

## BIBLIOMETRIC ANALYSIS AND LITERATURE REVIEW OF MOUNTAIN TOURISM

Shekhar <sup>1</sup>

*Faculty of Management Studies, University of Delhi, India*

ORCID: 0000-0002-7329-2994

### ABSTRACT

In recent years, the adventure-seeking behaviour of tourists has increased the consumption of mountain tourism. The research on mountain tourism, however, is fragmented, highlighting the gaps in the current literature. This study uses bibliometric analysis to summarise the literature from 1462 articles published on mountain tourism between 1982 to 2022. The study uses bibliographic data to carry out descriptive and network analysis. The co-authorship network is used to highlight the impactful contributors to mountain tourism research. Further, keyword co-occurrence and bibliographic coupling networks helped in identifying the economic development, nature conservation and preservation, climate change and future of mountain tourism, and tourist satisfaction and marketing as the themes in the mountain tourism research. The content analysis of these clusters delivers insight into past research and suggests research for future avenues. The study offers advantages to the researchers and practitioners by suggesting future research avenues and policy actions.

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## INTRODUCTION

Mountain tourism is the practice of travelling to hilly areas or mountains as an adventure or leisure-seeking activity (Geneletti & Dawa, 2009; Nepal & Chipeniuk, 2006). The unique characteristics of the mountain such as landscape, topography, and biodiversity offer an experience of calmness to the tourists. It encompasses a broad range of sports and leisure activities such as skiers, backpackers, and snowmobilers (Fredman, 2008). Mountain tourism has been facilitated by the authorities at destinations which are hilly and have limited economic opportunities. When well planned, mountain tourism has the potential to deliver substantial economic and

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<sup>1</sup> Address correspondence to Shekhar (Research Scholar), Faculty of Management Studies, University of Delhi, New Delhi, India. E-mail: shekhar0481.sa@gmail.com

social benefits to residents. For example, a person at a mountain tourism destination may explore employment opportunities as a tour guide, transportation business, rafting and paragliding trainer, or food stall owner, to boost their livelihood. However, unplanned mountain tourism development has seen an outburst of tourists as it leads to unsustainable development and excessive resource consumption (Singh et al., 2009; Sundriyal et al., 2018). Thus, it has caused massive unrest among the locals and a negative attitude towards the tourists. Thus, it is recommended that stakeholder cooperation is essential in mountain tourism policy-making and development (Maroudas et al., 2011).

Mountain tourism has often been considered a means of economic development. A significant advantage of mountain tourism is its ability to attract tourists throughout the year (Steiger et al., 2022). Researchers have considered it as a channel for economic growth at mountain destinations. However, its development has always been watched through the lenses of sustainable development (Bourdeau et al., 2010; Paunovic & Jovanovic, 2017). The sustainability concerns in mountain regions have been significant because of the scarcity of resources and the serious loss of flora and fauna because of a catastrophic event. The increasing flow of tourists to mountain destinations also brings harm to the social fabric at such destinations (Gill & Williams, 1994). Several researchers have linked ecotourism development to mountain tourism (Bhalla et al., 2020; Varley & Medway, 2011). The development of mountain tourism also faces challenges. Researchers have questioned its sustainability because of its dependence on climate and the growing threat of climate change thwarting its development (Luthe et al., 2012). Similarly, it faces challenges of limited natural resources (Dornier & Mauri, 2018), accessibility (Palomo, 2017), pricing, and overtourism (Malik & Bhat, 2015). As these challenges grew, the academicians started to dig deeper into the mountain tourism development and hence literature mushroomed up.

In the recent decade, the growth of research on mountain tourism has necessitated the need to understand the present status of research. del Río-Rama et al. (2019) carried out a bibliometric analysis to understand what has been done in the research on mountain tourism. The study did not dig deep into future research avenues based on the bibliometric findings. Zeng et al. (2022) carried out a bibliometric analysis of the studies on mountain tourism published in WoS-indexed journals from 2010-to 2020. Chakraborty and Ghosal (2022) carried out a bibliometric analysis to study mountain tourism research focusing on the Himalayan region. However, the focus of these studies is narrowly focused in terms of coverage,

geographical location, and methodology used, highlighting a knowledge gap.

Since the literature on mountain tourism is expanding, therefore, it is necessary to extend the knowledge base on this field. The upcoming researchers need to identify research topics that lead to the development of sustainable mountain tourism. The focus should not only be on ensuring the tourism industry, but the inclusive development of other stakeholders should also be the primary motive of the researchers. However, to suggest new and upcoming themes, it is also important that researchers know and understand what has already been researched in mountain tourism. A literature review in the context of mountain tourism will help in understanding how the concepts, definitions, and methodologies evolved. The research gaps identified in the literature will act as future research agendas for the upcoming researchers. Therefore, through the current study, we aim to bridge the gaps by addressing three research questions: **RQ1.** Who are the major contributors to mountain tourism research? **RQ2.** What are the main thematic areas over the years in mountain tourism research? **RQ3.** What is the future of mountain tourism research? These three questions are frequently used in the bibliometric analysis to understand top contributions, past research trends and themes, and help in suggesting future actions. Answering these questions will make twin contributions, first, it will help the upcoming researchers by summarising the literature on mountain tourism and help in identifying top contributors for research collaboration. The researchers from nations where research on mountain tourism is primitive would be benefitted from the developed constructs in the advanced nations. Second, the study contributes to the theory of mountain tourism by applying software-based bibliometrics to study literary trends.

