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A Review of Global Winter Tourism Research in the Web of Science (WoS) Database between 1988-2020: A Bibliometric and Visualization Analysis

1988-2020 Yılları Arasındaki Web of Science (WoS) Veri Tabanındaki Küresel Kış Turizmi Araştırmalarının İncelenmesi: Bibliyometrik ve Görselleştirme Analizi

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Abstract

The purpose of the study is to reveal the retrospective nature of winter tourism investigations in social sciences, determine global trends sophisticatedly, and become a potential guide for future researches. In this respect, With the VOSviewer program, 278 studies on winter tourism in the Web of Science (WOS) database between 1988 and 2020 were analyzed bibliometrically. According to the results of the research, it was determined that the most productive countries in winter tourism are Austria, the USA, and Norway respectively and Europe is the leading region in this area. Likewise, it was also concluded that the most co-occurrence keyword is climate change. The paper is limited only to winter tourism studies in the field of Social Sciences between 1988 and 2020 from the WOS database. It is thought that the research will make significant contributions to researchers, local governments, destination policymakers and hotel managers.

Keywords: *Winter Tourism, Scientometrics, Bibliometric Analysis, VOSviewer, Visualization.*

Öz

Çalışmanın amacı, sosyal bilimlerde kış turizmi araştırmalarının geriye dönük doğasını ortaya çıkarmak, küresel eğilimleri çok yönlü bir şekilde belirlemek ve gelecekte araştırmalar için potansiyel bir rehber oluşturmaktır. Bu bakımdan, VOSviewer programı ile 1988 ve 2020 yılları arasında Web of Science (WOS) veri tabanındaki kış turizmi üzerine yapılan 278 çalışma bibliyometrik olarak analiz edilmiştir. Araştırma sonucuna göre kış turizmi konusunda en üretken ülkelerin sırasıyla Avusturya, ABD ve Norveç olduğu ve Avrupa'nın bu konuda lider bölge olduğu belirlenmiştir. Ayrıca iklim değişikliğinin en çok tekrarlanan anahtar kelime olduğu sonucuna ulaşılmıştır. Araştırma, yalnızca WOS veri tabanından 1988 ve 2020 yılları arasında Sosyal Bilimler alanında kış turizmi çalışmaları ile sınırlandırılmıştır. Çalışmanın araştırmacılar, yerel yönetimler, destinasyon politika yapıcıları ve otel yöneticilerine katkı sağlayacağı düşülmektedir.

Anahtar Kelimeler: *Kış Turizmi, Scientometrics, Bibliyometrik Analizi, VOSviewer, Görselleştirme.*

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Introduction

It is widely accepted that tourism plays a vital role in regional development. Through a successful tourism policy, tourist revenues at the destination can increase sustainable employment and government revenues. Therefore, there is high competition among the destinations and countries to attract tourists nowadays. In the fierce competition in the tourism sector, differentiation of the existing market by focusing on a new market section for the survival and development of the hotel business (Sriprasert et al., 2014: 216) or orientation towards alternative tourism types are considered as substantial strategies (Tokgozlu et al., 2012: 59).

Winter tourism, which is one of the alternative tourism types, is considered a special form of mountaineering (Sainaghi, 2008: 42) or a characteristic form of tourism in high snow-covered parts of the mountains (Tokgzoglu et al., 2012: 59). People can do winter tourism activities at certain times of the year in the sloping regions with suitable snow conditions, tracks, equipment, accommodation, food, beverage, and leisure (Ilban and Kaslı, 2008). Also, these activities create new winter tourism destinations (Sainaghi, 2008: 40) and establish competition between them (Sainaghi, 2008: 41). Winter tourism centers also carry out many activities such as nature-based tourism, youth camps, congress tourism, mountain, and yayla tourism (Buyukipekci et al., 2019: 42). Because of this variety of activities, winter tourism is crucial for improving infrastructure and superstructure opportunities in destinations where development is difficult (Groß, 2017: 125). The winter tourism research area has high diversity. However, researchers have mainly discussed climate change (Steiger and Scott, 2020; Rech et al., 2019; Schrot et al. 2019; Steiger et al., 2019), lack of snow (Falk and Vieru, 2019; Orr and Inoue, 2019) and sustainability (Dornier and Mauri, 2018a; 2018b) issues in recent years. Competitiveness and destination image (Gajdiosikova et al., 2019; Jeong and Kim, 2019; Kim et al., 2019; Andersen et al., 2018) are other fields of inquiry. Also, the Olympic Games and mega-events (Scott et al., 2019; Yang et al., 2019) are more specific research subjects for winter tourism.

Winter tourism is crucial for countries to take the lead in the competition and spread tourism all year. Many people have started to spend their holidays in winter tourism centres to get rid of the dirty air and difficult city life in recent years (Tokgozlu et al., 2012: 59). Thus, tourism activities spread throughout the year. Winter tourism includes activities related to local food and drinks, tasting, eating, buying, learning, and visiting (Dornier and Mauri, 2018a: 4), so it is more than skiing. This potential for winter tourism provides many advantages for both developed and developing economies. For instance, it promotes regional development and reduce disparities (Carson et al., 2017: 1; Gajdiosikova et al., 2019: 2; Groß, 2017: 125). In this context, winter tourism is one of the major factors of social and economic development, and so information and data requirements about winter tourism have increased gradually. Scientific literature plays a significant role in satisfying these needs. Therefore, in order to better understand the characteristics and trends of winter tourism researches, integrated and systematic analyzes on global scientific production in this field are required. In this regard, a bibliometric analysis of 278 studies related to winter tourism in the "Web of Science" database between 1988 and 2020 was conducted by the VOSviewer program. Hereby, it is aimed to reveal the retrospective nature of winter tourism researches in the social sciences field, determine global trends sophisticatedly and become a potential guide for future researches.

