

## Mountain tourism research. A review

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### Abstract

In recent years, mountain tourism has gradually increased its position among tourists' preferences at international level. The main reason is the strong relationship that man develops with nature and precisely with the mountain, becoming a destination of great tourist influx. An adequate use of these tourist flows results in the development of a sustainable activity, capable of contributing to the improvement of economic conditions in these areas. The objective of this research is to identify and analyse the indexed scientific production on "mountain tourism" in the international databases Scopus and Web of Science, in order to analyse in-depth the current state of this area of study. The work methodology focuses on a bibliometric analysis of the 134 items identified by searching the term "Mountain Tourism". Prior to this analysis, the level of coverage and overlap of the information in both databases was analysed. The results show that Scopus performs a greater coverage of scientific production. In addition, the research is in its exponential growth stage, most researchers are small producers, only 19 have between two and three publications and the European continent is the most prolific in research on mountain tourism. Finally, note that, despite its long coverage over time, more than 40 years, it is an emerging area of study and there are many research lines that must be studied further.

**Keywords:** Mountain Tourism, Bibliometric, Scientific Production, databases.

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## Introduction

Mountain tourism appeared for the first time as a new type of tourism in *The Encyclopedia of Tourism* (Jafari, 2003), gradually increasing its positioning within the diversity of forms of tourism, showing a rapid development throughout the world in recent decades (Moss and Godde, 2000; Price, 1992). Mountain areas have currently established themselves as the second most visited tourist destination behind coastal areas (UNEP/PNUMA, 2007), in addition to contributing to 15-20% of tourism worldwide, which represents between 70 and 90 billion dollars per year (Mohd Taher *et al.*, 2015). For example, tourism in the Alps in 2002 represented between 7% and 10% of annual tourist revenues worldwide, a fact that was revealed in the framework of the International Year of the Mountains and also the International Year of Ecotourism.

With regard to this type of tourism, according to Godde *et al.* (2000), this has always existed, since these spaces were linked by the population to a religious or ancestral connotation (Nepal & Chipeniuk, 2005; Ortner, 2001), by housing religious sites, which the first pilgrimages moved towards (Godde *et al.*, 2000). Today, the increase in visitor flows, the dissemination of these spaces, the increase in accessibility and the adaptation of the necessary infrastructure make mountain spaces beyond a religious thing; spaces for leisure and sports. Specifically, in the 19<sup>th</sup> century, mountain areas, especially the Swiss Alps, were the main leisure and free time centres for the wealthy classes of Europe, a situation that spread to the Scandinavian Alps (Flognfeldt & Tjørve, 2013). With the onset of the 20<sup>th</sup> century, these areas became an even more attractive destination with the incorporation of new sports and recreational activities (Spanish Tourism Institute, 2009).

The relationship between the mountain and tourism is undeniable, mountains are a place with a large tourist influx, so its use from a well-focused form of tourism results in the development of a sustainable activity, capable of contributing to the improvement of the economic conditions of these places, which in many cases house low-income populations (Brohman, 1996; Gurung and DeCoursey,

2000; WTO, 2005). In fact, promoting economic development, as well as raising awareness about protecting the environment by promoting mountain tourism was the main issue of the 3<sup>rd</sup> Euro-Asian Mountain Resorts Conference of the World Tourism Organization (UNWTO, 2017).

According to Tigu (2012), the introduction of tourism in depressed areas enables to reduce inequalities, besides being considered an important source of economic income for the local population. This statement is confirmed by Duglio & Beltramo (2017), who studied the impact of carrying out sports events in mountain areas. The results of their study show that this form of tourism generates important direct and indirect benefits in the host localities, as well as promoting the sustainability of areas.

There are many spaces designed to develop this form of tourism, taking into account that 24% of the land surface is mountains; all the continents, as well as extreme ecosystems such as tropical forests, deserts, polar caps are taken into account and included in these calculations (UNEP/PNUMA, 2007). Table 1 shows the geographical distribution of the most important mountainous areas worldwide. In most cases, they are characterized by being areas of difficult access, having a high ecosystem fragility, housing a considerable percentage of the poorest population, as is the case of the Andes, as well as being areas that were forgotten in the past, when making political or economic decisions (Messerli & Ives, 1997). The European continent hosts the largest number of mountain spaces. According to the data from the Spanish Tourism Institute (2009), the main international destinations for mountain tourism are Austria, Switzerland, France, Italy and Germany.

The literature review on "mountain tourism" leads to the conclusion that there is still no clear and universally accepted definition of this form of tourism. In this sense, Nepal & Chipeniuk (2005) consider it a space for the development of interactions between nature and man. The appreciation of the landscape and cultural wealth can be included in this broad concept, as well as various recreational and sports activities such as alpine skiing,

**Table 1.** Mountain Ranges of the World

North America	South America	Europe	Africa	Asia	Oceania
Alaska Range (USA)	Andes (Argentina, Chile, Bolivia, Peru, Ecuador, Columbia)	Alps (Central Europe)	Atlas Mountains (Morocco, Algeria)	Altay Mountains (Mongolia)	Great Dividing Range (Australia)
Appalachians Mountains (USA)		Caucasus Mountains (Ukraine)	Crystal Mountains (Gabon, Congo, Zambia, Angola)	Himalayan Mountains (Afghanistan, Pakistan, India, Tibet, Nepal, Kashmir, China)	Southern Alps (New Zealand)
Brooks Range (USA)		Kjolen Mountains (Norway)	Drakensberg Mountains (South Africa)	Tian Shan (Tajikistan, Kyrgyzstan)	
Coastal Mountains (USA-Canada)		Pyrenees (France, Spain)	Mitumba Mountains (Zambia)	Zagros Mountains (Iran)	
Rocky Mountains (USA-Canada)		Taurus Mountains (Turkey)			
Sierra Madre (Mexico)		Thian Mountains (Eastern Europe)			
		Ural Mountains (Russia)			

**Source:** Own elaboration based on the information contained in the United Nations Environment Programme (UNEP/PNUMA, 2007).

mountaineering, climbing, alpinism or any other mountain activity (Gozalo, 2016). For Whitlock *et al.* (1991), mountain tourism or mountaineering, is just a sector of nature tourism, because this is a term that covers the different activities that can be performed within a natural area. Beedie & Hudson (2003) consider mountaineering a fragmentation of adventure tourism that has allowed to dominate most of the tourist market. Other authors such as Duglio & Beltramo (2017) establish that there is a relationship between sports tourism and mountaineering due to the wide range of sports practices it offers. Along the same lines, Bonadonna *et al.* (2017) identify several studies focused on mountain sports tourism, both winter and summer, as well as sports activities in mountain regions.