## METHODOLOGY AND FINDINGS

Bibliometrics has been used across domains to summarise and map the research such as tourism (Kumar et al., 2020; Shekhar, 2022), finance (Pattnaik et al., 2020, 2022), family businesses (Shekhar et al., 2022), and marketing (Kumar et al., 2022; Lim et al., 2021). Keyword co-occurrence, bibliographic coupling, and prestige analysis techniques have been commonly adopted in bibliometric analysis. The present study carried out network analysis such as bibliographic coupling analysis, citation analysis, keyword co-occurrence for author and indexed keywords, and co-citation analysis using the VOSviewer (Version 1.6.18) software package. It has been

widely used in studies because of its ability to analyse bibliometric data and its reliable statistical algorithms (Van Eck & Waltman, 2011). The study uses fractional counting over full counting measures to provide more reliable estimates in the counting of the results (Perianes-Rodriguez et al., 2016). Prestige Analysis is carried out using the Gephi for its suitable algorithms. The literature published in the Scopus indexed journals is selected and the bibliometric analysis conducted to answer these RQs. Studies have shown the bibliometric analysis is well suited to summarise the knowledge in a theme. RQ1 is answered following the bibliometric protocol developed by Khanra et al. (2020). The bibliographic data downloaded from the database is tabulated to identify the top contributions based on publication count. Then bibliographic coupling, citation analysis, and prestige analysis are used as compliments to identify the top contributors among author, institutes, and countries. The co-authorship analysis reveals if there exists sharing of knowledge through author collaboration. Then, findings from keyword co-occurrence, co-citation, and bibliographic coupling help in answering the RQ2 by identifying thematic areas. In the keyword analysis, a separate analysis is conducted for author-keywords and indexed keywords by using the density analysis. Next, future research actions (RQ3) are suggested based on the evolution of these themes and clusters using the dynamic co-citation analysis. It helps in understanding the evolution of the knowledge clusters, their peak duration, and if they have become exhausted during the evolutionary phase.

### **Literature Selection**

As per the adopted protocol, the literature selection is carried out in three stages, the *scanning phase*, *curating phase*, and *analysing of the sample* (Khanra et al., 2020). Scopus database is preferred over its peers such as Web of Science or Google Scholar for its vast coverage and stringent review protocol (de Granda-Orive et al., 2011; Falagas et al., 2008; Yataganbaba & Kurtbaş, 2016; Zyoud & Fuchs-Hanusch, 2017). Thus, the present study retrieves literature from the Scopus database using the search string with the title-abstract-keyword option.

#### ***Phase I- Scanning Phase***

A prior search of the documents suggests that researchers have used the terms mountain tourism, mountain vacation, hill tourism, hill vacation, and mountain visit to indicate mountain tourism. Thus, the search string: TITLE-ABS-KEY (mountain OR hill AND Tourism) was finalised. Using the mentioned search string, we retrieved 4060 documents (on 1<sup>st</sup> April 2022)

including articles, conference papers, review articles, book chapters, and editorials published in several research domains including management, geology, social sciences, and environmental studies.

### *Phase II- Curating Phase*

We applied several pre-determined filters to refine the results obtained in the previous step. The study focused only on the journal articles because of some assurance of quality due to the review mechanism. Then we applied the filter of the English language to ensure accuracy in the analysis. The subject area of this research is limited to disciplines of social sciences and business and management. As this study conducts a review of the last forty years of mountain tourism research, we then excluded all the publications before the year 1982. Thus, the search string was modified to TITLE-ABS-KEY (mountain OR hill AND tourism) AND ( LIMIT-TO ( DOCTYPE, "ar" ) ) AND ( LIMIT-TO ( LANGUAGE, "English" ) ) AND ( LIMIT-TO ( SUBJAREA, "SOCI" ) OR ( LIMIT-TO ( SUBJAREA, "BUSI" ) ) AND ( EXCLUDE ( PUBYEAR, 1981 ) OR EXCLUDE ( PUBYEAR, 1979 ) OR EXCLUDE ( PUBYEAR, 1977 ) OR EXCLUDE ( PUBYEAR, 1976 ) ). The filters resulted in the retrieval of 1462 documents which formed the sample for the bibliometric analysis.

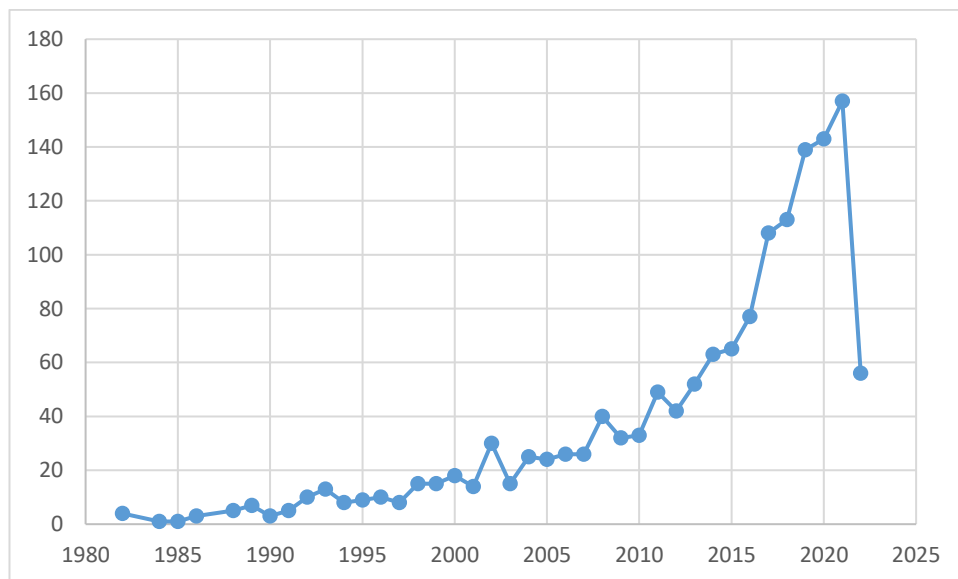


Figure 1. *Articles published on mountain tourism*

### *Phase III- Analysing Phase*

The first article in our sample published in 1982 indicates that mountain tourism research is a mature topic in the management and hospitality research domain. The trends in mountain tourism research, as suggested in

Figure 1, indicates that the interest of academicians in this field is still growing. It is visible in the growing publications and an h-index of 63 of the analysed publications. The sample of the present study is 1464 articles, 159 authors, 98 countries, and 160 organizations. In Table 1, we list the top 10 contributors i.e. authors, organizations, countries, and publication titles on mountain tourism research based on the Total Publication (TP) count.

