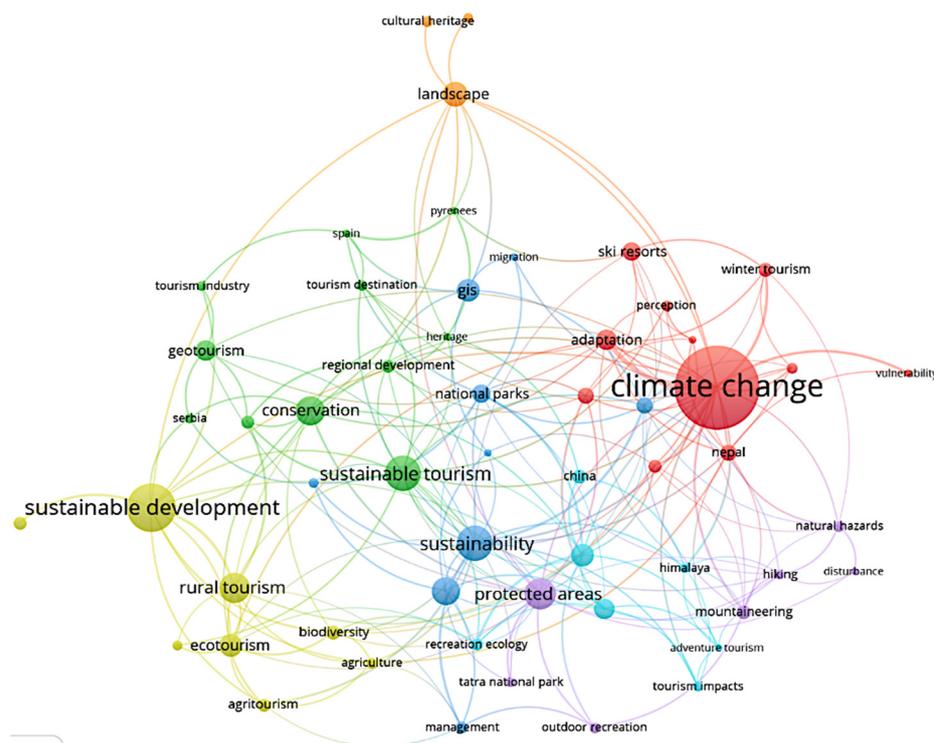


Figure 3. Co-occurrence of keywords in mountain tourism research.

The node sizes, the distances among nodes, and the connection lines among keywords, as visualized in Figure 3, suggested the most frequently studied terms included but were not limited to: climate change, sustainable development, sustainability, sustainable tourism, protected areas, rural tourism, conservation, tourism development, and landscape. The colors of the nodes divided these keywords into different clusters. In Figure 3, the node’s size reflects the number of keywords with larger font and node sizes indicating larger numbers of keywords [105]. The connection lines indicated the closeness among the keywords in mountain-based tourism research [5].

As shown in Figure 3, sustainable development, rural tourism, ecotourism, agritourism, and biodiversity were strongly related to each other within the same cluster. Climate change, adoption, perception, ski resorts, winter tourism, Nepal, and vulnerability were strongly related within the same cluster. Keywords from different clusters were also strongly linked, such as sustainability and protected area as well as sustainability and climate change. The most robust links were between sustainability and rural tourism as well as between climate change and Nepal. The most recent literature did not appear to address the link between the tourism industry and disturbance.

Generally, the common research keywords were climate change, sustainable development, sustainability, sustainable tourism, and protected areas.

Table 2. Summaries of primary keywords in mountain tourism research.

Keywords in Mountain Tourism Research	Occurrence	Average Publication Year	Average Citation	Avg. Norm. Citation
Climate change	69	2016	12	1.6317
Sustainable development	40	2015	2.825	0.5227
Sustainability	29	2017	12.931	2.0567
Sustainable tourism	29	2016	10.4138	1.2991
Protected areas	26	2016	8	1.2379
Rural tourism	25	2015	3.68	0.6795
Conservation	24	2016	6.8333	0.8472
Tourism development	23	2015	4.6957	0.8368
Landscape	21	2016	2.9048	0.8229
Ecotourism	19	2015	5.5789	0.9144
GIS	19	2015	5.1579	0.7235
Nature-based tourism	19	2014	18.4211	1.7346
Adaptation	17	2017	9.2353	2.3745
Geotourism	17	2015	10.4706	1.3774
Mountain biking	17	2015	21.7059	2.3091
National parks	15	2016	5.2667	0.9571
Ski resorts	15	2016	3.9333	0.7221
Alps	14	2016	7.8571	1.4638
Nepal	14	2016	11.7857	1.1724
Recreation	14	2014	14.5714	1.9272
Biodiversity	12	2014	12.3333	1.3604
China	12	2017	3.4167	0.8532
Mountaineering	12	2016	7.3333	1.414
Winter tourism	12	2013	11.6667	1.3927
Agritourism	11	2017	3.7273	1.8328
Ecosystem services	11	2017	9.1818	2.0999
Regional development	11	2014	5.7273	0.721
Romania	11	2016	2.7273	0.4245
Rural development	11	2017	1.0909	0.4433
Management	10	2016	3.8	0.5539
Recreation ecology	10	2013	36.7	3.2407
Agriculture	9	2015	3.7778	0.3533
Cultural heritage	9	2015	0.4444	0.049
Natural hazards	9	2015	10.5556	1.4528
Outdoor recreation	9	2018	3.1111	0.8315
Perception	9	2015	17.1111	1.7591
Switzerland	9	2014	18.5556	1.6058
Tourism destination	9	2017	14	1.7991
Environment	8	2015	3	0.4915
Hiking	8	2016	23	2.4248
Himalaya	8	2016	5.375	1.0144
Land use	8	2015	7.25	0.9649
Serbia	8	2016	9.5	0.823
Tatra national park	8	2017	2.5	0.5955
Tourism impacts	8	2015	10.375	1.4415
Tourism industry	8	2015	14.5	1.3674
Turkey	8	2014	10.125	1.133
Adventure tourism	7	2015	9.7143	1.1513
Disturbance	7	2016	8	0.7085
Forest management	7	2016	10.8571	1.4669
Heritage	7	2016	1	0.2122
Migration	7	2015	13.4286	1.559
Pyrenees	7	2014	15.2857	1.4808
Spain	7	2017	14.1429	1.787

