



Shahid Bahonar  
University of Kerman



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## Winter Sports Tourism: A Bibliometric Analysis of Published Works in The Tourism-Based Journals (1967–2023)

Fatemeh Abdavi<sup>1</sup> | Sajjad Pashaie<sup>2</sup> | Parastou Aslanzadeh<sup>3</sup>

1. Corresponding Author, Associate Professor of Sport Management, Department of Sport Management, Faculty of Physical Education and Sport Sciences, University of Tabriz, Tabriz, Iran. Email: [fatemehabdavi@yahoo.com](mailto:fatemehabdavi@yahoo.com)

2. Assistant Professor of Sport Management, Department of Sport Management, Faculty of Physical Education and Sport Sciences, University of Tabriz, Tabriz, Iran. Email: [pashaie.s@tabrizu.ac.ir](mailto:pashaie.s@tabrizu.ac.ir)

3. MA. Student, Department of Sport Management, Faculty of Physical Education and Sport Sciences, University of Tabriz, Tabriz, Iran. Email: [parastouaslanzade@gmail.com](mailto:parastouaslanzade@gmail.com)

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### ABSTRACT

This research paper presented a comprehensive analysis of the literature on winter sports tourism, tracing its development over a span of 56 years. It was reviewed with bibliometric techniques with VOSviewer software. The extensive bibliometric analysis revealed emerging trends, notable research contributions, and key participants in the field. Prominent countries in this niche are Australia and Canada, while the Universities of Innsbruck and Waterloo, journals such as Sustainability Journal (Switzerland), and authors such as Falk and Muller, Peters, Scottwere have shown significant focus in this area. Therefore, the study highlights the increasing importance of this niche tourism sector, reflecting a surge of interest in recent years as indicated by the rising number of relevant research papers. The review also underscored how vital bibliographic studies are to comprehending the landscape of winter sports tourism. The findings provided trends, patterns, and a roadmap for prospective researchers, flagging the necessity of keeping pace with the evolving realities of winter sports tourism and establishing a valuable foundation for understanding and examining current trends and future developments in winter sports tourism. That will undoubtedly prove useful for both researchers and decision-makers in the field of winter sports tourism.

## Introduction

The snow sports sector has witnessed a remarkable surge in its expansion over the past 50 years. It is estimated that there are about 120 million skiers worldwide and around 2,000 ski resorts in 80

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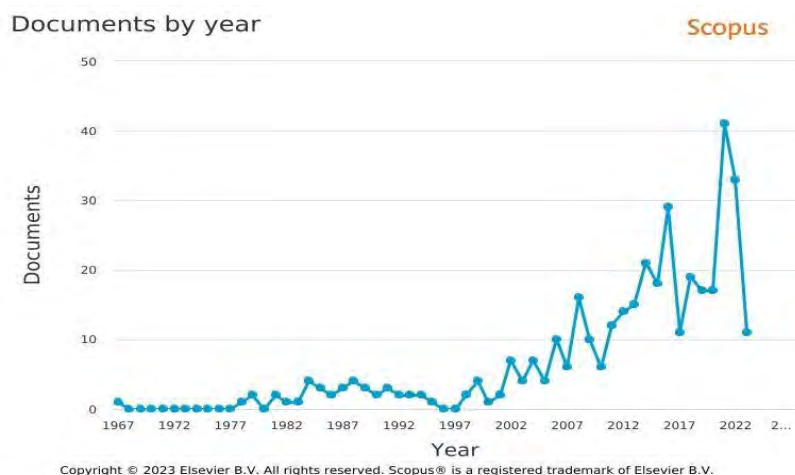
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countries catering to this growing market. Emerging ski resorts in Asia and Eastern Europe are vying for the attention of these visitors, alongside already established destinations (Hudson & Hudson, 2015). Nowadays, tourism development can be considered in different types of areas, such as nature, museums, buildings, and historical events, but it is noteworthy that one of the newest areas of the tourism industry that has become very popular is sports tourism (Moradi, 2019). Sports tourism may be described as journeys conducted for leisure (noncommercial) purposes to participate in or witness sports activities that take place beyond the location of habitual residency and may or may not have a competitive motive (Jiménez-García, Ruiz-Chico, Peña-Sánchez, & López-Sánchez, 2020; Pashaei, Askarian, & Rozafzon, 2018). For a long time, the interaction and connection between tourism and sports have been expanding (Abbasi, Bagheri, & Asgari, 2018). Although sport tourism appears first as a tourist activity, it is increasingly viewed as an experience of sport culture (Pigeassou, 2004). The findings hint at the future complexity of the sports tourism industry. Sports tourism in the post-COVID-19 era is heavily reliant on environmental factors and targeted assistance, with initiatives focusing on tourist safety and security, digitization of the business, and new job prospects (Pashaie & Perić, 2023).