Table 1. *Top 10 authors, organizations, countries, and journals by publication count*

| Author         | TP | Organization                     | TP | Country        | TP  | Publication Title                  | TP  |
|----------------|----|----------------------------------|----|----------------|-----|------------------------------------|-----|
| Nepal, S.K.    | 9  | Chinese Academy of Sciences      | 40 | United States  | 200 | Sustainability Switzerland         | 101 |
| Fuchs, M.      | 8  | Universität Innsbruck            | 26 | China          | 150 | Mountain Research and Development  | 80  |
| Duglio, S.     | 7  | Università degli Studi di Torino | 18 | Italy          | 104 | Journal of Mountain Science        | 63  |
| Dunets, A.N.   | 6  | Griffith University              | 15 | Australia      | 97  | Revue De Geographie Alpine         | 44  |
| Lexhagen, M.   | 6  | The University of Queensland     | 14 | United Kingdom | 97  | Journal of Sustainable Tourism     | 39  |
| Turnock, D.    | 6  | Univerza v Ljubljani             | 14 | Canada         | 96  | Tourism Management                 | 35  |
| Williams, P.W. | 6  | Colorado State University        | 13 | France         | 75  | Geoheritage                        | 34  |
| Adamov, T.     | 5  | Université Savoie Mont Blanc     | 13 | Spain          | 69  | Tourism Recreation Research        | 33  |
| Bonadonna, A.  | 5  | Sun Yat-Sen University           | 13 | Poland         | 65  | Annals of Tourism Research         | 27  |
| Brida, J.G.    | 5  | Mid Sweden University, Östersund | 13 | Romania        | 64  | Geojournal of Tourism and Geosites | 27  |

## Bibliometric analysis

### *Bibliographic coupling*

As per bibliographic coupling, if two articles cite the same references, it indicates that they relate to the same subject. It represents the overlapping in the reference lists of the publications (Kessler, 1963). Table 2 lists the prominent authors, organizations, publications titles, and countries from the collected sample. The results show that M Fuchs is the most productive and significant contributor to mountain tourism research followed by M Lexhagen and SK Nepal. Among the organizations, the University Fredrico Ii, the University of Chinese Academy, and Universite Savoie Mont-Blanc have the highest contribution to the theme. Among the countries, the United States represents the highest influence in mountain tourism research followed by China and United Kingdom. TLS stands for the total link

strength and indicates the total strength of the co-authorship links of a given researcher with other researchers (Van Eck & Waltman, 2011). For instance, the TLS of 4090.4 of the United States means it has 4090.4 links with other countries. The fraction counting is because of the fractional counting option used in the analysis.

Table 2. *Most productive authors, organizations, and countries by bibliographic coupling*

| Author        | TLS    | Organization   | TLS    | Country        | TLS     |
|---------------|--------|--|--------|----------------|---------|
| Fuchs M.      | 357.55 | Ev-K2-Cnr Committee, Italy   | 158.19 | United States  | 4090.4  |
| Lexhagen M.   | 349.55 | University Federico Ii, Department of Agricultural Engineering and Agronomy, Italy   | 158.19 | China          | 3300.64 |
| Nepal S.K.    | 25.67  | University of Chinese Academy of Sciences, China                                     | 72     | United Kingdom | 3094.23 |
| Wang Y.       | 21     | Institute of Geographic Sciences and Natural Resources Research, China               | 66     | Australia      | 2740.28 |
| Liu Y.        | 20     | Universite Savoie Mont-Blanc, France   | 16     | Italy          | 2317.44 |
| Williams P.W. | 13     | Department of Economics and Political Science, Universita Della Valle D'aosta, Italy | 14     | Austria        | 2075.25 |
| Liu J.        | 10     | Institute of Transport Economics, Norway   | 7      | Canada         | 2020.07 |
| Duglio S.     | 7      | Geography Department, The University, United Kingdom                                 | 4      | Spain          | 1687.1  |
| Turnock D.    | 2      | Southern Cross University, Australia   | 3      | Germany        | 1604.9  |
| Dunets A.N.   | 1      | East-West Center, United States  | 2      | France         | 1434.21 |

Table 3. *Most productive authors, organizations, and countries as per the citation analysis*

| Author        | TLS | Organization  | TLS | Country        | TLS |
|---------------|-----|---|-----|----------------|-----|
| Fuchs M.      | 326 | Plekhanov Russian University of Economics, Russian Federation                                       | 104 | United States  | 382 |
| Nepal S.K.    | 319 | Ev-K2-Cnr Committee, Italy  | 96  | Canada         | 336 |
| Lexhagen M.   | 289 | University Federico Ii, Department of Agricultural Engineering And Agronomy, Italy                  | 96  | Italy          | 247 |
| Fredman P.    | 273 | Institute of Transport Economics, Norway  | 91  | United Kingdom | 245 |
| Brida J.G.    | 254 | Geography Department, The University, United Kingdom  | 60  | China          | 228 |
| Williams P.W. | 186 | University of Chinese Academy Of Sciences, China  | 42  | Spain          | 195 |
| Dunets A.N.   | 119 | Southern Cross University, Australia  | 40  | Australia      | 158 |
| Duglio S.     | 109 | East-West Center, United States   | 39  | Romania        | 110 |
| Li H.         | 92  | Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, China | 34  | Austria        | 98  |
| Adamov T.     | 81  | Department of Economics and Political Science, Universita Della Valle D'aosta, Italy                | 30  | France         | 96  |



### *Citation analysis*

By this analysis, the popularity of a document is assessed by the citation count it has received over the years. Table 3 highlights the most productive and influential authors, organizations, and countries based on the citation analysis. M Fuchs was found to be the most influential author in our sample of mountain tourism research followed by SK Nepal and M Lexhagen. Among the organizations, Plekhanov Russian University of Economics (Russian Federation), Ev-K2-Cnr Committee (Italy), and University Federico Ii (Italy) are the most influential. Further, researchers from the United States, Canada, and Italy are found to be common in mountain tourism research. This approach only lists the popularity based on the citations a study receives. It assumes that seminal works in a field will have more citation count. However, this approach is biased toward old studies and does not consider the content of the study.