The study structure was created in connection with the aim of the research. In the following section, methodology, information is given about the method on which the research is based. In the findings section, numerical information about the data was presented and keywords co-occurrences analysis were performed. Discussion and conclusion sections are given after presenting the results of the study. Finally, the limitations and implications of the study are outlined.

1. Methodology

Bibliometry, which is a term firstly introduced by Alan Pritchard in 1969, means the application of mathematics and statistical methods for books and other communication tools (Guo et al., 2016: 328). The bibliometric analysis includes a series of visual and quantitative procedures to generalize patterns and dynamics in scientific publications. The new bibliometric analysis methods examine the scientific output of authors, institutions, and countries (Li et al., 2008: 248). Researchers use bibliometric analyses to reveal global trends of various fields (Liu et al., 2011: 808). More specifically, the bibliometric method often acts as a powerful tool in a particular area to trace different research features such as authors, scientific collaborations (relationships), subjects, geographical origins, institutional distributions, quotations, and significant research aspects (Guo et al., 2016: 328).

Scientometrics is the primary research method of this article. The reason for choosing the bibliometric analysis is to reveal the trajectories of winter tourism research. We prefer it because other methods like systematic review provide a summary answer for a specific research question. The scoping review method also presents information about a particular topic. In sum, the bibliometrics gives general information about a subject, but the scoping review presents findings and evidence

in the literature (Sucharew and Macaluso, 2019). Therefore, we prefer bibliometrics because our purpose is to reach a quantitative projection for the winter tourism research and reveal the retrospective nature of it. There is a need for such a study on winter tourism because there is no bibliometric analysis in the literature that uses the keyword winter tourism until now. Accordingly, this study will be a precious guide for new researchers who want to see the shortcomings in the literature.

We used VOSviewer (visualization of similarities) version 1.6.14 and MS Excel programs in the work. VOSviewer is widely used in bibliometry and offers a powerful visualization, especially for document information units that are suitable for analysing large-scale datasets and creating complex networks. In this context, we tried to reveal the relations between research areas and source, document types, countries, and publishing years with the VOSviewer. We listed publications using the winter tourism keyword from the Web of Science (WOS). It includes SCI-EXPANDED, SSCI, A and HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI indexes. We limited our research only to social science because the field of physical sciences has the potential to change the results of the study. Therefore, we collected data from WoS only in Hospitality Leisure Sport Tourism, Management, Economics, Business, Social Sciences Interdisciplinary, Business Finance, and Sport Sciences fields, and there is no time limit for them. The two hundred seventy-eight studies data in the WoS acquired as a file from only social science indexes between 1975 and 2020, on February 13, 2020.

VOSviewer uses the mapping technique (Van Eck et al., 2010: 2405) and creates network-based or text community-based maps such as citation networks (Sinkovics, 2016: 332). VOSviewer mapping technique is suitable for dealing with a large number of null (invalid) values and eliminating large differences in the recurrence of the term. VOSviewer combines the most advanced and valid techniques, for example, adding and removing terms for each step in the mapping process, clustering of objects, and visual mapping of relatedness (Lee et al., 2014: 341). VOSviwer offers two options network visualization and density visualization. Network visualization displays concepts according to their significance. The larger label or circle indicates that the term is more important (Sinkovics, 2016: 333). In addition to this, close or distant circles-labels represent the link strength. As they close to each other, link strength increases (Perianes-Rodriguez et al., 2016: 1186), and the color of the circle shows different clusters (Sinkovics, 2016: 333).

The association strength between the two terms is the ratio between the observed and expected number of co-occurrences of them (Lee et al., 2014: 341). A higher numerical value shows a strong link between items (Perianes Rodriguez et al., 2016: 1186). VOS has a significant technical advantage in measuring correlation strength among the alternative programs (e.g. Jaccard index, cosine). The distance between the two articles represents the relationship. If they are close to each other, it means similar terms, abstracts, and titles (Lee et al., 2014: 341).

Density visualization demonstrates the importance of the areas. While users create concept maps can choose between binary and full counts. In the binary method, the program counts only the presence or absence of a term in the document. The full count takes into account all circumstances (Sinkovics, 2016: 333). VOSviewer program split terms into clusters and clustering technique based on the same assumptions mapping technique (Waltman et al., 2010). Strongly related terms take place in the same group and color. The VOS clustering technique provides the basis for any classification which begins to appear in the literature (Lee et al., 2014: 341).

2. Findings

Numerical analysis and keyword co-occurrences analysis of the data gives the findings.

2.1. Numerical Analysis of Data

Figure 1 presents the distribution of the 278 studies from the Web of Science (WoS) database by years.