Mountain tourism is currently understood as a broad concept that includes: alpine skiing, mountaineering (hiking), climbing, alpinism and other active forms whose activity is in the

mountains have been included, such as bicycle touring, canyoning, horse riding, rafting, etc.

In this context, this research aims to analyse and examine the scientific production developed in relation to mountain tourism, in order to observe the evolution in the generation of knowledge about this form of tourism. Therefore, our starting point is the literature available on mountain tourism. There are many approaches followed by researchers ranging from cross-cutting issues such as sustainable development and climate change (Lasanta *et al.*, 2007; Scott *et al.*, 2007; Loibl & Walz, 2010; Luthe & Schläpfer, 2011; Morrison & Pickering, 2013; Bąkowska-Morawska, 2014; Dar *et al.*, 2014; Bonzanigo *et al.*, 2016; Strobl *et al.*, 2015; Bonadonna *et al.*, 2017; Brătucu *et al.*, 2017; Palomo, 2017; Paunović & Jovanović, 2017; Pronello & Camusso, 2017; Zhou & Liu, 2017; Dornier & Mauri, 2018; Gazzola *et al.*, 2018); to more specialized topics such as the study of experiences (Du Preez & Lee, 2016; Milman *et al.*, 2017; Milman & Zehrer, 2018),

attitudes of residents and mountaineers's towards tourism development (Muhar *et al.*, 2007; Demirović *et al.*, 2017; Zhang *et al.*, 2017; Tvrtko-Opačić & Banda, 2018), infrastructure and different markets (Dickson & Huyton, 2008; Kuščer, 2013; Banki & Ismail, 2015; Koemle & Morawetz, 2016; Rakytova & Tomcikova, 2017; Srđan & Marija, 2017; Chakraborty, 2018).

However, there is a gap in the conceptualization of this form, which leads to confusing it with other tourism forms such as adventure tourism (Maroudas *et al.*, 2004; Beedie & Hudson, 2003; Swarbrooke *et al.*, 2003), alpine tourism (Macchiavelli, 2009; Jafari, 2003), nature tourism (Fredman & Tyrväinen, 2010), as well as ecotourism, active tourism, among others. In all of them, both recreational and sports activities that can be done within mountain spaces are performed.

This article is structured into four sections. After the introduction in which the subject is contextualized, the work methodology is presented. In the third section, the results are shown and in the last section, the conclusions and limitations of the investigation are discussed.

### **Methodology**

A bibliometric study of the scientific production generated in relation to Mountain Tourism indexed within the international databases Web of Science (WoS) and Scopus is carried out. These bases stand out due to (1) *the coverage over time* that they provide, (2) the level of detail that exceeds other bases, as well as (3) due to the high-quality standards imposed by the Relative Quality Indices, JCR InCites Journal Citation Report, available for WoS and the SJR Scimago Journal Rank generated by Scopus. Due to all of these characteristics, the use of these two databases does not require further justification (Harzing & Alakangas, 2016).

This analysis consists of applying several bibliometric indicators, which have been grouped into two categories (Escorcía-Otálora & Poutou-Piñales, 2008). The activity indicators provide information on quantity, productivity, dispersion, collaboration and networks, among

others. On the other hand, the impact indicators provide information on the citation level of the documents, impact factor or immediacy index, H index, among others. All these indicators arise from mathematical models based on two variables being related (Hubert, 1981), as well as being based on "bibliometric laws" of great relevance such as Lotka's Law, Price's Law, Bradford's Law, as some examples. Table 2 shows the ones used in this investigation.

To apply these indicators, in the first place, it is necessary to build a database that contains detailed information of the documentary units to be analysed. To do so, the documents are tracked through the advanced search of terms; WoS in the field of "*TS=Topic*" and in Scopus in the field "*Article Title, Abstract, Keywords*". Search equation: "*Mountain Tourism*" *DOCTYPE (ar)* to date 12<sup>th</sup> March, 2018. A total of 188 articles were obtained (125 Scopus and 63 WoS). The search has been limited to the most cited documents at present. These documents undergo a peer-review process, which is considered a quality control mechanism (Bryman, 2006); and they are also characterized by the speed of updating and distribution among the scientific community (Martín Vega, 1995). Taking into account all this, books, book chapters and communications in congresses have been excluded from this investigation.

In order to comply with the proposed objective, to see the state of the art in this thematic area, an ad hoc work matrix is built in Microsoft Office Excel with the articles indexed in both databases, debugging it, identifying and deleting duplicate articles. As a final result, the joint work matrix contains 134 articles. For the individual analysis of each of the databases, the original matrices of each of them are maintained.