4.4. Co-Authorship Analysis

The investigation of research collaboration and the co-authorship of publications found that the minimum number of articles published and the minimum number of citations of an author set in VOSViewer were 3 and 30, respectively. A total of 62 out of the 3979 authors from the literature sample met the selection criteria. The most influential authors are presented in Figure 4 and Table 3. As shown in Figure 4, the authors were attributed to three categories that represented their research networks. The cluster size indicated the strength of their research connections.

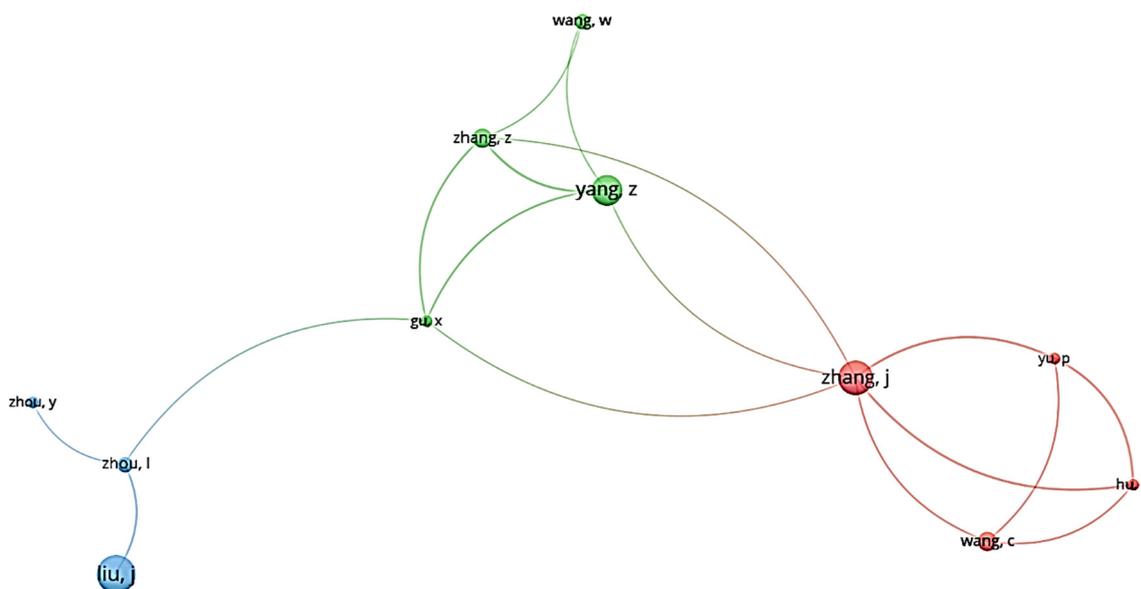


Figure 4. Co-authorship analysis in mountain tourism research.

Table 3. Quantitative measurements of scholars in mountain tourism research.

Scholar	Number of Documents	Number of Citations	Average Publication Year	Average Citation	Avg. Norm. Citation
Liu, J.	10	99	2017	9.9	1.1392
Zhang, J.	9	82	2018	9.1111	2.7787
Yang, Z.	8	69	2017	8.625	1.5783
Wang, C.	5	45	2018	9	2.9747
Zhang, Z.	5	58	2017	11.6	1.8092
Wang, W.	4	45	2015	11.25	1.2815
Zhou, L.	4	46	2016	11.5	2.5371
Gu, X.	3	36	2015	12	2.4708
Hu, H.	3	50	2018	16.6667	5.589
Yu, P.	3	50	2018	16.6667	5.589
Zhou, Y.	3	69	2014	23	3.5892