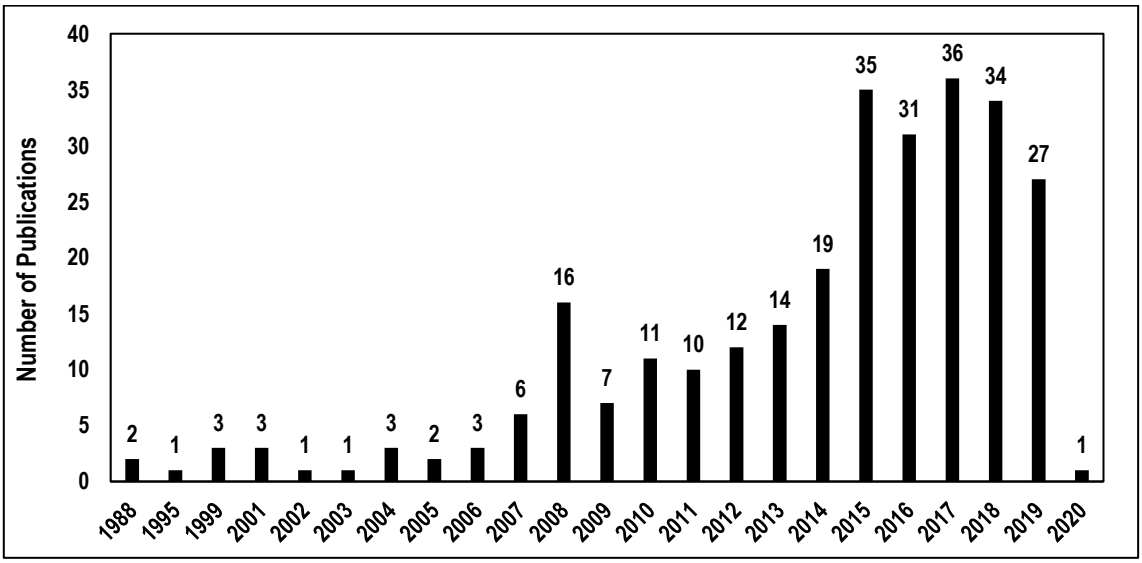

Figure 1. Quantitative Distribution of Number of Publications in Winter Tourism Studies, 1988–2020.

The first winter tourism study in social sciences was conducted in 1988. The number of publications has not been a sudden increase or decrease until 2008. However, the number of publications has increased considerably between 2014 and 2018 and winter tourism research reached the maximum number in 2017 (n=36). Table 1 represents the distribution of the publications by genre.

Table 1. Distribution of the Publications by Genre

Document Type	Frequency	%
Article	190	68.35
Proceedings Paper	54	19.43
Book Chapter	18	6.48
Review	7	2.51
Book Review	4	1.44
Editorial Material	3	1.07
Early Access	2	0.72
Total	**278**	**100.0**

According to Table 1, the great majority of the publications are the article (n=190) and 68.35% of the total, and proceedings papers (n=54) are 19.43%. Researchers mainly published their works as an article or a proceeding. Table 2 gives the number of citations by years for winter tourism research.

Table 2. The Number of Citations by Years

Years	No. of citations	Years	No. of citations
2000	1	2010	114
2001	2	2011	131
2002	2	2012	175
2003	5	2013	193
2004	6	2014	301
2005	15	2015	324
2006	29	2016	352
2007	33	2017	455
2008	41	2018	607
2009	72	2019	880
		2020	60
Average citations	13.76	**H-index**	33

The number of citations by years has increased continuously and reached a maximum number in 2019 (n=880). The average number of citations is 13.76 in the 2000-2020 period. The H-index is 33. The top ten journals given in Table 3 published 44.96% of the total studies (n=278). Tourism and Management published 10.07% of the total. These 28 studies have cited 1092 times until now.

Table 3. Journals Ranked by Total Publications

Rank	Journal	Quantity	Citations
1	Tourism Management	28	1092
2	Scandinavian Journal of Hospitality and Tourism	17	175
3	Current Issues in Tourism	13	225
4	Tourism Economics	11	106
5	Journal of Travel Research	9	272
6	Journal of Sustainable Tourism	9	270
7	Journal of Outdoor Recreation and Tourism-Research Planning and Management	9	52
8	Tourism Analysis	7	43

9	Annals of Tourism Research	6	636
10	Tourism Geographies	6	98
11	Ecological Economics	5	90
12	Worldwide Hospitality and Tourism Themes	5	10

Table 3 shows journal ranking by the number of publications. Tourism and Management journal is in the lead according to both the number of studies and citations. Scandinavian Journal of Hospitality and Tourism follows this journal with the 17 research papers. Annual Tourism Research ranks first according to the average number of citations with 106. Tourism Management has only 39 citations on average. Table 4 presents the ten most cited studies in the journals.

Table 4. Top 10 Most Cited Papers

Rank	Author/s	Title	Journal	Year	Quantity
1	Gursoy and Kendall	Hosting Mega Events: Modelling Locals' Support	Annals of Tourism Research	2006	245
2	Flagestad and Hope	Strategic Success in Winter Sports Destinations: A Sustainable Value Creation Perspective	Tourism Management	2001	175
3	Kim et al.	Effects of Korean Television Dramas on the Flow of Japanese Tourists	Tourism Management	2007	142
4	Gustafson	Tourism and Seasonal Retirement Migration	Annals of Tourism Research	2002	118
5	Paget et al.	A Tourism Innovation Case: An Actor-Network Approach	Annals of Tourism Research	2010	97
6	Kajan and Saarinen	Tourism, Climate Change and Adaptation: A Review	Current Issues in Tourism	2013	96
7	Ahas et al.	Seasonal Tourism Spaces in Estonia: Case Study with Mobile Positioning Data	Tourism Management	2007	93

8	Müller	What Makes an Event a Mega-Event? Definitions and Sizes	Leisure Studies	2015	85
9	Simpson and Siguaw	Destination Word of Mouth: The Role of Traveller Type, Residents, and Identity Salience	Journal of Travel Research	2008	81
10	Gyimothy and Mykletun	Play in Adventure Tourism: The Case of Arctic Trekking	Annals of Tourism Research	2004	81

According to Table 4, Annals of Tourism Research (n=4) and Tourism Management (n=3) journals are the most publications and also these two journals are the first two most cited journals in the related field. The most cited study entitled Hosting Mega Events: Modeling Locals' Support (Annals of Tourism Research) has 245 citations. Despite being the earliest work Strategic Success in Winter Sports Destinations: A Sustainable Value Creation Perspective is ranked 2nd in Table 4.