### **Traditional Overlapping (TO) and Relative Overlapping**

The use of Meyer's index, Traditional Overlapping (TO) and Relative Overlapping allows to identify the level of overlap of articles indexed in both databases (Gavel & Iselid, 2008; Pulgarín & Escalona, 2008). Although the overlapping phenomenon has been known

**Table 2.** Search terms in databases

<b>Activity indicators</b>	<ul style="list-style-type: none"> <li>- Productivity per year: total number of articles published per year included in the study.</li> <li>- Author productivity: number of articles signed by author.</li> <li>- The authors' productivity index: <math>IP = \log N</math>, where <math>N =</math> total of original documents.</li> <li>- Lotka index (decimal logarithm of the number of publications): establishes the periodicity of the authors in relation to the publication to a particular topic. The obtaining formula is: <math>Y = C / X^n</math> where <math>X</math> is the number of publications, and it establishes the frequency of authors with <math>X</math> publications, while <math>n</math> and <math>C</math>, are established as constant variables from the field of study analyzed (<math>n \approx 2</math>).</li> <li>- Co-authorship: papers that are produced by two or more authors, this is subdivided into:             <ul style="list-style-type: none"> <li>o Co-authorship per institution: documents produced by one or more authors inside or outside the same institution.</li> <li>o Co-authorship per country: documents produced by one or more authors inside or outside the same country</li> </ul> </li> <li>- Productivity by institutions: total number of articles produced by the institution which they belong to in the period of time studied.</li> <li>- Productivity by country: total of articles produced by a country within the established study period.</li> <li>- Co-author index (number of signatures per paper): quotient between the number of authors and the number of articles.</li> <li>- Index of institutional collaboration: quotient between the number of signatory centres and the number of articles.</li> </ul>
<b>Impact Indicators</b>	<ul style="list-style-type: none"> <li>- <b>Impact factor:</b> SJR or JCR according to the study base that establishes the impact that the different resources identified within the study have.</li> </ul>

Source: Authors' own data

for more than 50 years, it is in the last decade where there has been a greater interest in its study and application (Gavel & Iselid, 2008).

*Meyer's index* allows to evaluate the existing coverage in different databases on a specific subject of study (Pulgarín & Escalona, 2008), based on the determination of the number of repetitions a document has among the chosen databases (Costas *et al.*, 2008; Cañedo Andalia, 1999; Meyer *et al.*, 1983). The calculation of this index gives a weight based on the number of times the document is repeated between the bases, with the greatest weight being given to those documents registered within a single base (weight = 1). As the number of repetitions of a document increases, based on the number of databases used for the comparison, the weight will be reduced gradually for duplicated documents (0.5), tripled documents (0.3), and so on progressively. The value that results from the application of Meyer's index will allow to establish the singularity of each base, the higher the value reached by the index, the greater the originality of the base (Meyer *et al.*, 1983).

$$\text{Meyer's index (MI)} = \frac{\sum \text{Sources} * \text{Weight}}{\text{Total sources}}$$

- *Traditional Overlapping (TO)* determines the percentage of overlap, or the degree of similarity between two bases, in other words, it establishes the similarity that base A has inside base B. Therefore, the higher the percentage obtained, the greater the similarity there is (Gluck, 1990).

$$TO = 100 * \left( \frac{|A \cap B|}{|A \cup B|} \right)$$

- *Relative Overlapping (RO)* provides the existing percentage of overlap of one base on another, that is, the coverage that base A has on base B (Bearman & Kunberger, 1977), considering the weight of overlapping documents with respect to those of a single nature (Costas *et al.*, 2008).

$$\text{Overlapping in A} = 100 * \left( \frac{|A \cap B|}{|A|} \right),$$

$$\text{Overlapping in B} = 100 * \left( \frac{|A \cap B|}{|B|} \right)$$

At this point it should be mentioned that the creation algorithms used for Traditional Overlapping (TO) and Relative Overlapping, generate a considerable difference of these with respect to Meyer's index, because the overlapping percentages take into account all

the possible unions that can be produced between the analysed databases (Gluck, 1990).

## Result

### *Overlap of Databases*

Firstly, a correlation analysis is carried out between both databases, in order to observe their relationship level. The linear correlation coefficient is 0.82, which indicates a strong and direct correlation between Scopus and WoS. It is observed that 54 of the 188 articles (125 Scopus and 63 WoS) are found in both bases, which represents 43% of Scopus and 86% of WoS. The remaining articles, 71 of Scopus and 9 of WoS, are classified as single documents since they are present in only of the two bases.

Secondly, Meyer's index (MI) is applied in order to determine the singularity of the bases. Scopus shows a higher singularity index by having a greater number of single documents with an MI = 0.80 while in WoS the MI = 0.60.

**Table 3.** Singularity of the Databases

Databases	% Single Documents		Meyer's Index	
	Articles	Journals	Articles	Journals
Scopus	56.80%	59.74%	0.80	0.80
WoS	14.29%	16.22%	0.60	0.58

Source: Authors' own data

On the other hand, the Traditional Overlapping (TO) % between Scopus and WoS shows a 40.30% similarity or a disparity of 59.70% between the bases.

$$\%TO_{Sources} = 100 * \left( \frac{|WoS \cap Scopus|}{|WoS \cup Scopus|} \right) \Rightarrow$$

$$\%TO = 100 * 54 / (125 + 63 - 54)$$

$$\Rightarrow \%TO_{Sources} = 40.30\%$$

Finally, to establish the percentage coverage of Scopus in relation to WoS and vice versa (Gluck, 1990), Relative Overlapping (RO) was applied:

$$\% RO_{Scopus} = 100 * 54 / 125 = 43.20\%;$$

$$\%TO_{WoS} = 100 * 54 / 63 = 85.71\%$$

This result shows that 43.20% of Scopus is covered by WoS, whereas on the contrary, the

Relative Overlapping (RO) of WoS shows that Scopus covers this base by 85.71%. In this sense, Scopus has a 43% lower overlap than WoS. This difference can be explained by the coverage over time that each of the bases has, as well as by the indexation policies that in some cases has led to not sharing entirely all the Articles registered within the journals which they have in common (Costas *et al.*, 2008).