Table 4. *Most prestigious articles on mountain tourism*

| <b>Publication</b>      | <b>PageRank value</b> | <b>LCC</b> | <b>GCC</b> |
|-------------------------|-----------------------|------------|------------|
| Kuščer and Dwyer (2018) | 0.007099              | 8          | 12         |
| Sood et al. (2017)      | 0.005661              | 34         | 60         |
| Río-Rama et al. (2019)  | 0.005447              | 15         | 24         |
| Kuščer et al. (2016)    | 0.005236              | 42         | 73         |
| Araújo et al. (2019)    | 0.005078              | 7          | 10         |
| Kuščer (2014)           | 0.004754              | 1          | 6          |
| Maroudas et al. (2011)  | 0.004424              | 17         | 36         |
| Ziegler et al. (2021)   | 0.004362              | 4          | 5          |
| Lai et al. (2015)       | 0.004104              | 26         | 41         |

Note: Local citation count (LCC) is from Scopus and Global citation count (GCC) is from Google Scholar

### *Prestige Analysis*

The bibliographic coupling approach is claimed to be biased towards new studies and citation analysis is assumed to be biased towards older studies. Thus, there is a need for an analysis that overcomes the limitation of other approaches. Prestige analysis is one such analysis that ranks the studies based on several parameters including citations, publication title, age etc. It uses the PageRank algorithm to assess the worth of the article. This algorithm is given in Gephi as a statistical tool for analysing the network diagram. Using the PageRank algorithm (Brin & Page, 1998) in the Gephi (Bastian et al., 2009), we identify the most prestigious articles (Table 4) published in the mountain tourism research in the business, management, and social science domain. These articles are published in top sources and have good citation counts. Past bibliometric studies suggest using two different citation metrics. First is LCC or Local Citation Count and second is GCC or Global Citation Count (Pattnaik et al., 2020). The LCC here refers



to the number of citations that an article has received from the articles downloaded in our sample. Whereas, GCC is the total citations received by an article from other articles as indicated on the Google Scholar platform. The results suggest that Kuščer & Dwyer (2018), Sood et al. (2017), and Río-Rama et al. (2019) are the most prestigious articles in our sample. Most of these articles are published in the last five years which indicates that recent articles have gained prominence.

### *Co-word analysis*

To identify the various themes in mountain tourism research, we ran a keyword co-occurrence analysis on the author-provided keywords and journal-indexed keywords. The main idea was to get a review of the research that has been undertaken in mountain tourism. The authors in our sample provided 4223 keywords while publishers indexed them with 2718 keywords. In the VOSviewer keyword co-occurrence network, the density of the keyword indicates its occurrence. In Table 5, the top author and indexed keywords having the highest frequency in mountain tourism research are listed. The results reveal that sustainability and climate change is the primary concern for the authors while carrying out mountain tourism research. They suggest sustainable development through developing geotourism, sustainable tourism, ecotourism, and rural tourism. However, journals index them in broader aspects of tourism development and management, tourism economics, and tourism destinations in mountain regions.

Table 5. *Most frequent author and indexed keywords*

| <b>Author Keyword</b>   | <b>TLS</b> | <b>Indexed Keyword</b>  | <b>TLS</b> |
|-------------------------|------------|-------------------------|------------|
| Sustainability          | 29         | Tourism Development     | 267        |
| Climate Change          | 26         | Mountain Region         | 219        |
| Geotourism              | 20         | Tourist Destination     | 169        |
| Sustainable Tourism     | 20         | Ecotourism              | 142        |
| Ecotourism              | 19         | Tourism Management      | 118        |
| Rural Tourism           | 18         | China                   | 100        |
| Landscape               | 16         | Sustainable Development | 99         |
| Conservation            | 14         | Sustainability          | 81         |
| Sustainable Development | 14         | Tourist Attraction      | 71         |
| Protected Areas         | 13         | Tourism Economics       | 69         |

Figure 2 represents the network of the author-provided keywords while in Figure 3, we represent the network of indexed keywords. The network diagrams were then uploaded in the Gephi to find the commonalities of the theme using the modularity class statistics (Blondel et al., 2008; Lambiotte et al., 2008). The modularity class helps in clustering the

common attributes and determining the community structure. It is interesting that in the two network diagrams, keywords cover the following common themes: (1) Nature protection and resident perception and interest (Author keywords: sustainable development, sustainable tourism, conservation, protected areas, nature, sustainability; Indexed keywords: Sustainability, nature conservation, heritage conservation, environment protection, nature-based tourism), (2) Economic development (author keywords: sustainable tourism, rural tourism, agriculture, agritourism, rural tourism, stakeholder development; indexed keyword: tourism economics, ecotourism, tourism market, regional development), (3) Tourist satisfaction (author keywords: tourist satisfaction, motivation, destination image; indexed keywords: tourist behaviour, tourist attraction, recreational activity), and (4) Climate preservation and conservation (author keywords: climate change, tourism impacts, geoheritage, geosites, geotourism; indexed keywords: climate change, environmental impact, mountain region, land use). Additionally, indexed keywords also highlight the main countries and regions of research (France, Italy, Eurasia, India).