The most cited study Gursoy and Kendall (2006) investigated the 2002 Winter Olympics organized in the USA, Utah Salt Lake City. They examined the impacts of the 2002 Winter Olympics as a mega tourism event on residents' perceptions with a structural model. The structural model of development is based on community concern, community attachment, and ecocentric attitude fields. Findings indicate that hosting a mega-event is beneficial for locals who have a high level of relation to their communities. Also, environmental sensitivity concerns are substantial for locals' supports.

The second most cited paper Flagestad and Hope (2001) researched strategic success in winter sports destinations. In this study, it has been focused on strategies for creating a competitive advantage and meeting the sustainable tourism criteria by the World Tourism Organization (WTO). Flagestad and Hope (2001) combined these two dimensions into the strategic performance concept. They presented two new models and extended strategy theory for destinations and conceptual organization model for winter sports destinations.

On the other side, the third most cited paper Kim et al. (2007) researched for the effects of the Korean television (TV) drama series, Winter Sonata, on the potential or actual Japanese tourist flow to Korea. This study does not relate to winter tourism directly. Yet, it is one of the extraordinary examples of tourism research and a new type of cultural tourism studies. Gustafson (2002), which is the fourth most cited study, mentioned that Swedish retirees spend their summers in Sweden and their winters in Spain.

The fifth most cited study Paget et al. (2010) investigated innovations of a tourism company, especially for French ski resorts. The actor-network theory provides a conceptual foundation for this study. Paget et al. (2010) presented some theoretical frameworks on how to tourism companies reach success with innovative products.

On the other side, Kajan and Saarinen's (2013) review paper has been cited ninety-six times since its publishing date. They used a systematic review method to scan tourism and adaptation literature before the 2012 year. Therefore, they also discussed climate change in the paper because of adaptation.

Ahas et al. (2007) analyzed the seasonality of foreign tourists in Estonia with mobile positioning data. According to the results, coastal regions are popular in summer times mostly, and continental inland is more used in the winter season generally.

Müller's (2015) study is another mega event paper-like Gursoy and Kendall (2006). In this study, events are grouped as major, mega, and Giga events, respectively, according to their size. Simpson and Siguaw (2008) paper analyzed word-of-mouth promotion at different levels in the winter tourist market.

Lastly, Gyimothy and Mykletun (2004) examined adventure tourism by associating with winter tourism in Svalbard, Norway. When we evaluate these ten studies, there is no dominant subject. However, mega-event activities are relatively most studied.

According to the quantitative analysis of productive countries, all the papers on winter tourism come from 48 countries. Developed or developing European countries publish most of the articles. The top ten countries have 77.34 percent of all

278 published papers. The top five productive countries (Austria, the USA, Norway, Germany, and Canada) have more than half of the studies. The first country Austria has published 48 papers since 1988 and has 17.27% of total publications in the winter tourism research area up until now. Additionally, the USA is the second productive country with 39 papers and 14.02% of the total. The top ten most productive countries in winter tourism researchers are presented in Table 5.

Table 5. Top 10 Productive Countries in Winter Tourism Studies

Rank	Countries	Region	Quantity	Citations
1	Austria	Western Europe	48	835
2	USA	North America	39	651
3	Norway	Northern Europe	22	459
4	Germany	Western Europe	21	164
5	Canada	North America	16	311
6	China	East Asia	16	214
7	Australia	Australia	14	246
8	Italy	Southern Europe	14	107
9	England	Western Europe	13	452
10	Finland	Northern Europe	12	273

Note: Countries are selected according to the quantity of publications.

In terms of scientific productivity, the most productive country Austria has 48 studies and 835 citations. This country is followed by USA with 39 studies and 651 citations, and Norway with 22 works and 459 citations. Some factors affect the leadership of the USA, Austria, and Norway. Firstly, many people in the USA, Austria, and Norway are interested in winter sports and activities (Koşan, 2013: 95), and society makes it a part of their daily life (Koşan, 2013: 297-298). Secondly, these countries have a long history of winter tourism (Fry, 2017: 4-7) because they hosted the Winter Olympics. The Winter Olympics Games were held 8 times in the USA (1904 St. Louis, 1932 Lake Placid, 1932 Los Angeles, 1960 Squaw Valley, 1980 Lake Placid, 1984 Los Angeles, 1996 Atlanta, 2007 Salt Lake City), two times in Austria (Innsbruck 1964-1976) and once in Norway (1952 Oslo) (Olympic, 2020; Wikipedia, 2020). The most important reason for a lot of research is that these countries have many winter tourism centres and equipment. According to the average, England ranks first with a 34.76 average citation. This country follows by Finland with 22.75 and Norway with 20.86. In the context of the region, Europe is the driving force in scientific productivity.

Figure 2 indicates bibliometric data from WoS as labels and thermographic patches. The colour of the patches depends on the number of works published by the countries/regions. As the number increase, the colour of the patches becomes warmer (redder). Otherwise, the colour of the parts becomes colder (bluer). As can be seen in the figure, countries that published many articles locate in the centre of the plaque (Shi et al., 2019: 5).