Table 3 presents the five main quantitative measurement methods, namely, the total link strength, the number of published articles, the total number of citations in the WoS, the average publication period, and the average number of citations per article. The first three metrics showed the production of research results and the impact of a given author on the research community [5]. According to Table 3, Liu was the most productive author in the field of mountain tourism research. As compared to the other authors, Liu was cited more frequently, illustrating that Liu was both productive and influential in this field. Other scholars who made significant contributions to the research community include Zhang, Yang, and Zhou. These scholars have also collaborated with one another, as shown in Figure 4. The average publication year indicated emerging researchers, including Hu, Yu,

Wang, and Zhang. Their publications were generally published around the year 2018. The standardized citation analysis showed the average annual influence of researchers such as Hu and Yu. Although they were not the most published, they had a higher average number of citations and the highest annual impact; thus, they have made significant contributions to mountain tourism research.

4.5. Citation of Articles

Being cited in other published works represents influence in the research domain. The most influential publications in the last decade were also investigated using VOSViewer. When we set the minimum number of citations at 43, a total of 37 out of 1413 articles were found. The most influential articles measured by the number of citations are shown in Figure 5. Consistent with the findings in Figure 4 and Table 3, the visualization in Figure 5 further illustrated that Steven (2011) led a series of studies that contributed significantly to mountain tourism research. More details concerning these articles, including full titles, number of links, and total citations, are summarized in Table 4.

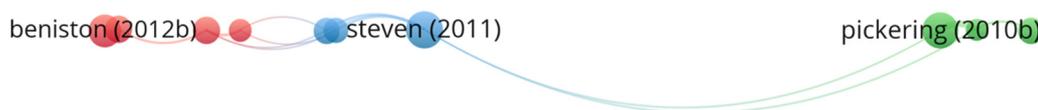


Figure 5. Science mapping of the most influential publications in mountain tourism research.

Table 4. List of publications with the highest impact in mountain tourism research.

Scholar	Title	Number of Citations	Average Publication Year	Average Citation	Avg. Norm. Citation
Steven (2011)	A review of the impacts of nature-based recreation on birds	126	2011	126	9.1577
Pickering (2010b)	Comparing hiking, mountain biking, and horse-riding impacts on vegetation and soils in Australia and the United States of America	119	2010	119	8.2069
Beniston (2012b)	Impacts of climatic change on water and associated economic activities in the Swiss Alps	99	2012	99	8.7
Rixen (2011)	Winter tourism and climate change in the Alps: an assessment of resource consumption, snow reliability, and future snowmaking potential	67	2011	67	4.8696
Beniston (2012a)	Is snow in the Alps receding or disappearing?	66	2012	66	5.8
Cetin (2016)	Evaluating the recreation potential of Ilgaz Mountain National Park in Turkey	64	2016	64	12.3496
Thiel (2011)	Winter tourism increases stress hormone levels in the capercaillie <i>Tetrao urogallus</i>	60	2011	60	4.3608
Braunisch (2011)	Spatially explicit modelling of conflict zones between wildlife and snow sports: prioritizing areas for winter refuges	55	2011	55	3.9974
Pickering (2010a)	Climate response by the ski industry: the shortcomings of snowmaking for Australian resorts	49	2010	49	3.3793
Barros (2013)	Impacts of informal trails on vegetation and soils in the highest protected area in the southern hemisphere	44	2013	44	3.4412

The themes of the highly-cited articles included (1) winter tourism resources, activities, and development potential [107–109]; (2) the spatially explicit modelling of tourism destinations; (3) winter tourism increasing stress hormone levels; (4) recreational potential; and (5) vegetation and soil protection [110]. These highly cited articles all concerned sustainable development in mountainous regions. The most cited article in the last decade was from Steven (2011), who studied the impact of natural recreational activities on birds. Pickering (2010b) ranked second in terms of citation rates in the last ten years. Some trends suggested by the present study included those comparing the impact of hiking, mountain biking, and horseback riding on soil and vegetation in Australia and the U.S. Ecology and sustainability were the main research topics. Beniston et al. (2012b) had the third most cited article, which focused on the impact of Swiss climate change on water and related economic activities.

These results affirmed those found in the co-authorship analysis (Figure 4); however, there were few collaborations found in these articles, and it is vital to improve author networks in this research domain.

4.6. Countries Active in Mountain Research

VOSViewer was used in this study to further identify and evaluate country-specific contributions to the global research community, and the minimum number of documents and citations per country were set at 15 and 60, respectively. A total of 25 out of 95 countries were identified. Figure 6 and Table 5 present the findings of countries that have been active in mountain tourism research over the last decade.