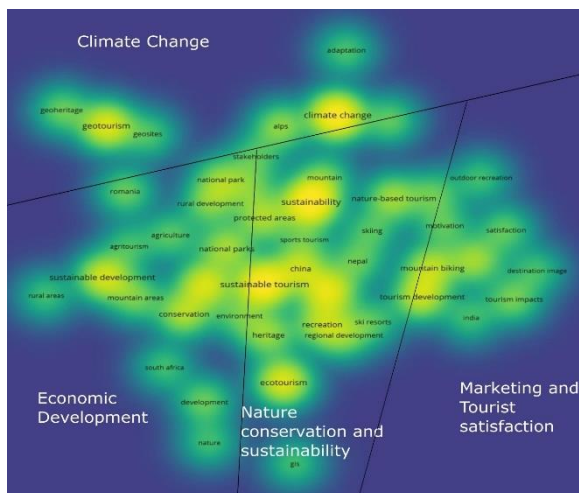


Figure 2. Keyword co-occurrence of author keywords

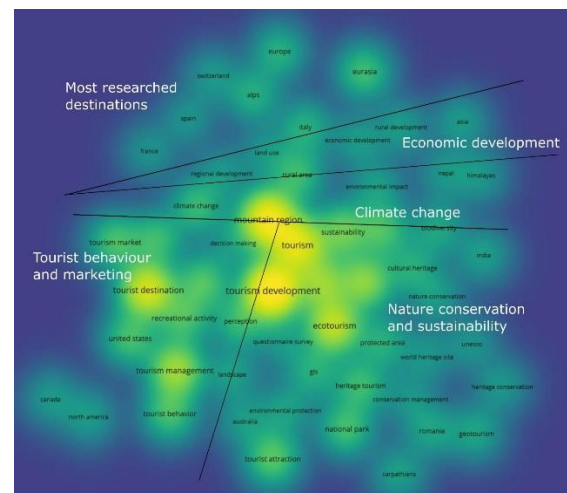


Figure 3. Keyword co-occurrence of indexed-keywords

### Co-authorship analysis

The network (Figure 4) is divided into six groups. In group 1, M Yang (3 links), L Hens (5 links), X Ou (3 links), and R de Wulf (4 links) collaborated and published articles on mountain tourism. In group 2, we have L Zhou (4 links) and BJ Lewis (3 links). In group 3, we have the collaboration of M Voda (5 links) and A Torpan (3 links). In group 4, A Muhar (5 links) and L Khartishvili (3 links) have frequently collaborated in researching mountain

tourism. In group 5, K Huang (5 links) and P Pearce (3 links) have a research collaboration. In group 6, RYM Li (3 links) and L Zeng share research collaboration. Although there are collaborations among the researchers, however, the count of authors in each group is very low. There is a need to expand these networks by including authors from several domains, institutions, and countries.

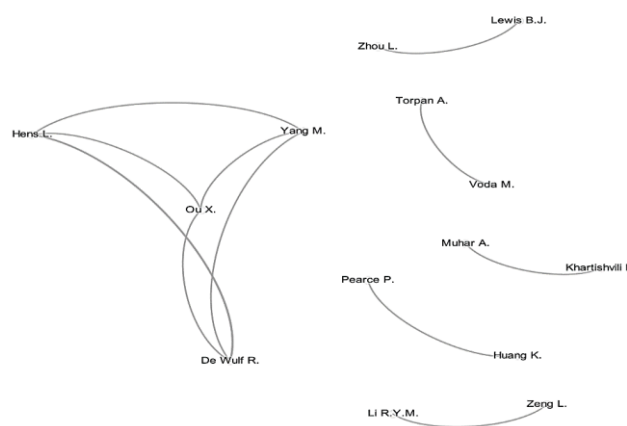


Figure 4. *Co-authorship network*

### Thematic areas

The co-citation analysis helps in the identification of the following themes in mountain tourism research. Through the dynamic co-citation analysis, we identify the evolution and trends of these clusters (Table 6). Both analyses were carried out using the VOSviewer. The co-citation and dynamic co-citation analysis resulted in 859 studies (58.75% of the sample). The clusters are discussed in the following sub-sections. Cluster 2 is the largest in the study followed by Cluster 3, Cluster 1, and Cluster 4. Cluster 4 is the latest as the studies focus on the topic of future of the mountain tourism because of climate change. The dynamic co-citation evaluates the evolution of these clusters. For instance, the studies in cluster 1 originated in 1989 and it has the oldest studies. Yet, it does not have the highest study count among the clusters. Whereas, Cluster 4 has the least number of studies and originated much later than other clusters. Thus, C4 can be termed an emerging cluster and researchers can focus on topics to study from this cluster. Although C2 and C3 have the most studies, the studies continue to explore these topics. It shows that there still exists a lot of study gaps in these clusters that the researchers are exploring globally. The qualitative content of these clusters is discussed in the following sub-sections. Figure 5 is the visual representation of the co-citation analysis

clusters drawn in Gephi. The nodes or the articles are represented as circles. Each cluster has its colour and is divided based on the modularity class statistic. The network shows that studies in each cluster are unique but are connected to the other clusters. For instance, studies in cluster 4 on climate change are closely entangled with studies in cluster 1 on economic development. It means that climate change and its impact on mountain tourism will influence the economic contribution made by the mountain tourism industry. Similarly, studies in the other clusters are related to each other.

### ***Cluster 1: Economic Development through mountain tourism***

Economic development has been a major concern for policymakers at mountain destinations because of the non-availability of earning opportunities (Kumar & Shekhar, 2020). Mountain tourism has been viewed as not only an alternate source of income but also the only livelihood possibility for the regions that offer scenic beauty and adventure and cannot be commercialized. Mountain destinations offer the possibility for the development of several typologies of tourism i.e. adventure tourism, wellness tourism, agro-tourism, rural tourism, and eco-tourism. Lun et al. (2016) identified the critical success factors for the development of rural tourism in mountain destinations and identified communication as a key driver. Although the question of economic contribution is undeniable (Mutana & Mukwada, 2018a; Putkaradze & Abuselidze, 2019), scholars also pointed out that several mountain destinations are moving beyond winter tourism to ensure tourist survival throughout the year (Gilani et al., 2018). Mountain tourism has the potential to restrict poverty and assist people in raising their standard of living (Liang & Bao, 2018). In addition, most of the common destinations have become mature and therefore the revenue-generating capacity has also declined (Danzi & Figini, 2022). Scholars also identified the possibility of the development of niche tourism such as health tourism (Dunets et al., 2020) and bike tourism (Buning & Lamont, 2020). Tourism may also generate creative workforce and may lead to migration of people (Thulemark et al., 2014). It might help the government in distributing people from high density land.