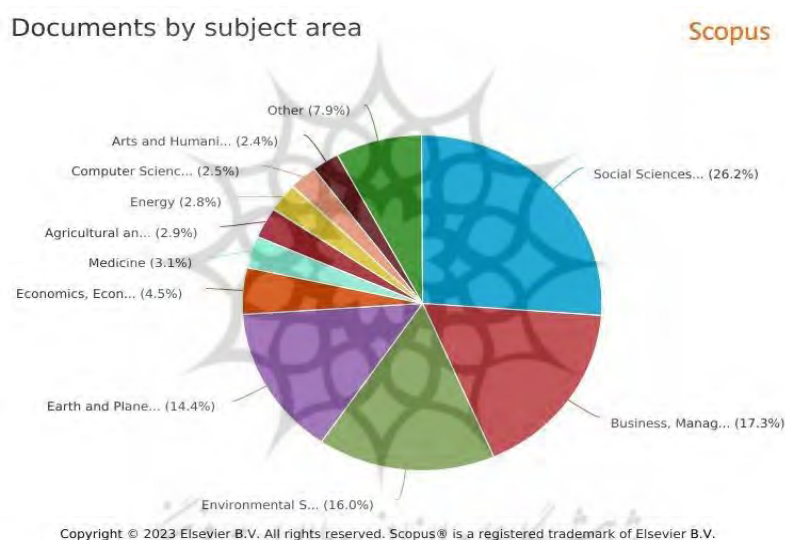
Winter tourism is frequently connected with rural locations and snow-based sports. However, urban locations may provide outdoor winter sports as well as a comprehensive range of urban tourist product bundles that are not simply sports-related (Bichler & Pikkemaat, 2021). Winter sports are among the most popular activities in mountain locations, and they have played an important role in the brisk expansion of mountain tourism in recent decades (Bonadonna, Giachino, & Truant, 2017; Herman et al., 2021; Petrovic, 2013). Winter sports are one of the most popular activities in mountainous locations and have played an important role in the growth of mountain tourism in recent decades (Herman et al., 2021). Bausch and Gartner (2020) recently conducted research in which they evaluated rural European mountain winter destinations in five areas and determined that most winter mountain trips were equivalent to winter sports vacations (Bausch & Gartner, 2020). The authors demonstrated that highly developed rural winter sports locations have heavily concentrated on winter sports as the primary appeal element, with little study on non-sports-related winter tourism (Bichler & Pikkemaat, 2021). Mountains and depressions constitute 27.91% of the landform units, with nearly 90% having heights suitable for winter sports of less than 1500 m (Ilieş, Ilieş, Tătar, & Ilieş, 2017). What is interesting in this regard is that mountainous and snowy regions in countries such as France, Switzerland, Austria, and Italy owe part of their sports and tourism prestige to the snow and winter in the magnificent Alps. Also, China and Russia have a similar situation in this field (Abbasi et al., 2018). Psychological security, economic security, and social security have a positive and significant relationship with the behavioral intentions of winter sports tourists in Tehran, Iran, ski resorts (Nazari, Karoubi, & Karazmoudeh, 2021).

As you can see in Figure 1, it is quite clear that the number of articles published in the field of winter sports tourism, despite the drop in some years, has always grown continuously and has reached its peak in recent years. The decline of the linear graph in 2023 can be justified by the fact that not enough time has passed for the publication of accepted articles this year, and researchers believe that with the publication of these articles, we will see the growth of this graph again. With a little reflection on the graph, we can also see that there is a close relationship between sports and winter tourism. In every year that big sports and winter tournaments have been held, the attention to this industry and the publication of articles related to it have also grown significantly.



**Figure 1.** The growth chart of published researches based on the year of publication

In addition, the information in Figure 2 shows that there is always an emphasis on the importance and necessity of conducting a bibliographic study in the field of winter sports tourism. Also, this diagram specifies the diversity and breadth of the research fields related to winter sports tourism and the necessity of defining diverse research fields to get to know the knowledge in this field and discover the existing gaps.