### *Productivity per years*

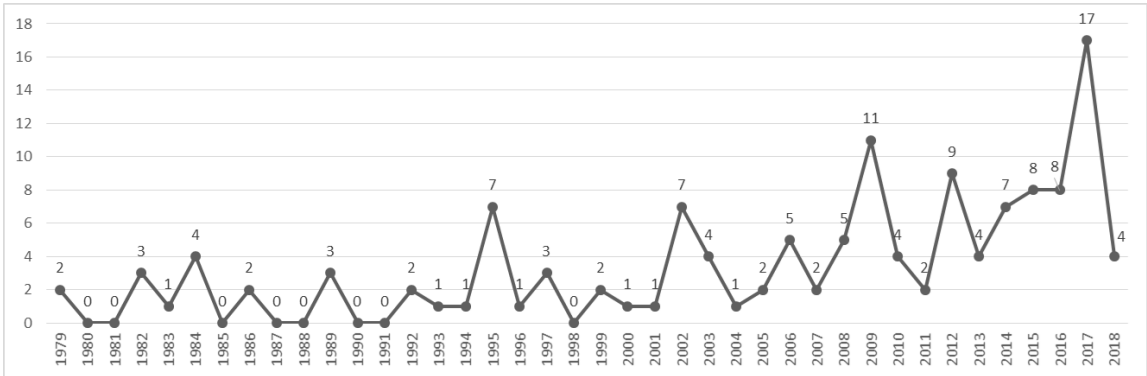
The coverage over time that is observed considering the two bases goes from 1979 to 2018, a total of 40 years; the first two publications are published in Scopus in 1979 and the first publication in WoS does not appear until the year 2000. The joint work base that groups both databases after debugging and deleting duplicate articles was made up of 134 articles (71 Scopus and 9 WoS, 54 articles contained in both databases). In this period, two of the four stages of the growth process established by Price (1976) can be seen. The first stage, the precursor stage goes from 1979-2007 (74 articles in 29 years), where slow growth is shown. The second stage begins in 2008 and goes until 2018 (60 articles in 11 years). In this stage, the number of articles has grown exponentially, showing a considerable increase in the initial scientific production in time and quantity. Taking into account the growth curve, it is observed that it will remain constant for the coming years ( $R^2 = 0.4541$ ).

A greater coverage of this subject is observed in the Scopus database, both regarding the number of articles published and the number of original articles, Meyer's Index of 0.80 (Figure 2 and 3).

### *Authoral and co-authorships Productivity*

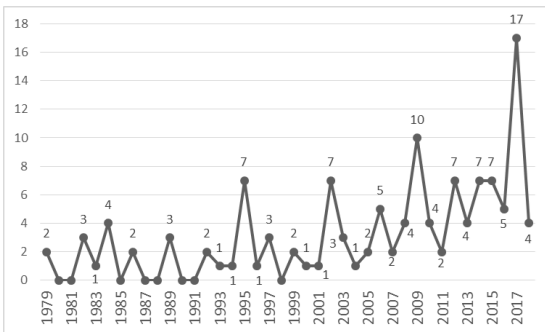
In relation to the productivity by authors, a total of 276 authors have been identified. 93% have contributed with a single article, therefore, the author's productivity index is 1.08. P. Fredman, I. Sacareau and P.W. Williams, with 3 publications each, lead the ranking of the most productive authors. The productivity index is very similar in both databases, 1.09 in Scopus and 1.03 for WoS.

Lotka's Law was applied, which allows to obtain the decimal logarithm of the total num-



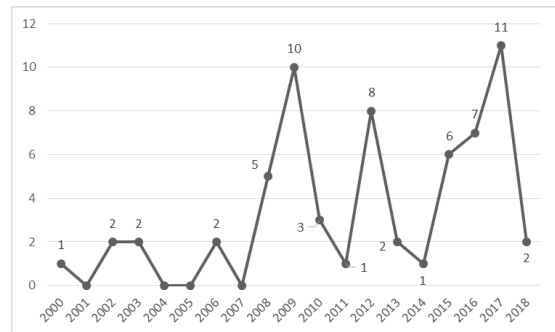
Source: Authors' own data

Figure 1. Trend of publications Scopus ∪ WoS



Source: Authors' own data

Figure 2. Trend of publications in Scopus



Source: Authors' own data

Figure 3. Trend of publications in WoS

ber of publications registered by each one of the authors, and from the value obtained, they are grouped into three productivity levels (Lotka, 1926). The initial group is established as small producers, characterized by a single published article and obtaining an index = 0, where 92% of Scopus authors and 97% of WoS are found. The next level corresponds to medium producers, which are characterized by having published between 2 and 9 articles and obtaining an index > 0, but < 1, 8% of authors of Scopus and 3% of WoS are identified with this level. Finally, the last level or also called large producers, where authors with 10 or more

articles are concentrated and with an index ≥ 1, does not register any authors in this subject analysis. The distribution identified by Lotka's Law corroborates the existence of a large number of authors with a single publication and the predominance of small producers in this area of study.

In the analysis of networks, by applying the co-authorship index or signatures/article index, an average of 2.23 authors per article is observed. 39% (52) of the articles are signed by a single author.