### ***Cluster 2: Nature protection and conservation in mountain tourism***

In this theme, the focus of researchers was on the impact of mountain tourism development on the environment and nature. The studies further necessitated the need for strong environmental protection and nature conservation. They also studied the perception of the residents on the

development of mountain tourism and towards the tourists. The studies focus on making mountain tourism destinations more sustainable. Kuščer and Dwyer (2018) argued that the larger ski resorts served tourists more environmentally efficiently. In addition, the altitude of the mountain forces management to behave more responsibly. The sustainability level of the destination also depends on innovative practices (Kuščer et al., 2016). Mountain tourism however cannot be developed without the participation of the locals (Maroudas et al., 2011). A positive perception of the tourists helps in enhancing the economic contribution of the industry (Brida et al., 2011), whereas negative environmental consequences trouble them (Ali, 2020). Community participation also explains the variance in the economic contribution of the mountain tourism industry at different sites (Nyaupane et al., 2006). Since community participation is essential, practitioners must try to minimise stakeholder conflict (Dangi & Gribb, 2018). Stakeholders must engage in collaborative planning to develop the industry and engage in the conservation and protection of the natural resources at such destinations (Kumar et al., 2018). A desirable framework to support community development and co-management must be employed by the practitioners. Suitable approaches for making mountain tourism sustainable should be adopted (Brătucu et al., 2017). By focusing on improving the productivity and value chains of local tourism operators, practitioners can make mountain tourism more sustainable (Fuchs et al., 2015).

### ***Cluster 3: Tourist satisfaction and marketing of mountain tourism***

The articles in this cluster focused on tourist behaviour, understanding their perception and related aspects of marketing such as segmentation of mountain tourists based on their behaviour and demographics. Practitioners must try to create a suitable destination image for the mountains that can attract tourists (Araújo et al., 2019). Mauri and Nava (2021) observed that bored tourists have higher expenditures and involve in many activities. Thus, practitioners must identify tourists with a longer average length of stay (Lal et al., 2019). This will prove to be a more sustainable option. Moreover, motivation plays a significant role in visiting a destination. Taher et al. (2015) observed that the mountain landscape and behaviour of the organizing company strongly influence visit and revisit motives. Thus, mountain tourists can further be segregated based on their motivation and revisit intention. Further, tourists that have higher disposable income and strong educational backgrounds can be a vital segment (Strobl et al., 2015). Safety has been assessed as an important influencer for mountain tourists (Rebelo et al., 2017). Thus, practitioners

must ensure that at mountain destinations only trained and skilled staff is recruited to carry out activities. Practitioners must also engage in continuous monitoring of the risk at such destinations based on tourist socio-demographic profiles (Jones & Yamamoto, 2016). Lastly, the focus at these destinations must be on enhancing the visitor experiences. Enhanced tourist experiences result in loyalty and generate revisit intention. Proper use of technology at such places can further help in boosting the destination image and tourist experience. Environmental reviews on social media and online platforms can help in influencing the tourist's decision to visit the mountain destination (Bigné et al., 2020). Visit motives for several types of tourists such as rural tourism may further assist in getting insights into tourist behaviour. It will help in modelling the tourism products, setting effective pricing, and engaging in suitable promotion mix strategies for the mountain tourism industry (Kumar et al., 2021).

#### ***Cluster 4: Climate change and the future of mountain tourism***

Mountain tourism, particularly where winter sports are the main theme, is highly vulnerable to changes in climate and increasing global temperatures (Nyaupane & Chhetri, 2009). These destinations are at risk of becoming obsolete and pose serious challenges to the residents. Therefore, there is a need to critically assess these challenges and adopt mitigation strategies (Palomo, 2017). Steiger and Scott (2020) suggested that climate change will have an impact on the destination's reputation and competitiveness. Thus, adaptation strategies, such as artificial snowmaking must be adopted to restore these sites (Haanpää et al., 2014). Another practice could be to carry out destination discontinuity and shift the tourists to a similar destination in a nearby vicinity with similar characteristics and infrastructure. Extreme climatic conditions also will have an impact on the mountain tourism future (Jedd et al., 2017). Pröbstl-Haider et al. (2021) observed that extreme summer could have an impact on the tourist consumption of outdoor activities. Over-tourism in mountain destinations is a common phenomenon because of the extreme heat in the plains (Barbhuiya, 2021). Practitioners must adopt GIS to monitor the changes in climatic conditions and observe any future abnormalities. If the extreme climatic events are regular, then, the destinations must be abandoned to protect the life of the visitors. If such calamities are non-recurring, mitigation strategies could be adopted to safeguard the industry and people. Over tourism must be restricted at all costs as it has an impact on the long-term survival of the mountain tourism industry.