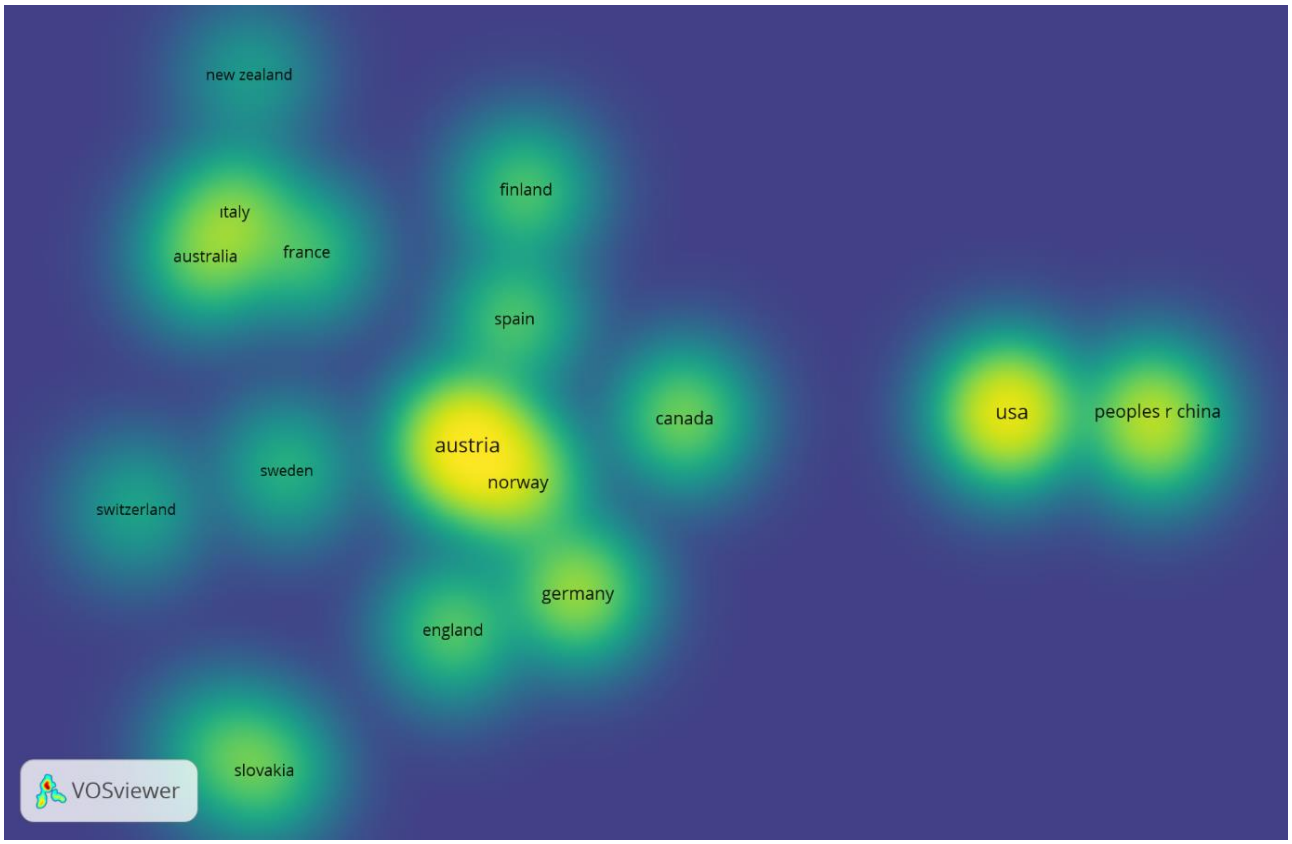

Figure 2. The Density of Main Research Countries in Winter Tourism Studies

Austria, USA, and Norway labels are in a prominent position in figure 2. According to Table 5, Austria contributes to approximately one-fifth of the total publications. Therefore, the color of the plaque is the densest/warm piece in Figure 2. Austria is a leading country in winter tourism because of its suitable geographical conditions (Aydemir et al., 2013: 84). The mountainous nature of Austria has triggered the development of winter tourism potential and sports. Indeed, the Austrian economy created 21.6 billion Euros direct and indirect value added from tourism activities, 8.8% of the gross domestic product (GDP) in 2005. Also, more than 30 million tourists stay 44 million overnights in the winter tourism areas in Austria (Töglhofer et al., 2011: 1). The USA is the second most dense/warm patch color country after Austria. Winter tourists spent 72 billion dollars in 2017, and winter tourism destinations employed approximately 965 thousand people in the USA. (Outdoor Industry Association, 2017: 18). The fact that the USA has rich winter tourism potential. Also, tourism is vital for local economic and social development in the third most productive country Norway. The total (direct and indirect) contribution of travel and tourism to the national gross domestic product was 6.2% in 2012 (Landauer et al., 2018: 3). USA and Norway have similar characteristics to Austria. Generally, they are dominant and guide countries in the field of winter tourism. Table 6 gives the top 10 organizations ranked by total citation.

Table 6. Top 10 Organizations Ranked by Total Citations

Rank	Organization	Country	Quantity	Citations
1	University of Innsbruck	Austria	15	348
2	University of Oulu	Finland	5	212
3	Austrian Institute of Economic Research (WIFO)	Austria	9	178
4	Hong Kong Polytechnic University	Hong Kong	4	174
5	Simon Fraser University	Canada	4	163

6	University of Waterloo	Canada	7	121
7	German Sport University Cologne	Germany	6	94
8	Lillehammer University College	Norway	5	47
9	University of Minnesota	USA	4	18
10	Utah State University	USA	4	16

The most cited organization is The University of Innsbruck (n=348), and the second one is The University of Oulu (n=212). Austria, Canada, and the USA take part in the table with two universities for each. According to the number of publications, The University of Innsbruck (n=15) is in the first place, again. Austrian Institute of Economic Research (WIFO) (n=9) is in second place. Lastly, Hong Kong Polytechnic University (n=43.4) takes the lead according to average citations per publication.