Table 4. Most productive authors Scopus union WoS

Author	No. Articles	Lotka index
P. Fredman; I. Sacareau; P.W. Williams	3	0.477
B. Abegg; H. Elsasser; N. Espenbetov; M. Fiebig; T.A. Heberlein; M. Ikenaga; T. Imangulova; K. Kušcer; T. Lasanta; R. Lessmeister; T. Luthe; A. Muhar; S.K. Nepal; U. Pröbstl-Haider; F. Ritter; S. Tsiaras; R. Wyss	2	0.301

Source: Authors' own data

**Table 5.** No. of co-authorships

<b>Scopus and WoS</b>		
<b>Classification</b>	<b>Number of articles</b>	<b>Number of authorships</b>
Articles with 1 author	52	52
Articles with 2 authors	36	72
Articles with 3 authors	27	81
Articles with more than 4 authors	46	94
Total	134	299

**Source:** Authors' own data

*Productivity by type of institutions and country*

It is possible to evaluate the behaviour of the investigation according to the organizations or countries through the analysis of the productivity by type of institution and country (Spinak, 1996). Regarding the productivity per institution, 154 were identified. Universities have the highest number of affiliations with 75% (115), followed by Research Institutes with 17% (26). Table 6 shows the ranking of institutions taking into account authors' affiliations. Kazakh Academy of Sports and Tourism of Kazakhstan leads the ranking, followed by the Transylvania University of

Braşov located in Romania. If each one of the bases is taken into account separately, 145 institutions for Scopus and 84 WoS are identified, 75% (109) belonging to the university typology in Scopus and 77% (65) in WoS. As for the joint database, a ranking of the institutions was developed according to the affiliations registered by the authors. The university that holds the first place is the Kazakh Academy of Sports and Tourism of Kazakhstan in Scopus and the University of Nebraska of the United States (WoS).

Regarding the productivity per country, Table 7 shows the ranking of the countries according to the affiliations registered by the authors, positioning France with 22 authors, 24 authorships and 17 centres as the leader, followed by the United States with 20 authors, 22 authorships and 10 centres. European countries predominate, which also have the highest number of affiliations of authors, authorships and research centres. If both databases are analysed separately, the United States with 20 authors, 22 authorships and 10 centres is the leader in Scopus and China with 18 authors, 18 authorships and 12 centres in WoS (Table 7).

**Table 6.** Most productive institutions with authors and authorships

<b>Institution</b>	<b>Authors</b>	<b>Authorships</b>
Kazakh Academy of Sports and Tourism	6	8
Transylvania University of Braşov	6	6
University of Nebraska	6	6
Simon Fraser University	5	7
Instituto Pirenaico de Ecologia	5	6
Islamic Azad University	5	5
Serbian Spatial Planners Association	5	5
Università degli Studi di Milano	5	5
University in Belgrade	5	5
University in Novi Sad	5	5
Ivane Javakhishvili Tbilisi State University	4	4
Lillehammer University College	4	4
Nanjing University	4	4
North Carolina State University	4	4
Universidad Nacional del Comahue	4	4
Universiti Teknologi MARA	4	4
University of Turin	4	3
Catholic University of Eichstätt-Ingolstadt	4	2
University of Natural Resources and Life Sciences	4	2
University of the Free State	4	2

**Source:** Authors' own data



**Table 7.** Number of centres, authors and authorships by their country of affiliation

Scopus and WoS (n=134 articles)				Scopus (n=125 articles)				WoS (n=63 articles)			
Country	Authors	Authorships	No. Centres	Country	Authors	Authorships	No. Centres	Country	Authors	Authorships	No. Centres
France	22	24	17	U.S.A	20	22	10	China	18	18	12
U.S.A	20	22	10	Romania	20	20	8	U.S.A	18	18	8
Romania	20	20	8	France	19	21	15	Serbia	15	15	5
Serbia	20	20	6	China	19	19	13	Italy	12	12	5
China	19	19	13	Serbia	15	15	5	Romania	12	12	4
Italy	16	16	8	Canada	14	16	9	France	9	9	7
Canada	14	16	10	Italy	14	14	6	Norway	7	7	2
Spain	12	13	7	Spain	9	10	5	Canada	6	6	4
Austria	8	13	7	Austria	8	13	7	India	5	5	4
Kazakhstan	8	10	1	Poland	8	8	4	Germany	5	5	4
Poland	8	8	4	Kazakhstan	8	10	1	South Africa	5	5	3
Germany	7	8	5	India	7	7	6	Austria	5	8	3
Greece	7	8	5	Greece	7	8	5	Spain	5	5	3
India	7	7	6	Norway	7	7	2	Poland	5	5	2
Norway	7	7	2	Australia	6	6	5	Iran	5	5	1
Switzerland	6	9	4	Switzerland	6	9	4	Australia	4	4	3
Australia	6	6	5	Germany	5	6	4	Switzerland	4	4	2
South Africa	5	5	3	South Africa	5	5	3	Argentina	4	4	1
Iran	5	5	1	Nepal	4	4	4	Malaysia	4	4	1
Nepal	4	4	4	U.K..	4	4	3	Sweden	3	4	1
U.K..	4	4	3	Argentina	4	4	1	Georgia	3	3	1
Argentina	4	4	1	Malaysia	4	4	1	Albania	2	2	2
Georgia	4	4	1	Georgia	4	4	1	U.K.	2	2	2
Malaysia	4	4	1	Kyrgyzstan	3	3	3	Greece	2	3	1
Sweden	3	5	1	Portugal	3	3	2	Slovenia	2	2	1
Slovenia	3	4	1	Russia	3	3	2	Taiwan	1	1	1
Kyrgyzstan	3	3	3	Morocco	3	3	1	Croatia	1	1	1
Portugal	3	3	2	Indonesia	3	3	1	<b>Total</b>	<b>164</b>	<b>169</b>	<b>84</b>
Russia	3	3	2	Slovenia	3	4	1				
Indonesia	3	3	1	Sweden	3	5	1				
Morocco	3	3	1	Japan	2	3	2				
Japan	2	3	2	Albania	2	2	2				
Albania	2	2	2	Croatia	2	2	2				
Croatia	2	2	2	Slovakia	2	2	1				
Slovakia	2	2	1	Taiwan	1	1	1				
Bosnia and Herzegovina	1	1	1	Thailand	1	1	1				
Finland	1	1	1	Bosnia and Herzegovina	1	1	1				
Taiwan	1	1	1	Finland	1	1	1				
Thailand	1	1	1	Without affiliation	6	6	0				
Without affiliation	6	6	0	<b>Total</b>	<b>256</b>	<b>279</b>	<b>144</b>				
<b>Total</b>	<b>276</b>	<b>299</b>	<b>154</b>								

Source: Authors' own data

To determine the collaboration processes in this area of study, only articles written by two or more authors, i.e., 61% (82) of the articles that make up the joint base, are taken into account. Within this group, it can be seen that in 71% (58) of the articles, the authors who sign them are from the same country, there are

international participations in 27% (22), whereas 2% (2) of the articles do not have any information to establish the type of collaboration they have. In the case of national collaborations, 67% (39) of the articles are signed by authors from the same institution, and the remaining 33% (19) are signed by

authors from different institutions, but from the same country. Regarding international collaboration, 95% (21) of the articles are signed by authors of several institutions based in different countries and only 5% (1) of the articles have been written under the collaboration of authors of the same university, but with headquarters in different areas of the world.