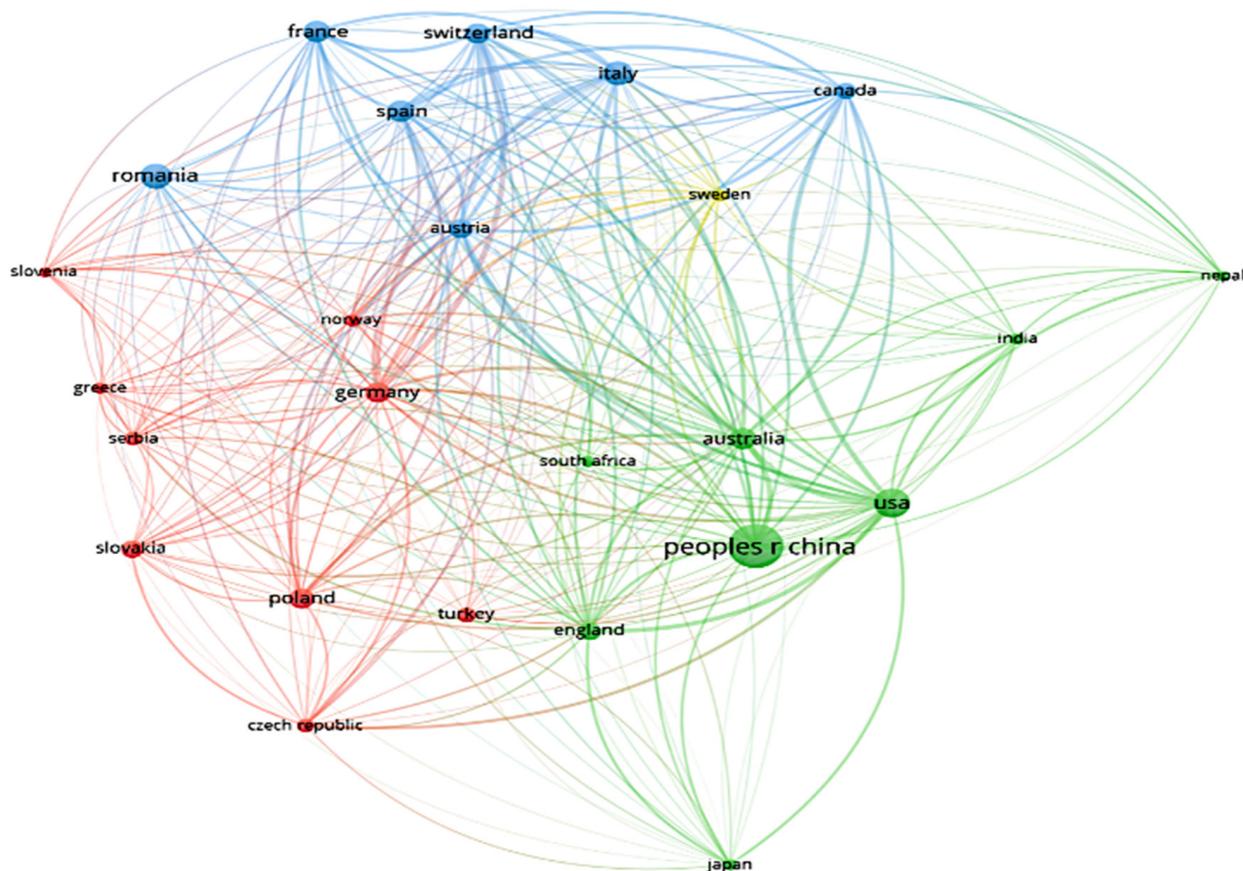


Figure 6. Mapping of countries actively researching mountain tourism.

Table 5. Number of documents published in 25 countries (from high to low).

Country	Developing/Developed Countries	Continent	Weight (Links)	Weight (Total Link Strength)	Weight (Documents)
China. P. R.	Developing	East Asia	24	7936	301
U.S.	Developed	North America	24	12064	134
Romania	Developing	South Europe	24	2124	104
Italy	Developed	South Europe	24	7803	93
Australia	Developed	Oceania	24	10468	75
Spain	Developed	South Europe	24	6907	69
France	Developed	West Europe	24	5628	69
Switzerland	Developed	Central Europe	24	8566	64
Poland	Developing	Central Europe	24	3651	64
Germany	Developed	Central Europe	24	8039	62
Austria	Developed	Central Europe	24	8415	60
Slovakia	Developed	Central Europe	24	2068	49
U.K.	Developed	West Europe	24	5529	47
Canada	Developed	North America	24	6934	46
Turkey	Developing	West Asia	24	647	37
Serbia	Developing	South Europe	24	1811	34
Czech Republic	Developed	Central Europe	24	2501	33
Sweden	Developed	North Europe	24	3472	28
Norway	Developed	North Europe	24	3076	26
Greece	Developing	South Europe	24	1729	23
Japan	Developed	East Asia	24	1612	21
India	Developing	South Asia	24	1855	20
South Africa	Developing	Africa	24	1398	20
Slovenia	Developed	South Europe	24	1655	18
Nepal	Developing	South Asia	24	1664	16

The connecting line in Figure 6 shows the research results cited by different countries/regions, which were further measured by the total link strength, as shown in Table 5. As shown in Figure 6, the following countries or regions contributed to the research (the research institutions were based on their node size and connection lines with other countries/regions): China, the U.S., Romania, Italy, Australia, France, and Spain.