**Figure 2.** Chart of courses with the desired field

The current study is an exploratory investigation of this research issue. This effort intends to contribute to the literature by using bibliometric approaches and conducting literature reviews (Jiménez-García et al., 2020). There are two approaches to bibliometric ally analyzing a study field. First, performance analysis focuses on measuring scientific impact and citations using various indices. Second, science mapping makes it possible to portray scientific research and its growth in intellectual, conceptual, and social realms (Gutiérrez-Salcedo, Martínez, Moral-Munoz, Herrera-Viedma, & Cobo, 2018). This work serves two functions. First, the purpose of this research is to identify the major trends in research on sports tourism and winter tourism, allowing for a better understanding of the evolution of this research issue. Second, this study is to provide a map of the studied field, which will be valuable for researchers in this subject who want a topic tree to guide their careers and future research. As a result, a bibliometric study on the topic of "wintery sports tourism" was conducted using the VOSviewer and data from Scopus (Capobianco-Uriarte, Casado-Belmonte, Marín-Carrillo, & Terán-Yépez, 2019).

Hence to fill in the gaps and present state-of-the-art knowledge structure and science mapping on the subject, this study presents a bibliometric review based on the following objectives:

- i. To evaluate the past and current knowledge structure on winter sport tourism through bibliographic coupling analysis.
- ii. To evaluate the directions and future trends of winter sport tourism through co-word analysis.

## **Theoretical background and hypotheses**

### *Winter Sports Tourism*

Winter sports tourism, as one of the important activities in many mountain regions around the world, is recognized as a key economic factor (Bausch & Unseld, 2018). Winter sports originated with the inventions of the British affluent class. These sports were introduced for the first time in the villages of Zermatt, Valais, and St. Moritz in Switzerland in 1864. The history of the first winter sports tour for winter holidays dates back to 1903, which was also held in Switzerland (Yusufian Qadiklai, 2016). France has an important position in the winter tourism industry and ranks second in the world with more than 518 million ski visitors in the winter season of 2016–2017. The country has 336 recreation and winter sports centers with 3391 lifts, which constitute more than 18% of the global capacity in this field. In other words, France is one of the important global destinations for winter tourism experiences, with a large number of sports resorts and winter recreation centers (Rech, Paget, & Dimanche, 2019). In the past, winter tourism was accessible only to the privileged social classes, but nowadays, with the development of tourism and the existence of economic and public facilities, different sections of society have also become interested in it. Countries with mountainous and snowy regions provide ideal conditions for winter tourism (Rahmani, 2012). As the broad literature on winter tourism shows, there is a strong link between winter sport and winter tourism (Steiner & Alteneder, 2018). Bichler & Pikkemaat pointed out in their research that urban destinations are also able to provide tourists with winter sports in open spaces and integrated complexes (Bichler & Pikkemaat, 2021). The results show that in winters that lack snow, resorts in high destinations gain importance and travel distances lose some relevance (Unbehaun, Pröbstl, & Haider, 2008). In general, the restrictions have a significant effect on the motivation of tourists (Hesari & Azizan Kohan, 2021).

### *Winter sports as an attractiveness factor in tourism destinations*

Cities are diverse, multifunctional, and complex and offer various products and services for tourism (Ashworth & Page, 2011). In general, tourism to urban areas has become an important research stream in various fields, including geography, sociology, and urban studies (Bichler & Pikkemaat, 2021). Today, the connection between sports and tourism has produced a new style of tourism that incorporates a variety of elements (Pashaei et al., 2018). According to a number of academics, understanding consumer motivation is essential for sport organizations to grasp the factors that influence people's participation in sport, leisure, and related tourist behaviors. This understanding could aid sport managers in developing psychographic profiles of consumers, enhancing their offerings, and creating communication strategies in an effort to meet the needs and satisfy the wants of consumers (Wang, Zhang, Song, & Wan, 2020). Internationally, the number of individuals who combine tourism with winter sports is growing, but the context of winter sports has been largely ignored in the field of destination attractiveness research (Bichler & Pikkemaat, 2021). Despite some conceptual models of tourism destination competitiveness in general (Evans, 2016), limited models focus specifically on winter destinations (Hallmann, Müller, & Feiler, 2014) or ski resorts (He & Luo, 2020). While some research focused on climate change ((Bichler & Pikkemaat, 2021; Steiger & Abegg, 2018), others dealt with the size of the ski resort and its link to success (Falk, 2013). According to the research results, the higher the security factor in a place from various aspects, the more winter sports tourists will be willing to travel to that place (Nazari et al., 2021).