Table 6. *Evolution of thematic clusters*

| Year         | C1         | C2         | C3         | C4        | Total      |
|--------------|------------|------------|------------|-----------|------------|
| 1989         | 1          |            |            |           | 1          |
| 1991         |            | 2          |            |           | 2          |
| 1992         | 1          |            | 2          |           | 3          |
| 1993         |            | 1          |            |           | 1          |
| 1994         | 1          | 1          |            |           | 2          |
| 1995         | 1          |            | 1          |           | 2          |
| 1996         | 1          | 1          |            |           | 2          |
| 1997         | 1          | 2          | 1          |           | 4          |
| 1998         | 1          | 3          | 1          |           | 5          |
| 1999         | 1          | 1          | 3          | 1         | 6          |
| 2000         | 1          | 6          | 3          | 1         | 11         |
| 2001         | 1          | 3          | 3          |           | 7          |
| 2002         | 4          | 6          | 1          |           | 11         |
| 2003         | 4          | 3          |            |           | 7          |
| 2004         | 1          | 4          | 3          |           | 8          |
| 2005         | 3          | 7          | 4          |           | 14         |
| 2006         | 1          | 4          | 6          |           | 11         |
| 2007         | 2          | 5          | 4          | 1         | 12         |
| 2008         | 1          | 11         | 13         |           | 25         |
| 2009         | 5          | 8          | 2          | 3         | 18         |
| 2010         | 7          | 8          | 6          | 2         | 23         |
| 2011         | 5          | 14         | 5          | 4         | 28         |
| 2012         | 6          | 6          | 2          | 2         | 16         |
| 2013         | 5          | 10         | 15         | 1         | 31         |
| 2014         | 4          | 17         | 15         | 1         | 37         |
| 2015         | 7          | 14         | 16         | 3         | 40         |
| 2016         | 12         | 22         | 23         | 4         | 61         |
| 2017         | 14         | 35         | 13         | 5         | 67         |
| 2018         | 11         | 43         | 24         | 2         | 80         |
| 2019         | 11         | 50         | 20         | 8         | 89         |
| 2020         | 7          | 62         | 19         | 4         | 92         |
| 2021         | 22         | 53         | 21         | 6         | 102        |
| 2022         | 8          | 20         | 12         | 1         | 41         |
| <b>Total</b> | <b>150</b> | <b>422</b> | <b>238</b> | <b>49</b> | <b>859</b> |

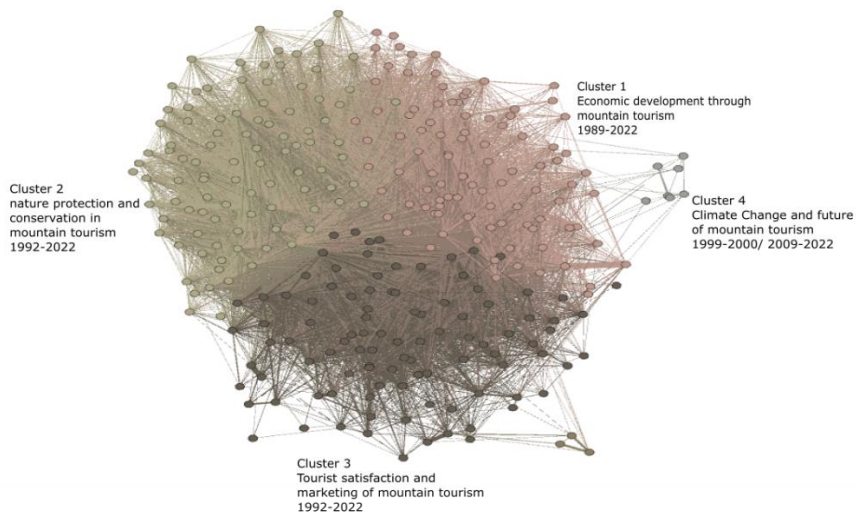


Figure 5. *Visual representation of co-citation clusters*



## GAPS IN LITERATURE AND RECOMMENDATIONS

### **Methodological novelty**

Most of the reviewed literature had adopted similar methodologies with respect to study design, data collection, and data analysis. Most of the studies in cluster 2 are case studies (Dabrowski, 2005; Gardner & Sinclair, 2011; Mason & Leberman, 2010) or descriptive studies using focused group discussions or interview-based discussions. Studies in cluster 1 adopted scenario-based modelling to predict the economic impact of mountain tourism development. Several studies have adopted structural equation modelling (SEM) in cluster 3 to meet their objectives (Zeng & Li, 2021). The use of literature reviews is a common method adopted by many studies in clusters 2 and 3 (Mutana & Mukwada, 2018b; Sánchez-Cañizares et al., 2018). We suggest that future studies could identify the basic building blocks in the mountain tourism framework and empirically test and statistically validate it using quantitative measures. Studies in cluster 3 are empirical as they relate to identifying motives and perceptions of the tourists and observing their behavioural patterns. Future scholars may adopt suitable approaches (such as the TCCM approach) to identify the prominent methodological frameworks used in the literature on mountain tourism and focus on tourists' attitudes and behaviours toward sustainability in mountain destinations.

### **New themes for mountain tourism research**

Mountain tourism development is a multidisciplinary and intradisciplinary knowledge domain connecting hospitality and tourism management with geology, business and management, environmental studies, social sciences, and economics. We identified four major themes that have been the focal point of mountain tourism research related to business management and social sciences. The first theme (Cluster 1) suggests that mountain tourism development leads to rural development and raises the standard of living (Abrudan & Turnock, 1998). The second theme (Cluster 2) highlights that nature protection and conservation are essential for the longevity of mountain tourism (Gunya et al., 2021). The third theme (Cluster 3) focuses on increasing tourist satisfaction by understanding their behaviour and marketing (Huang et al., 2014; Truong et al., 2018). The fourth theme suggests that climate change may prove to be a challenge for the development of winter mountain tourism (Cluster 4).

There is limited research that interconnects mountain tourism and other disciplines, such as operations, strategic management, finance, and taxation. There is negligible research on the role of ancillary industries such as hospitals and healthcare at mountain tourism destinations, the role of mountain tourism in wellness tourism, and opportunities for wedding and glamping tourism in mountain tourism destinations. In addition, themes and issues such as financing options and tour packages for mountain tourists, taxation benefits to the mountain destination conservation and development, and post-pandemic sustainable behaviour of the tourists are yet to be studied in detail. These themes are of importance because of the increased focus of the organizations on their corporate social responsibilities, availing tax benefits, and altered consumer behaviour post-pandemic.