More developed countries have been actively involved in mountain tourism research. That may be due to the history of mountain tourism, which originated in Europe before expanding into North America and then developing throughout the world. In terms of the number of publications and total citations, researchers from China and the U.S. ranked highest, followed by Australia, Switzerland, Italy, and Romania (Tables 5 and 6).

In terms of average citations, the most developed countries had higher average citations, such as Switzerland, Canada, Australia, the U.K., the U.S., Spain, Germany, Sweden, etc., and most were in Europe, while some developing countries such as Nepal had higher average citations than some developed countries such as the U.S., Spain, and Germany (Table 7). The average normalized citation measure indicated that developed countries or regions including Sweden, Canada, Australia, Nepal, Switzerland, Spain, Austria, Germany, and the U.K. had a higher annual impact on the research community (Table 8). With the exception of Nepal, the most influential countries were developed countries, many of which are in Europe. Nepal, India, and Japan were the top three countries with the highest average normalized citations in Asia. Although Slovenia, Switzerland, the U.S., Norway, Czech Republic, Australia, Canada, and other developed countries had fewer publications as compared to China, a developing country, they began researching mountain tourism earlier (Tables 9 and 10).

Table 6. Number of citations in 25 countries (from high to low).

Country	Developing/Developed Countries	Continent	Number of Citations
U.S.	Developed	North America	1679
Australia	Developed	Oceania	1159
China. P. R.	Developing	East Asia	1053
Switzerland	Developed	Central Europe	1023
Italy	Developed	South Europe	880
Spain	Developed	South Europe	830
Canada	Developed	North America	727
Germany	Developed	Central Europe	695
U.K.	Developed	West Europe	638
Austria	Developed	Central Europe	528
France	Developed	West Europe	385
Poland	Developing	Central Europe	374
Sweden	Developed	North Europe	311
Norway	Developed	North Europe	251
Turkey	Developing	West Asia	238
Romania	Developing	South Europe	223
Nepal	Developing	South Asia	212
Greece	Developing	South Europe	195
Serbia	Developing	South Europe	171
Czech Republic	Developed	Central Europe	163
India	Developing	South Asia	152
South Africa	Developing	Africa	148
Japan	Developed	East Asia	123
Slovakia	Developed	Central Europe	106
Slovenia	Developed	South Europe	78

Table 7. Number of average citations in 25 countries (from high to low).

Country	Developing/Developed Countries	Continent	Average Citation
Switzerland	Developed	Central Europe	15.9844
Canada	Developed	North America	15.8043
Australia	Developed	Oceania	15.4533
U.K.	Developed	West Europe	13.5745
Nepal	Developing	South Asia	13.25
U.S.	Developed	North America	12.5299
Spain	Developed	South Europe	12.029
Germany	Developed	Central Europe	11.2097
Sweden	Developed	North Europe	11.1071
Norway	Developed	North Europe	9.6538
Italy	Developed	South Europe	9.4624
Austria	Developed	Central Europe	8.8
Greece	Developing	South Europe	8.4783
India	Developing	South Asia	7.6
South Africa	Developing	Africa	7.4
Turkey	Developing	West Asia	6.4324
Japan	Developed	East Asia	5.8571
Poland	Developing	Central Europe	5.8438
France	Developed	West Europe	5.5797
Serbia	Developing	South Europe	5.0294
Czech Republic	Developed	Central Europe	4.9394
Slovenia	Developed	South Europe	4.3333
China. P. R.	Developing	East Asia	3.4983
Slovakia	Developed	Central Europe	2.1633
Romania	Developing	South Europe	2.1442

Table 8. Number of average normalized citations in 25 countries (from high to low).

Country	Developing/Developed Countries	Continent	Avg. Norm. Citation
Sweden	Developed	North Europe	1.9165
Canada	Developed	North America	1.8586
Australia	Developed	Oceania	1.8459
Nepal	Developing	South Asia	1.8222
Switzerland	Developed	Central Europe	1.7745
Spain	Developed	South Europe	1.7285
Austria	Developed	Central Europe	1.6975
Germany	Developed	Central Europe	1.6811
U.K.	Developed	West Europe	1.5597
India	Developing	South Asia	1.5229
Italy	Developed	South Europe	1.4907
U.S.	Developed	North America	1.4868
Greece	Developing	South Europe	1.1594
Norway	Developed	North Europe	1.1237
South Africa	Developing	Africa	1.1019
Poland	Developing	Central Europe	0.9918
France	Developed	West Europe	0.9739
Slovenia	Developed	South Europe	0.9076
Turkey	Developing	West Asia	0.8991
Serbia	Developing	South Europe	0.8241
Czech Republic	Developed	Central Europe	0.6498
Japan	Developed	East Asia	0.6044
China. P. R.	Developing	East Asia	0.5785
Romania	Developing	South Europe	0.4353
Slovakia	Developed	Central Europe	0.3753

Table 9. Top 10 countries' (from early to late) average publication dates (years) from 2010 to 2020.