## **Methodology**

Review methodology is a methodical, step-by-step process to approach the research topic impartially. It should be a top priority for all researchers to assess the scientific literature (Tranfield, Denyer, & Smart, 2003). Researchers are responsible for the growth of science by using review research to update their knowledge (Aria & Cuccurullo, 2017). This research adopts a bibliometric analysis to



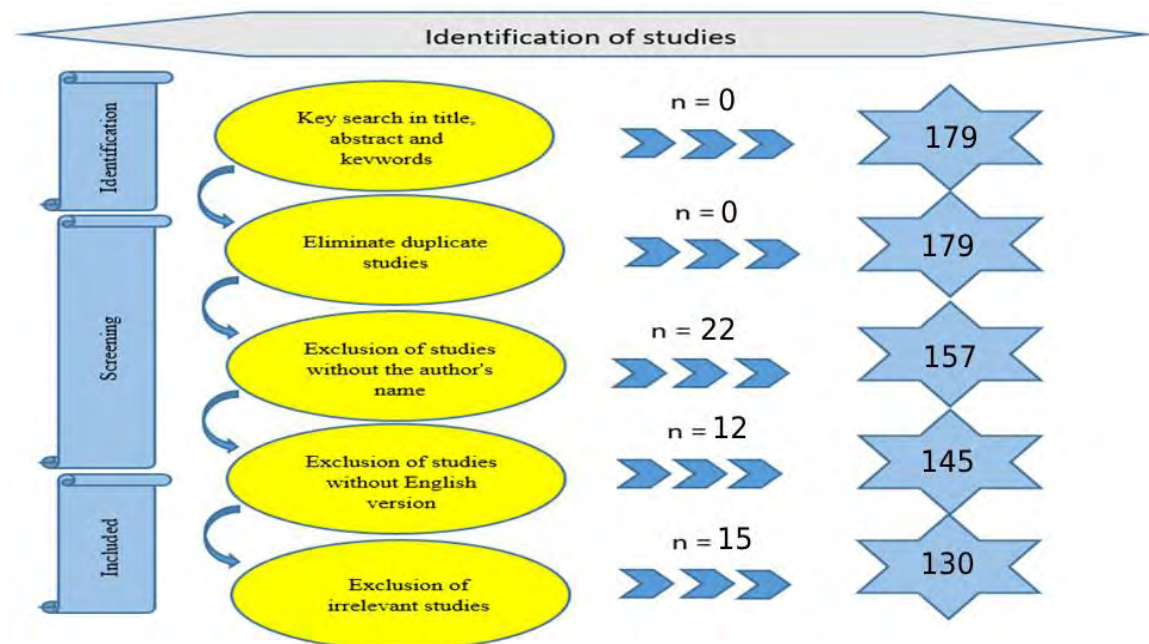
analyze the prominent publications regarding tourism in the literature, particularly in the winter sports tourism field. Bibliometric has become a staple instrument in scientific management and policy over the past few decades (Roy & Basak, 2013). The research plan or strategy used in the bibliometric technique helps the researcher achieve their research objectives by using strategies and practices. It has been explored in the academic literature with distinct winter sports tourism-related themes such as sports tourism, sports, and winter. The current study's scope involves all articles published in the English language until 2023, by tourism and sports tourism journals indexed by the Scopus database. Data collections on the Scopus database occurred between 1967 and 2023, respectively. Web of Science (WOS) and Scopus are the two main bibliographic databases (Pranckutė, 2021). This paper presents an advanced method for analyzing scientific collaboration networks at universities and research institutions. This method is based on automatically obtaining bibliographic data from scientific publications through the use of the Scopus database (Montoya, Alcaide, Baños, & Manzano-Agugliaro, 2018).

Exclusively utilizing the Scopus database for this study was grounded in several considerations. Firstly, Scopus stands out as one of the most extensive abstract and citation databases globally, encompassing a wide spectrum of scientific disciplines, including tourism research. Its broad coverage guarantees access to a diverse collection of scholarly literature, which is indispensable for conducting a thorough bibliometric analysis. Secondly, Scopus offers robust functionalities tailored for bibliometric analysis, such as citation tracking, co-authorship analysis, and keyword mapping, among others. These capabilities streamline the extraction of valuable insights into the structure and dynamics of research in winter sports tourism. Moreover, Scopus grants access to an extensive repository of peer-reviewed journals, conference proceedings, and other scholarly publications, ensuring the reliability and quality of the data utilized in this study.