If both bases are analysed separately, there are 62% (77) of articles in Scopus and 76% (48) in WoS, written by two or more authors. The results obtained show that 69% (53) of the articles in Scopus are written with the participation of authors from the same country, 29% (22) have international participation, while 3% (2) of the Articles do not have any information to establish the type of collaboration they have. In the case of WoS, it is observed that 75% (36) of the articles are signed by authors from the same country, and the remaining 25% (3) are signed by authors from different countries.

#### *Journals*

In the analysis of the journals where the articles are published, it is observed that the 134 articles have been published in 83 journals, which represents a dispersion index of 1.61 articles/journals. Thus, 45% (60 journals) have published a single article on this area of study. Taking into account the ranking of the most prolific journals, *Revue de Geographie Alpine* (11 articles) holds the first position, whose publication country is France (JCR index of 0.365, Q4). *Mountain Research and Development* (9 articles) published in the United States (Q2 with an index of 0.441 in The SCImago Journal & Country Rank) is in the second position. If both databases are analysed separately, the dispersion index in Scopus is 1.62 articles/journals and 1.70 articles/journals in WoS. Thus, 70% (54 journals) of Scopus and 76% (28 journals) of WoS have published a single article on this area of study. Taking into account the ranking of the most prolific journals, *Mountain Research and Development* in Scopus is in the first position and the leading journal in WoS is *Revue de Geographie Alpine*.

According to Bradford's Law, it is possible to observe the presence of a unique behaviour in

which the articles are concentrated in a small number of journals (Bradford, 1934). In the case of this study area, 51% (68) of the articles have been published in 24% (20) of the journals (3.88 articles/journals). In Scopus, 57% (71) of the articles have been published in 30% (23) of the journals (3.88 articles/journals) and in WoS, 56% (35) of the articles have been published in 24 % (9) of the journals (3.40 articles/journals). Therefore, it is observed that there is a core of journals that contain the majority of articles published on the subject.

In relation to the quality indices, taking into account the *SCImago Journal Rank* (SJR) indices of Scopus and the JCR of WoS, it is observed that 25% of the articles are published in journals with a Q2 impact index, followed by 22% that are published in Q4 journals.

#### *Study Areas*

Both Scopus and WoS show a strong multidisciplinary nature, and although the classification of areas is different in both databases, many similarities are observed, an element which allows for comparison. The areas in which most publications are grouped in Scopus is *Social Sciences* with 46% of the articles, followed by *Business, Management and Accounting* (24%). In WoS, *Environmental Sciences & Ecology* (41%) and *Social Sciences - Other Topics* (22%).

Regarding the categories, *Geography, Planning and Development* with 24% of the articles, followed by *Tourism, Leisure and Hospitality Management* (18%) are the two main categories in Scopus. In WoS, they are *Environmental Sciences* (30%) and *Hospitality, Leisure, Sport & Tourism* (22%).

#### *Content analysis*

The content analysis enabled to identify (1) the research lines or thematic areas followed by the authors, and (2) the geographical areas of the researchers, which coincides mainly with the geographical area where the study is carried out (the traditional model of five continents of the UN, Africa, America, Asia, Europe and Oceania was followed). This analysis showed the research trends on this area of study taking into account a geographical criterion.

**Table 8. Journals with the highest number of articles**

Scopus and WoS (n=134 articles)				Scopus (n=125 articles)				WoS (n=63 articles)			
Journals	No. Articles	%	Quartile	Journals	No. Articles	%	Quartile	Journals	No. Articles	%	Quartile
Revue de Geographie Alpine	11	8.2	Q4								
Mountain Research and Development	9	6.7	Q2	Mountain Research and Development	9	7.2	Q2	Revue de Geographie Alpine	7	11.1	Q4
Sustainability (Switzerland)	5	3.7	Q2	Revue de Geographie Alpine	8	6.4	Q4	Mountain Research and Development	7	11.1	Q4
Journal of Sustainable Tourism	4	3.0	Q1	Sustainability (Switzerland)	5	4.0	Q2	Sustainability	5	7.9	Q2
Tourism Recreation Research	4	3.0	--	Tourism Recreation Research	4	3.2	--	Journal of Sustainable Tourism	4	6.3	Q1
Anatolia	3	2.2	Q2	Journal of Sustainable Tourism	4	3.2	Q1	Journal of Mountain Science	3	4.8	Q4
Geografija	3	2.2	--	Geografija	3	2.4	--	Metalurgia International	3	4.8	Q4
ICIMOD Discussion Paper, MEI Series	3	2.2	--	ICIMOD Discussion Paper, MEI Series	3	2.4	--	Ambio	2	3.2	Q1
Journal of Mountain Science	3	2.2	Q2	Metalurgia International	3	2.4	Q4	Journal of Outdoor Recreation and Tourism	2	3.2	--
Metalurgia International	3	2.2	Q4	Journal of Mountain Science	3	2.4	Q2	Tourism Economics	2	3.2	Q3
Ambio	2	1.5	Q1	Anatolia	3	2.4	Q2	<b>In summary:</b>	<b>Total Articles</b>	<b>% on total</b>	
Cuadernos de Turismo	2	1.5	Q4	Japanese Journal of Human Geography	2	1.6	--	28 Journals with 1 article	28	44.4	
Erdkunde	2	1.5	Q3	Geographica Pannonica	2	1.6	Q3				
Espacios	2	1.5	Q3	Cuadernos de Turismo	2	1.6	Q4				
Geographica Pannonica	2	1.5	Q3	Scandinavian Journal of Hospitality and Tourism	2	1.6	Q2				
Geojournal of Tourism and Geosites	2	1.5	Q3	Journal of Outdoor Recreation and Tourism	2	1.6	Q3				
Japanese Journal of Human Geography	2	1.5	--	Tourism Management Perspectives	2	1.6	Q1				
Journal of Outdoor Recreation and Tourism	2	1.5	Q3	Espacios	2	1.6	Q3				
Scandinavian Journal of Hospitality and Tourism	2	1.5	Q2	Erdkunde	2	1.6	Q3				
Tourism Economics	2	1.5	Q1	Geojournal of Tourism and Geosites	2	1.6	Q3				
Tourism Geographies	2	1.5	Q1	Ambio	2	1.6	Q1				
Tourism Management	2	1.5	Q1	Tourism Management	2	1.6	Q1				
Tourism Management Perspectives	2	1.5	Q1	Tourism Economics	2	1.6	Q1				
<b>In summary:</b>	<b>Total Articles</b>	<b>% on total</b>		Tourism Geographies	2	1.6	Q1				
60 Journals with 1 article each	60	44.8		<b>In summary:</b>	<b>Total Articles</b>	<b>% on total</b>					
				54 Journals with 1 article each	54	43.2					