Country	Developing/Developed Countries	Continent	Average Publication Year
Slovenia	Developed	South Europe	2013.8333
Turkey	Developing	West Asia	2014.0541
Nepal	Developing	South Asia	2014.4667
Switzerland	Developed	Central Europe	2014.875
Romania	Developing	South Europe	2015.0192
U.S.	Developed	North America	2015.0985
Norway	Developed	North Europe	2015.2174
Czech Republic	Developed	Central Europe	2015.2812
Australia	Developed	Oceania	2015.3288
Canada	Developed	North America	2015.3913

Table 10. Top 10 countries' (from late to early) average publication dates (years) from 2010 to 2020.

Country	Developing/Developed Countries	Continent	Average Publication Year
Poland	Developing	Central Europe	2016.5968
India	Developing	South Asia	2016.5789
Austria	Developed	Central Europe	2016.4833
Sweden	Developed	North Europe	2016.4815
France	Developed	West Europe	2016.4638
Spain	Developed	South Europe	2016.1014
Italy	Developed	South Europe	2015.9565
Japan	Developed	East Asia	2015.9
Greece	Developing	South Europe	2015.7727
Germany	Developed	Central Europe	2015.7258

The comprehensive analysis of the multiple quantitative measurements, as shown in Table 5, suggested a potential correlation between a country's academic publication and the factors affecting mountain tourism. These influencing factors included but were not limited to mountain tourism resources [77], mountain tourism transportation [21], market factors [78], and population density [75]. These factors may have promoted academic research in several publications in some developing countries, such as those in China and Nepal. However, there is limited evidence for a causal relationship between these influencing factors and the academic achievements of a specific country or region. Further research is needed to analyze the relationship between a country's influencing factors on mountain tourism development and its academic achievements.

5. Discussion

The keyword analysis revealed that the emerging research topics in mountain tourism are climate change, sustainable development, sustainability, sustainable tourism, protected areas, rural tourism, and conservation, and that China, the U.S., and Romania produced the most significant mountain tourism articles indexed in the WoS. Most developed countries in Europe had the highest average and average normalized citations, which indicated that they may have more influence in this field of research as compared to other countries. Some developing countries, such as India, Nepal, and China, had higher citations, average citations, and/or average normalized citations than other countries. We also identified several critical research topics in the context of mountain tourism, which we will now discuss, such as research on transport as well as cooperation (i.e., combining with cooperation and competition) in mountain tourism areas.

5.1. Transport to the Mountain and Economic Efficiency

Along with climate change, transport is another critical aspect in the sustainable development of mountain tourism. Despite its importance, it did not emerge as a common keyword in our results, and this thus signals the need for further research. No sustainable policy can be designed without sufficient research and investment in transport solutions in mountainous areas. In order to promote the development of comprehensive policies and agendas for sustainable mountain tourism, transport is an essential element [111].

Accessibility and mobility play important roles in regional development strategies that aim to improve the leisure potential of mountainous areas [112]. Tian et al. (2021) took Lijiang as a case study and found that transportation connections constituted the main elements of mountain tourism destinations, and they provided a scientific basis for resource optimization and sustainable development [113]. Paunović and Jovanović's (2019) research in a case study of the German Alps showed that sustainability was dependent on the balance among ecological, social, and economic interests [20]. Poponi et al. (2020) suggested that the Italian national parks of the Apennines and the available transportation options were critical areas for sustainable development, social cultural awareness of conservation issues, and local low-impact economic practices [114].

Transportation impacts the mountainous ecological environment. Juan et al. (2014) suggested that South Tyrol had provided a transportation system that was able to foster tourism in remote and environmentally fragile areas by promoting the usage of public transportation and thus reducing negative impacts caused by the use of private cars [112]. Transportation is one of the main emission sources in mountainous regions [115]; thus, public transportation can better support sustainable tourism as compared to private automobiles. Unger and et al. (2016) focused on developing a model for Alpine tourism and transportation by calculating energy consumption and greenhouse gas emissions resulting from travel to a single Alpine holiday destination [111].

Transportation systems can be used by the local population as well as by tourists to reach recreational activities [112]. However, transportation systems have also presented challenges in their implementation, including increased air pollution and congestion as well as having a negative impact on agricultural and local cultural concerns (e.g., bimodal

seasonal distribution and a decrease in residents' quality of life) [112]. Despite these obstacles, efficient and sustainable transportation systems can increase accessibility and attract more tourists as well as benefit the residents at a mountain tourism destination. Social and legal bases for high-quality tourism, nature protection, traditional knowledge preservation, and the promotion of environmental education and the culture of local people and visitors can be enhanced by sustainable transportation development in mountain tourism destinations [116,117].