2.2. Keywords Co-occurrences Analysis

Keywords provide crucial information and constitute an essential part of the research (Wang et al., 2013: 42). Analysis of keywords ensures a clear understanding of emerging trends and research differences in the field (Guo et al., 2016: 335). Researchers generally use keywords co-occurrences analysis to analyze the strength of links between different keywords in a large number of documents. By analyzing the keywords, we can reveal the structure of the internal components and the research limits in a specific academic area. Hence, keywords co-occurrences analysis has become a prevailing research method in Scientometrics (Shi et al., 2019: 7).

There are 930 keywords in winter tourism literature from the WOS database in our study. VOSviewer program selected keywords with a frequency of more than five and a full counting method. VOSviwer identified the top 20 keywords. Table 7 represents co-occurrences analysis of keywords.

Table 7. Co-occurrences

Rank	Key Words	Occurrences	Total Link Strength
1	Climate change	43	48
2	Tourism	35	17
3	Winter tourism	29	18
4	Adaptation	11	18
5	Tourism demand	10	8
6	Ski resorts	9	10
7	Sports tourism	9	6
8	Outdoor recreation	7	9
9	Sustainability	7	5
10	Weather	7	9
11	Ski tourism	6	7
12	Nature-based tourism	5	8

13	Seasonality	5	4
14	Ski industry	5	4
15	Tourism development	5	3
16	Ski resort	5	3
17	recreation	5	2
18	Sustainable tourism	5	2
19	Destination	5	1
20	Rural tourism	5	1

We expected the most repeated keywords winter sports, recreation, tourism, etc. but climate change is surprisingly the most repeated keyword (n=43) with 48 total link strength. Tourism with 35 co-occurrences and 17 total link strength takes place in second. Winter tourism is repeated 29 times and has 18 total link strength. On the other hand, adaptation has a strong relationship with others despite low co-occurrences (n=11). Climate change is a big problem today. Global warming has continued for this century. In our opinion, climate change will have significant influences on the output and productivity of outdoor work-intensive sectors. Besides, climate change will affect not only weather-related industries but also economic growth, economic production, human health, conflict, migration, and demography profoundly (Falk and Lin, 2018: 174). Winter tourism is quite vulnerable to climate change (Scott et al., 2008: 3). Therefore, snowfall and snow depth will decrease, the ski season will be shorter, and artificial snowmaking costs will increase because of climate change (Bank and Wiesner, 2011: 62; Steiger and Scott; 2020: 2). Moreover, as a result of changes in conditions of competition, the number of ski areas operating in the regional market decrease. Consequently, we can explain the reasons why climate change is the most repeated keyword as follows:

The availability of snow cover plays a dominant role in whether tourists prefer winter tourism areas. (Dornier and Mauri, 2018a: 4),

- Since winter tourism is an income and employment opportunity for countries and regions, to determine how winter tourism destinations are affected by this change and to encourage the development of action plans for this purpose.
- Winter tourism has attracted the attention of researchers because of recent increasing popularity.

There are 20 nodes, 46 total links, and 92 total link strengths related to winter tourism in figure 3. Each node represents a keyword. The size of the node refers to the number of repeated. Also, the connection between the nodes means the link between the keywords.