Source: Authors' own data

Firstly, three main lines of research were identified:

– **Climate changes.** Study of the climate changes that are taking place in mountain areas, from a tourist perspective.

– **Sustainable development.** It groups research that studies aspects related to the economic, social and environmental dimension in the sustainable development of the tourism activity.

– **Tourist system.** Four work approaches:

(1) Demand analysis: tourist flows, tourist experience of visitors, tourist expenditure, motivations and perception of tourists about the spaces visited and the demand for sports activities in these spaces.

(2) Supply analysis: it includes studies in which the situation of service providers is analysed, as well as the cooperation between the different supply elements. Aspects such as the design and implementation of technologies for the management and improvement of information and tourism promotion, human talent, the level of development of the areas that have opted for the offer of mountain tourism are also dealt with.

(3) Destination management: it groups studies that analyse the potential of mountain areas, policies for the exploitation and use of mountain areas for tourism purposes, as well as the identification of the impacts that arise from the introduction and development of the tourist activity in mountain destinations.

(4) Conceptualization: it establishes the reference framework for the understanding of mountain tourism.

Secondly, the research is analysed considering the researcher affiliation criterion to one of the four continents considered. The aim is to observe if there is a predominance of studies by line and continent.

– **Europe:** this continent is positioned as the main reference in the development of studies in relation to mountain tourism, with 78 studies; France is the country of affiliation with the highest number of studies, with 11 altogether. With regard to the lines of research, studies on the climate change that is taking place within mountain areas from the tourist activity perspective (Varley & Medway, 2011) are observed, others deal with the environmental degradation of natural resources, among which

water stands out (Younes *et al.*, 2002). Tsiaras & Andreopoulou (2015) address sustainable development as a multilateral concept in which mountain tourism management is integrated as an important pillar and Fredman (2008) identifies the determinants of tourist expenditure.

– **Asia:** it is the second continent where the greatest number of researchers is concentrated. Leading countries include Nepal (9), India (6) and China (4). Regarding the research lines, studies focused mainly on the tourism system are observed; Destination management and its tourism potential (Cappucci *et al.*, 2015), demand analysis when measuring tourism flows (Mohd Taher *et al.*, 2015). Other studies address the sustainable development of the areas that have been or will be designed for mountain tourism activities (Cole & Sinclair, 2002).

– **America:** it is the third continent in the ranking. The country with the highest concentration is Canada (3), followed by the United States (2) and Argentina (1). Demand studies are carried out through tourism flows to mountainous areas (Kelly *et al.*, 2006) and on the management of growth and depopulation in the mountains (Gonzalez *et al.*, 2009).

– **Africa:** researchers are mainly affiliated to Morocco (3) and South Africa (3). The studies address the management of the destination; determine the tourist potential that the study areas have for the development of new mountain tourism destinations (Linde & Grab, 2008).

– **Oceania:** it is the last continent taking into account the ranking developed. Studies developed exclusively in Australia are identified (2); Pickering & Buckley (2010) address climate change and Tonkin (1995) management policies of this form of tourism.

In addition, a total of 8 multicontinental studies that deal with the sustainable development of mountain spaces were identified. Hereafter, due to their relevance, studies related to the European continent are collected.

## Conclusions

In order to comply with the proposed objective, a bibliometric analysis was carried out that allowed to identify the profile of the area under study "Mountain Tourism" (evolution,

researchers, affiliation, etc). In this research, two databases were used and a study on their overlap and coverage was carried out. The findings point out that the Scopus database has a greater coverage of the scientific production on this area under study. In this sense, Scopus covers 85.71% of WoS, since it is observed that 54 of the 188 articles indexed in both databases are duplicated and 71 articles are classified as single in Scopus and 9 in WoS.

After a slow growing first stage from 1979 to 2007, the research is currently immersed in a second stage of exponential growth (60 articles in 11 years), and taking into account the growth curve ( $R^2 = 0, 4541$ ). it is expected to remain

constant in the coming years.