Transportation infrastructure is required in areas that rely on tourism for a significant portion of their local economy, so it is crucial to provide efficient and preferred tourist transportation options, such as cableways in mountainous areas [112]. However, this type of transportation in the Italian Alps has been regarded as relatively economically inefficient, and most of the cableways have reported decreasing returns to scale [112]. The acknowledged negative impact of traffic on the tourism economy has been perceived as less problematic than the potential effects of traffic management [112]. Scuttari and et al. (2019) found that, in the case of the Dolomites, this meant that alternative transportation had to be inexpensive, integrated, and frequently available on an extended daily schedule, whereas any restrictions on private mobility should be clear and limited only to those that were unavoidable [21]. Thus, in ecologically sensitive but tourism-intensive areas, transportation policymakers must contend with the paradox of minimizing transportation-related impacts while increasing transportation options for tourists [21]. From an economic perspective, it is important to determine whether an alternative and more sustainable mode of transportation will also be economically efficient [112].

5.2. Romania Created a Competitive Advantage Based on Mountain Tourism

As shown in Table 5, Romania ranked in the top three productive countries within the context of mountain tourism. Although it has not had much impact on international tourism, this may be changing, as Romania has recently become a favored destination for more tourists due to its natural appeal [118]. Situated in the heart of Europe, Romania is a country with broad tourism potential [119]. Mountainous areas represent approximately 30% of the territory and are the least anthropically modified, with a low density of stable population and small localities [2]. Romania has a unique heritage, which may give it certain advantages over other countries. Among all the forms of tourism implemented in Romania, mountain tourism has become a priority in terms of availability, accessibility, and diversity as well as the degree of environmental conservation [118].

Romania has a competitive advantage in mountain tourism for several reasons. First, investment programs and initiatives have been focused on the development of mountain tourism, including improving the quality of tourist attractions and facilities [118]. Investors and developers of tourism destinations focus on modernizing existing historical and cultural facilities for accommodation as well as building new facilities that are energy efficient and optimized for their purpose, thereby improving the delivery and quality of the services provided. When formulating investment strategies to improve the efficiency of mountain tourism, they combine public participation and needs, such as infrastructure, accommodation, catering, tourist leisure activities, and mountain sports options, so they can benefit both the residential and the tourist populations. They have participation and support from various entities, such as financial support from local and national governments, the possibility of attracting investment funds through EU plans, and financial support for activities in the mountain tourism sector [118]. The developed tourist resorts were preferred for investment programs financed by the state budget and by European funds [119].

Second, for the investment programs focused on protecting the natural environment, the government played a key role in making decisions and implementing development projects in Romania [119], as well as implementing strategies and policies to protect the natural environment [118]. Administrative agencies for the conservation of natural resources and the protection of cultural and environmental heritage as well as government policies

ensure the necessary framework is in place to protect the material and natural resources of the area [119].

Since the 2000s, when the Romanian economy experienced a revitalization, a series of studies and projects have been conducted to determine whether a new ski infrastructure or the modernization of the existing one would be more beneficial for the country [119]. Local, national, and even international support as well as targeted research to guide the development of mountain tourism in Romania gives it a competitive advantage [13].

5.3. Coopetition in Mountain Tourism

Coopetition is a behavior that generates a network relationship where cooperation and competition coexist [120]. When this relationship occurs among a network of companies or in the economic sector and is nurtured as a continuous process, the result creates a system [120]. Within the context of tourism, coopetition is not a new term [121]; consider Chim-Miki and Batista-Canino's research in the review of tourism coopetition and their research model development [120,122]. Schnitzer et al. (2019) took the Leisure Card Tirol as a case study and analyzed the coopetition between tourism and leisure suppliers [121]. While there has been some research concerning the competition or cooperation in mountain tourism [19], scarce research has been completed regarding coopetition within the context of mountain tourism. The keyword "coopetition" was not shown in the mountain tourism research literature in Figure 3, indicating a need for further study in this area.

First, according to Paunović and Jovanović's research, cross-border identities have been an important consideration for cross-border cooperation. The most important element in this type of cooperation has been for the destinations to find a common theme (e.g., climate change, demographic change, culture, accessibility, tourism in the public media discourse), share their experiences, and learn from the experiences of the other destinations [19]. However, the challenge has been to adapt tourism policies to create cross-border opportunities that emphasize cultural and historical overlaps among the cross-border regions [19]. For example, a tourist from the U.S. or China may not differentiate between Bavaria, Southeast Bavaria, or Austria.

Second, achieving competitiveness without sustaining it is not a goal worth pursuing [19]. In the case of tourism, competition has proven to be a successful strategy for improving the performance of tourism firms and destination management organizations [123,124]. Although competition is a vital concept in the sustainable tourism development research domain [125], competitiveness can be further improved by collaboration and competition [126]. Tourism destinations will have to be sustainable and adhere to the principles of sustainability as well as resilient in their crisis management plans in order to remain competitive in the global market [19].