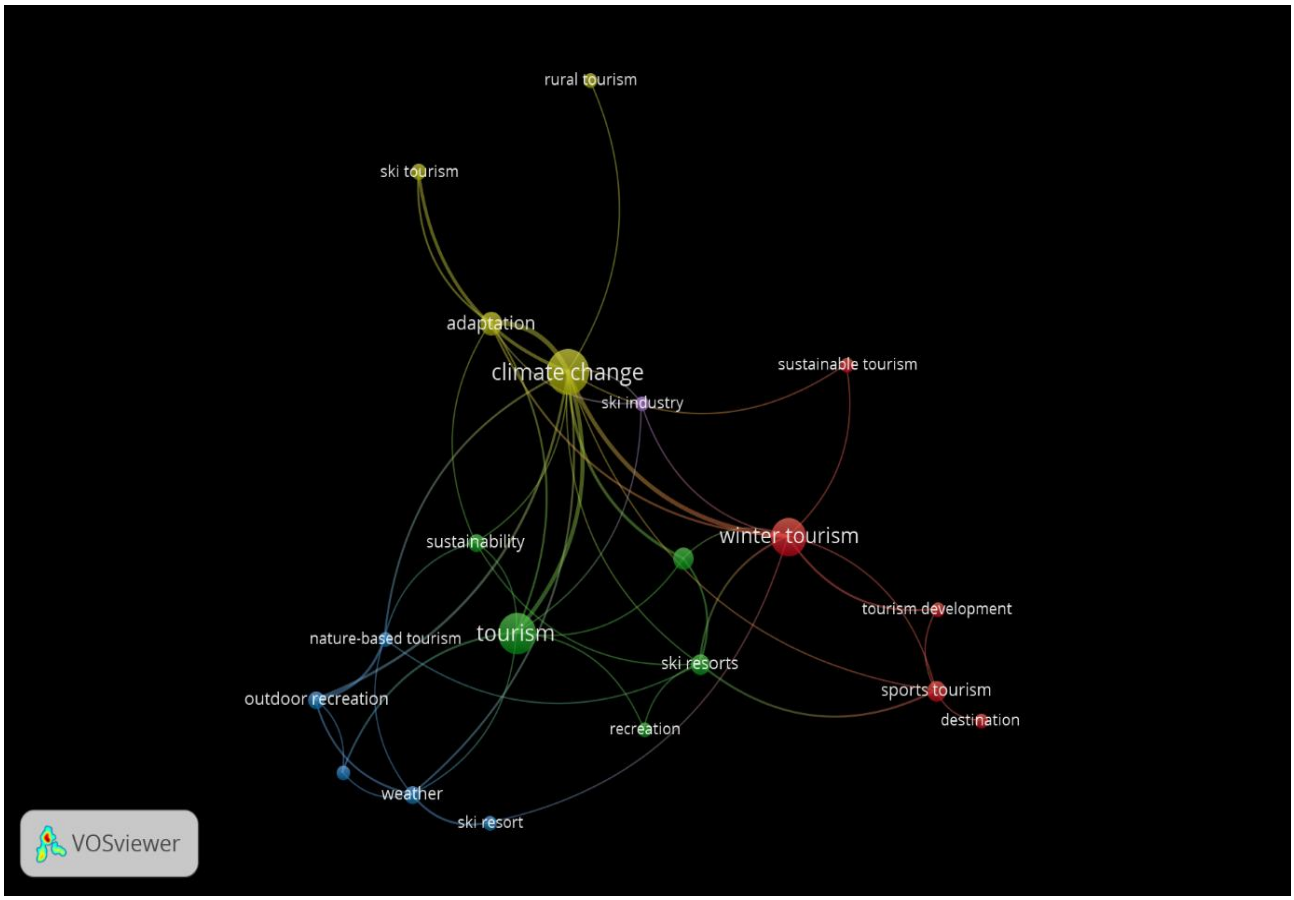

Figure 3. The Keywords Co-Occurrence Network of Winter Tourism Studies

In Figure 3, research themes related to winter tourism constitute 5 clusters. There are significant correlations between words.

Cluster 1 (red): Destination, Sport Tourism, Sustainable Tourism, Tourism Development, Winter Tourism.

Cluster 2 (green): Recreation, Ski Resorts, Sustainability, Tourism, Tourism Demand.

Cluster 3 (blue): Nature-Based Tourism, Outdoor Recreation, Seasonality, Weather, Ski Resort.

Cluster 4 (yellow): Adaptation, Climate Change, Rural Tourism, Ski Tourism.

Cluster 5 (purple): Ski Industry.

Table 8 shows the number of link and link strength of the top three keywords.

Table 8. Number of Links Top Three Keywords

Rank	Climate Change (14 Links) With	Link Strength	Tourism (8 Links) With	Link Strength	Winter Tourism (9 Links) With	Link Strength
1	Adaptation (to Climate Change)	10	Climate Change	8	Climate Change	8
2	Winter Tourism	8	Seasonality	2	Adaptation	2

3	Tourism	8	Adaptation	2	Tourism Development	2
4	Ski Tourism	5	Tourism Demand	1	Ski Resorts	2
5	Tourism Demand	4	Ski Industry	1	Ski resort	1
6	Outdoor Recreation	3	Recreation	1	Ski Industry	1
7	Weather	2	Sustainability	1	Sports Tourism	1
8	Nature-Based Tourism	2	Weather (tourism to weather)	1	Tourism Demand	1
9	Sports Tourism	1			Sustainable Tourism	1
10	Ski Resorts	1				
11	Ski Industry	1				
12	Sustainable Tourism	1				
13	Sustainability	1				
14	Rural Tourism	1				

Climate change is associated with 14 keywords. Climate change has the highest link strength with adaptation. These two keywords can be associated and examined in terms of climate adaptation (Steiger and Scott, 2020). For instance, adaptation strategies against climate change (Hoffmann et al., 2009; Landauer et al., 2018; Witting and Schmude, 2019), adaptive capacity and climate vulnerabilities in the context of sports organizations (Orr and Inoue, 2019), climate change adaptation efforts in ski destinations (Steiger et al., 2019; Scott et al., 2008), long and short term effects of climate change on winter tourism within the scope of adaptive capacity (Schrot et al., 2019). Moreover, climate change has a high link strength with both the concepts of tourism and winter tourism. Tourism is related to 8 keywords, while winter tourism is related to 9 keywords. The link strength of these two words with climate change is the same.

Discussion and Conclusion

Winter tourism is one of the fastest-growing markets in the tourism sector. Today, despite the negative impacts of global warming on winter tourism, the number of destinations and tourists who are interested in winter sports have been increasing from day to day (Evren and Kozak, 2018: 248). Therefore, winter tourism provides many advantages for rival countries and also becomes a transforming factor for developing countries and underdevelopment destinations. For this reason, performing integrated and systematic analyses to understand winter tourism research trends becomes significant. In this research, a bibliometric analysis of the studies between 1988 and 2020 was carried out to to comprehend the tendency of the winter tourism research area.