### **New directions for mountain tourism research**

Budding researchers should incorporate the concepts from other management and allied areas to have a deeper understanding of issues in mountain tourism. In addition, the 'sustainable competitive advantage' necessary to sustain mountain tourism destinations because of climate change may pave way for effective management strategies. Furthermore, educating tourists about the consequences of their behaviour and using the Theory of Planned Behaviour (TPB) to plan tourism activities at such destinations will provide new directions for research. Shifting the tourist burden from peak seasons to off-seasons by developing other activities will benefit hospitality managers. Using advanced technologies and big data analytics may help provide more input towards the behaviour of the tourists and residents perceptions. Seminal works may be developed from these concepts to provide new directions to mountain tourism research.

## **DISCUSSION**

Prior literature suggests that the research on mountain tourism is scattered geographically across various disciplines and journals. The present study addresses the gap by making the following contributions to the theme.

**Recognizes key contributors and prestigious articles.** We applied bibliometrics to answer RQ1, which aimed at identifying the top contributors in mountain tourism research. Table 1-3 suggests that SK Nepal, M Fuchs, M Lexhagen, and S Duglio are prominent authors in mountain tourism research. In terms of organizations, the University Federico Ii, the University of Chinese Academy of Sciences, and the Ev-K2-

Cnr Committee, Italy are the top contributors. In terms of countries, the United States, China, Italy, and Canada have the highest contribution to mountain tourism research. The co-authorship network suggests that authors have very minimum collaboration in mountain tourism research. The absence of cross-institutional research collaboration further suggests a low level of inter-institutional collaboration among the researchers. The most prestigious articles in our sample are listed in Table 4. Most of these articles have been published after 2013 indicating novel research in recent years.

**Identification of thematic areas.** Through the RQ2, we aimed to identify the prominent and recent themes in mountain tourism literature. The question is answered using the co-citation analysis of the documents. In the recent articles, we find a strong focus on the identified themes. Cluster 1 focuses on the economic development of the regions through the development of mountain tourism. Cluster 4 focuses on the reducing winters and their impact on the future of winter sports and tourism at mountain sites. Cluster 3 highlights the changing behaviour of mountain tourists and the need for a stronger emphasis on the marketing aspects of mountain tourism. And, Cluster 2 focuses on the need for nature protection and conservation at the mountain sites because of over-tourism and its consequences.

The evolution of the clusters reveals that Cluster 2 is the most researched cluster that focuses on nature conservation and sustainability. Cluster 4 is the latest cluster that focuses on climate change and the future of winter tourism at mountain destinations. Since the issue is new, therefore, this cluster has the least studies but its importance is growing in the coming decade.

**Future research scope.** Through RQ3, we aimed to identify and recommend future research scopes to mountain tourism researchers. First, we suggest that researchers must continue focusing on exploring the existing themes in mountain tourism research. Second, they must also place some attention on the new themes that have not yet been studied and provide new directions to mountain tourism research. In addition, the study stresses the need to conduct multi-disciplinary and interdisciplinary research in mountain tourism research. The researchers should bridge the knowledge gap across disciplines. For instance, the research domain of operations and strategic management must be connected with mountain tourism to determine the carrying capacity for mountains and manage tourist footfall during the peak season. Studying mountain tourism through citizen science will help

in throwing useful insights into tourist behaviour. Furthermore, integrating agritourism, rural tourism, and adventure tourism may provide economic development to the neglected and tribal areas in the economy. The present study will help the researchers in identifying the basic building blocks of mountain tourism research and add value to their contribution.

## CONCLUSION AND LIMITATIONS

In this study, we present a comprehensive review of mountain tourism research. We applied suitable bibliometric analysis following a robust protocol to retrieve the literature from the Scopus database to identify top contributors, most productive authors, top-cited articles, and institutions in mountain tourism research. We further identified four thematic areas relating to economic development due to mountain tourism, nature preservation and conservation as a challenge in mountain tourism, climate change and future of the mountain tourism, and marketing of mountain tourism through understanding tourist behaviour. Then we identified research gaps from the findings and suggested future thematic areas and new directions for mountain tourism research concerning methodological and theoretical advancement. The study also offers several implications for the practitioners and the researchers. The study makes several contributions to the theory. First, it enriches the extant literature on mountain tourism by summarising the past research work and suggesting future research actions. Second, it allows for use of bibliometrics, a widely appreciated literature review technique, in the field of mountain tourism. Researchers could similarly study the other tourism typologies to understand their development. For industry practitioners and managers, the study recommends research-guided development of the mountain tourism industry. Providing suggestions about tourist post-pandemic behaviour should be one of the priorities. In addition, managers should try to make mountain tourism products evolve. One of the concepts widely used in understanding a product is the five levels of the products developed by Kotler (Kotler & Armstrong, 2017). Managers must try to make potential products of today, and the basic or expected products of tomorrow. It is one of the probable ways through which tourist satisfaction could be enhanced. Managers must involve local players in the tourism supply chain clusters to enhance resilience in the event of climate change effects. The formation of local tourism clusters in the mountains for knowledge sharing will further boost the shock-absorbing capacity of the industry. The concept of Creating Shared Value (CSV) can further boost the socioeconomic contribution of the industry.

The present study suffers from limitations that are inherent to the bibliometric analysis. The findings and discussions are based on the analysed sample. Future studies may include literature from multiple databases to enlarge the sample size. Studies can also focus on articles published specifically in journals focusing on mountain tourism research as it would provide them with a more up-to-date state of mountain tourism research. There may exist several studies that might not have been missed out from our sample because of our search string. It is because several types of tourism activities might take place at mountain destinations and since we searched only for 'mountain' in the search string, these studies might get omitted from our sample. Thus, future studies could include studies that focus more on a specific form of tourism at such destinations and extend the findings of the present study. Despite the limitations, we believe that the present study will assist the upcoming researchers to adopt novelty in the research themes and methodology and provide a new direction to advance research on mountain tourism.

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