Third, the coopetition paradigm postulates that corporations not only compete against or cooperate with each other, but can do both at the same time, even in the tourism industry [121]. The coopetition-related research in sustainable tourism was related to the following: (1) Coopetition and sustainable competitive advantage in tourist destinations [123,124,127]; (2) The coopetition model in ecotourism ecosystems [128]; (3) The coopetition between tourism and leisure suppliers [121]; (4) Rural tourism partnership and sustainability [129]; and (5) Coopetition in maritime tourist sustainability [126]. Based on the sustainable principles of mountain tourism, especially those concerning ecological and cultural resources, excessive competition may negatively result in fewer benefits and unreasonable pricing, whereas excessive cooperation may negatively result in a lack of distinct local and cultural identities. Therefore, balancing the relationship between cooperation and competition, also known as coopetition, is also vital for sustainable mountain tourism.

6. Conclusions

6.1. Theoretical Implications

This study was conducted using classical bibliometric laws and scientometric techniques (VOSViewer) to determine values for production, impact, and relationship. Through

the analysis of publication years and journals, it was found that the amount of research on mountain tourism has increased. Regarding the scope of research, countries with large mountainous areas, such as the U.S., China, Canada, Australia, Romania, and certain archipelagic countries (e.g., Japan), have researched mountain tourism, and this was especially so in developing countries including Nepal and South Africa. More developed countries in Europe had higher average citations and higher average normalized citations, which indicated the importance of their research in mountain tourism. Regarding research trends in sustainable research in mountain tourism, the national government and other departments have accelerated the network popularization of mountain tourism regions, balanced the relationship between competition and cooperation, and built a cooperation system to promote sustainable global mountain tourism development research, especially in light of the COVID-19 pandemic. As a key piece of research in the area of mountain tourism, Paunović and Jovanović's study integrated knowledge from sustainability and management science with tourism geography and social psychology. They employed a similar research question concerning more sustainable mountain destinations in the German Alps and offered valuable policy implications on which our research was built. Their findings contributed to the understanding of both "threats pushing the agenda of sustainable development (e.g., climate change and depletion of resources), indicators of sustainable tourism (to measure the scope of change)", and "cross-border cooperation and stakeholder engagement" [19,20].

6.2. Policy Implications

International coordination is necessary to sustain mountain tourism as a savior of the tourism industry during a global pandemic. The issue of sustainability involves many stakeholders who can combine their knowledge, competencies, and activities to maximize the attractiveness of a location while preserving its resources for the future [130]. Moreover, leadership, intersectoral networks, a standard orientation towards high-quality and sustainable knowledge, energy recycling, and effective communication appear to be critical success factors in mountain tourism development [62]. Some indications of heightened ecological consciousness and a sense of place can be detected among local tourism stakeholders, providing insight for more sustainable mountain tourism development [68].

Alternative sustainable transportation is an important part of mountain tourism for governments and stakeholders [19]. Proper international and cross-border cooperation relationships between destination management organizations contribute to the maximum use of economic, environmental, and social values [20]. There are five key processes, exploiting, exploring, bridging, sharing, and boundary-spanning [131], and seven factors, co-location, associationism, competition, cooperation, strategic management, co-entrepreneurship, and co-production [122]. Planning for crisis management and adhering to the principles of sustainability are two tracks of governance, such as risk management for COVID-19, climate change, and other safety hazards and risks.

Dornier and Mauri (2018) indicated that sustainability in mountain tourism has many facets, and it involves many aspects of tourism management: mobility and mobility infrastructure; global warming, snow shortage, and the long-term viability of ski stations; pollution and clean air; the price of accessibility; stakeholders' involvement and networking; and cross-border partnerships [130]. There were three main issues raised in their study: (1) Increasingly, tourists have preferred to visit mountain destinations that have plenty of natural and healthy resources and are safer than other forms of tourism, especially in light of the continuing COVID-19 pandemic; (2) The increasing popularity of mountain tourism depleted the value of preserving a pristine natural environment; (3) The competitive market failed to allocate resources efficiently to offset these negative externalities.; (4) Economic inefficiency due to market failure required governments to coordinate research in sustainable tourism.

6.3. Further Research Direction and Limitations

Future directions for research could include: (1) How the international organizations mobilize industry resources, support innovation and technology, and cultivate cooperation models for the tourism market to allocate resources efficiently; (2) as per other field of research, such as construction safety [132,133], government operations [134], artificial intelligence solutions. As such it may enhance transport and/or cooperation between sustainable mountain tourism destinations and shall become one new research area; (3) Likewise, the popularity of various Web 2.0 tools such as LinkedIn and Facebook which allow us to read and write in internet [135] offers a new source of data, similar approach used by Song et al. [136] for Twitter analysis can be adopted; (3) Comparative analyses of science mapping between Google Scholar, WoS, and/or Scopus shall provide a new research angle in the future. Our research had some limitations. (1) This study used 1413 papers from only one database (WoS), which does not represent all of the research papers published globally. Therefore, the conclusion and the method should only be considered within the context of mountain tourism research from this database. Whether our method would be suitable for another research field would need to be studied and confirmed further. (2) According to Paunović and Jovanović's findings, an interpretative, qualitative interview methodology can provide richer data and greater insights into phenomena compared to questionnaires; therefore, the qualitative interview method would increase the strength of our findings in addition to the science mapping analysis; otherwise, some keywords could be overlooked, such as transport, competition, cooperation, etc.

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