Firstly, one of the remarkable findings in the numerical analysis of the WOS data is that most publication year is 2017 in winter tourism. This year is quite late for winter tourism researches. Apart from this, the most cited studies were published in the last two years, 2018 and 2019. While the number of publications decreased relatively in 2018 and 2019, the number

of citations increased. Publications about winter tourism in the social sciences had a high rate in the last five years (2015-2019) compared to the previous period. Our study reveals the trajectories and trends of the current winter tourism studies via the bibliometric analysis. The first two most cited studies named Hosting Mega Events: Modeling Locals' Support by Gursoy and Kendall and Strategic Success in Winter Sports Destinations: A Sustainable Value Creation Perspective by Flagestad and Hope belongs to the year 2006 and 2001, respectively. It shows researchers started to attract attention to winter tourism after the mid-2000s. On the other side, it is an expected result that the top three most productive countries Austria, the USA, and Norway, respectively, because their climates are suitable for winter tourism. It is also not a surprising result that a technical university Hong Kong Polytechnic becomes the fourth most cited organization with only four publications. Hong Kong Polytechnic University is the leader in the university ranking by academic performance in tourism and services in the 2018/19 academic year (Polyu, 2020). In addition to this, China has remarkable potential for winter tourism. It has substantial winter activities such as winter festivals (Harbin Ice Festival), winter scenery (The rime Scenery of Jilin), and skiing resorts (being improved Ski Resorts for the 2022 Winter Olympics around Beijing), etc. (China Highlights, 2020). Most of the pioneer countries in this area are western. This consequence is an excepted phenomenon because of its high development level. Austria is one of the European winter tourism centers, so the leadership of Austria in academic publishing production is not unexpected. Austria dominates the world with publications about winter tourism. Other conclusions about producing academic papers that the USA, which is dominant in almost every field in the world, is second. Norway is the third. It is no coincidence because they hosted many of the winter Olympics Games that affected the academic studies in these countries. Common characteristics of these countries are besides their great potential for winter tourism, having notable centres, and earning significant income from this alternative tourism type. Also, In addition to this, other common characteristics of them are high employment in the winter tourism market, being developed and high-income countries, and hosting well-established universities in the world. For instance, The University of Innsbruck in Austria is the most cited organization. It also supports the result that Austria is the leader in academic publishing production.

Secondly, according to the co-occurrence analysis, the top three most repeated keywords are climate change, tourism, and winter tourism, respectively. As a result of global warming, climate changes affect countries and destinations seriously, and also winter tourism sector is more severely affected by this situation. Therefore, scientists have naturally examined how destinations are affected by climate change and how to adapt to this situation. Today, they have been studying about ensure the adaptation and sustainability of the tourism areas, so it is not surprising that the most occurrence keyword is climate change. However, climate change has not been attracted attention very much by the tourism research community and tourism industry until recently. Some studies examine the effects of climate change on winter tourism from different countries such as Canada, the USA, Australia, New Zealand, Austria, Switzerland, and the UK. (Burki et al., 2003). Hennessy et al. (2003) aimed to determine the impacts of climate change on snow cover and precipitation in mountain areas in Australia. It has been deduced that the thickness of snow, the duration of snow on the ground, and the rate of precipitation would decrease in mountainous areas in 2020 and 2050. Breiling et al. (1997) estimated that the winter tourism sector might be losing revenue by 10 percent because of a decrease in snow cover due to climate change in Austria (Scott et al., 2006: 377). Wolfsegger et al. (2008) investigated how climate change in the Austrian ski regions affected the activities and manager responses. It has been concluded that climate change is not perceived as severely threatened for ski operation and technological adaptation can effectively cope with it. Fukuskima et al. (2002) aimed to evaluate the effects of air temperature change on skiing activities in 7 regions of Japan. In this study, it has been determined that the ski industry can be seriously affected by global warming, especially for ski areas in south-western Japan or at low altitudes. Also, Scott et al. (2004) determined that the winter season in Canada will get shorter due to climate change. Therefore, climate change will affect the winter season in Canada. Jones and Scott (2006) examined the potential impact of climate change on the annual number of visitors and seasonal visits to Canadian national parks. According to the results, the number of visitors in Canadian national parks may increase because of the extended hot weather season and improving opportunities. However, Elsasser and Bürki (2002) stated that there would be significantly damaging effects in the ski industry in Switzerland resulting from climate change. Moen and Fredman (2007) concluded that climate change might have remarkable adverse effects on ski season lengths and economic outcomes in the southernmost ski area in the Swedish mountains in the future. In our study, the climate change keyword has the highest link strength with adaptation but relatively low link strength with sustainability. However, VOSviewer keyword cluster analysis results are not significant. It is not clear why the program grouped keywords under these clusters. These meaningless groups can originate that winter tourism studies have not reached a sufficient level.

Implications

Our research has some theoretical and managerial implications. For the theoretical implications, firstly revealing the mainstream and trend of winter tourism literature makes a significant contribution to enrich and improve related literature.

Secondly, the bibliometric structure of the research provides systematic and numerical information for the researchers, and this framework enables researchers to grasp the winter tourism literature. Lastly, the study presents numeric data about keywords and their relationships with each other. For the managerial implications, changes occurred by global warming should be not only a source of concern for researchers but also local administrations and destination managers. Besides, our numerical data can give opportunities for local administrators and destination policymakers to make a holistic assessment for the industry through the trajectory of scientific researches.

Limitation of Study and Recommendations for Future Research

This study has some limitations. First of all, we may have included studies not related to winter tourism in the scope of the research, also excluded some substantial works because of the focus only on the WOS database and social sciences. In this context, we recommend a bibliometric analysis of all winter tourism literature without any restriction. Thus, researchers can have more comprehensive inferences about the winter tourism research area. The fact that the study provides numerical data on the keywords allow researchers to find out stimulating subjects in the winter tourism research area. In this regard, the study is a guide for future studies. Also, this study can be repeated with a systematic literature review method in the future.

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