The analysis shows that most researchers in this area are part of the group called small producers if Lotka's Law or the productivity of the authors (Lotka, 1926) is considered. 93% of the authors (256 of a total of 276) published a single article, and the rest, 19 authors have between 2 and 3 publications. The most productive authors with 3 publications are P. Fredman, I. Sacareau; P.W. Williams, The productivity index is 1.08 articles. A very high number of papers were signed by a single author (38%), the average is 2.23 signatures per paper.

**Table 9.** Areas of study in the European Continent

General Line	Specific Line	No. Articles	Authors
Climate Change	Climate Change	9	Djordjevic <i>et al.</i> (2016), Pröbstl-Haider <i>et al.</i> (2016), Stojasavljević <i>et al.</i> (2016), Wyss <i>et al.</i> (2014), Luthe <i>et al.</i> (2012), Ritter <i>et al.</i> (2012), Varley & Medway (2011), Błazejczyk & Sitek (2003), Abegg & Elsasser (1996)
	Environmental Degradation	2	Storch & Leidenberger (2003), Younes <i>et al.</i> (2002)
Sustainable Development	Sustainable Development	10	Bonadonna <i>et al.</i> (2017), Brătucu <i>et al.</i> (2017), Paunović & Jovanović (2017), Tsiaras (2017), Tsiaras & Andreopoulou (2015), Minciu <i>et al.</i> (2009), Saz Gil & Carus Ribalaygua (2008), Ikenaga (2001), Ikenaga (1999), Stadelbauer (1983)
	Growth Management and Depopulation	3	Kohler <i>et al.</i> (2017), Galvani (1993), Mazuel (1992)
Tourist System	Analysis of the offer	23	Tvrko-Opačić & Banda (2018), Kuščer <i>et al.</i> (2017), Czakon & Czernek (2016), Suarez Botas (2016), Pawłowska <i>et al.</i> (2015), Tizzoni (2015), Băltărețu (2014), Tofan & Niță (2014), Cousquer & Beames (2013), Flognfeldt & Tjørve (2013), Dissart (2012), George-Marcelpoil & Francois (2012), Krištofić (2010), Nistor <i>et al.</i> (2010), Ritter <i>et al.</i> (2010), Kaltenborn <i>et al.</i> (2008), Bourdeau <i>et al.</i> (2002), Heberlein <i>et al.</i> (2002), Petit (2002), Frosch & Elsasser (1989), Semerdzhiev & Dancheva (1984), B'Chvarov (1982), Hadzhinikolov (1982)
	Analysis of demand	10	Frochot <i>et al.</i> (2017), Kortoci & Kortoci (2017), Milman <i>et al.</i> (2017), Fuchs <i>et al.</i> (2014), Silva <i>et al.</i> (2013), Bitsani & Kavoura (2012), Garavaglia <i>et al.</i> (2012), Nicolae & Florin (2009), Fredman (2008), Fredman & Heberlein (2005)
	Conceptualization	1	Macchiavelli (2009)
	Destination Management	20	Rakytova & Tomcikova (2017), Nikolić <i>et al.</i> (2015), Lasanta <i>et al.</i> (2014), Rodriguez (2012), Skenderovic <i>et al.</i> (2012), Timotin <i>et al.</i> (2009), Lasanta <i>et al.</i> (2007), Boudières (2006), Duboeuf (2006), Mechukaev & Mechukaev (2006), Marin-Yaseli & Martínez (2003), Tchistiakova & Cabanne (1997), Cerutti (1995), Gaudard (1995), Lepovitz (1989), Herbin (1986), Penz (1984), Vlad & Truti (1984), De Reparaz (1982), Lichtenberger (1979)

Source: Authors' own data

Universities are the institutions with the highest number of affiliations, with 75%. Kazakh Academy of Sports and Tourism of Kazakhstan leads the ranking, followed by the Transylvania University of Braşov located in Romania. If productivity by country based on the affiliations registered by the authors is observed, France is positioned as the leader followed by the United States. European countries predominate in the group of countries, which also have the highest number of affiliations of authors, authorships and research centres. On the other hand, 71% of articles with more than two signatories are written in collaboration with authors from the same country. In the case of national collaborations, 67% of the articles are signed by authors of the same institution.

The analysis of the study areas makes it possible to identify the European continent as the most prolific in research on mountain tourism, partly due to having a greater number of mountain ranges, tourist infrastructures and greater accessibility, followed by Asia, being the Himalayas the main destination. Regarding the lines of research followed by the different authors, the study of the sustainable development of spaces, the climate changes that have caused the degradation of the spaces and the potentiality of certain areas due to their positioning as destinations for mountain tourism predominate. This analysis confirms that it is an emerging area of study, with many research lines that must be studied further such as the overcrowding in destinations, load capacity, migration or depopulation of mountain areas, policies on destination management, etc. These approaches are followed by a small number of articles, and it is necessary to progress in the generation of knowledge at the level of all continents.

In summary, research is very necessary to know and deepen the phenomenon of "Mountain Tourism" at the management level, with the aim of providing assistance, to mountain tour operators and all the entities involved, in the development of the activity tourism in mountain areas, so that these can improve their social and environmental performance. The growth in the number of visitors to mountain areas provides important advantages to local communities in terms of job

creation, income, etc. However, there are also many dangers that come from the possible impacts of mountain tourism and its activities. In this sense, according to UNEP / PNUMA (2007) it is necessary to observe good practices in key aspects related to mountain tourism: good business practices, good environmental practices and good practices of specific tourism activities. In this context, research is very necessary.

The main limitation of the study is related to the lack of a clear conceptualization of the concept, which generates an ambiguity about what mountain tourism comprises. This ambiguity is reflected in the authors' indexing words. Therefore, we chose to use a single search term "Mountain Tourism" in order to delimit the area under study with greater precision. A second limitation is related to the selected databases. In this sense, the geographic coverage identified in the analysis of the study areas suggests that future research should expand the databases and consider others such as Scielo, Latindex, Emerald, enabling to identify a greater number of studies.

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