The authors established and applied six exclusion criteria to the collected data in the following sequence: 1) exclusion of other forms of publication such as book reviews, books, commentaries, and letters; 2) exclusion of articles published in non-tourism-based journals; 3) exclusion of articles not published in English; 4) exclusion of articles published after 2023; 5) removal of duplicate studies found in Scopus; and 6) exclusion of publications that did not directly focus on winter sports tourism. Figure 3 illustrates the data gathering procedures conducted on the Scopus database. The PRISMA procedure was employed to screen the research. Based on the data in Table 1 and Fig 3, 130 studies were identified using the targeted keywords and specific operators in the Scopus database.

**Table 1.** Procedures and search criteria for reference sources

Items	description
Citation base	Scopus citation database
Keywords	" winter sports tourism" OR " sports tourism "
Search field in the library	Title, abstract ,keywords
search command	TITLE-ABS-KEY ( "sports" AND "tourism" AND "Winter" ) AND ( LIMIT-TO ( SUBJAREA , "SOCI" ) OR LIMIT-TO ( SUBJAREA , "BUSI" ) OR LIMIT-TO ( SUBJAREA , "ARTS" ) ) AND ( LIMIT-TO ( DOCTYPE , "or" ) ) AND ( LIMIT-TO ( LANGUAGE , "English" )
Type of documents	Journal articles
Search time frame	1967 - 2023



**Figure 3.** Agreement on the study selection based on the PRISMA protocol

Source: (Page et al., 2021)

Firstly, data collection was conducted using the Scopus database, identifying 130 documents related to the "winter sports tourism" field. These documents were found using descriptors such as 'winter sports tourism,' 'sports tourism,' and 'tourism,' with specific search filters applied to titles, abstracts, and keywords. Initially, 59 publications were selected and exported to an electronic spreadsheet for further analysis using the exclusion criteria. After applying the six exclusion criteria, the authors analyzed 59 publications. Through this methodology, the authors assessed the development of meta-level (discipline/subject field and period), meso-level (journal, institution, and country), and micro-level (individuals) linked to the scientific production of winter sports tourism. To structure the findings and highlight the relevant journals, periods, authors, institutions, countries, and research topics, figures and tables were designed. Lastly, to understand scholars' interests in winter sports tourism reflected in the 59 publications, the authors investigated the curriculum and research interests of those with a relatively high number of publications on the subject.

The examination of networks and their categorization was conducted utilizing VOSviewer software. VOSviewer software empowers researchers to delve into and assess their networks with greater depth and accuracy, showcasing visually appealing and high-caliber networks. This project utilizes version 1.6.19 of the software, designed for the Windows 64-bit operating system.

## Results

Table 2 provides data on the number of publications published between 1967 and 2023 in the area of winter sports tourism. The analysis basket contains 154 documents released by 59 publications, with an average citation rate of 24.25%. However, there are some articles with fewer citations. Additionally, the numbers shown indicate that this field's annual growth in scientific output is 1.98%. Also, the numbers obtained in this table show that the impact of the journal, the number of citations, and the number of authors are very important for the acceptance and citation of documents. Journals in fast-growing fields outperform journals in slow-growing or declining fields (Sjögårde & Didegah, 2022).

Authors classified their papers using 413 keywords, with 40 single-authored research on winter sports tourism' and risk in sports. 2.36 writers contributed to 130 other works, with a 26.15 percent international collaboration rate.

**Table 2.** Overview of bibliometric main information

Description	Results
Timespan	1967:2023
Sources (Journals, Books, etc)	59
Documents	130
Annual Growth Rate %	1/98
Document Average Age	10/02
Average citations per doc	24/25
References	6251
DOCUMENT CONTENTS	
Keywords Plus (ID)	323
Author's Keywords (DE)	413
AUTHORS	
Authors	271
Authors of single-authored docs	40
AUTHORS COLLABORATION	
Single-authored docs	42
Co-Authors per Doc	2/36
International co-authorships %	26/15
DOCUMENT TYPES	
Article	130

**Functional analysis of documents and authors**

The most important idea is to gather relevant documents and evaluate notable writers to gain insight into the subject area. This approach allows for a greater understanding of the target area by analyzing well-known authors who have access to more study findings (Han, Kang, Kim, & Kwon, 2020).

**Table 3.** 10 best studies in the field of winter sports tourism

Paper	DOI	Total Citations	TC per Year	Normal ized TC
DECCIO C, 2002, J TRAVEL RES	<a href="https://doi.org/10.1177/0047287502041001006">10.1177/0047287502041001006</a>	310	14/09	1/79
FLAGESTAD A, 2001, TOUR MANAGE	<a href="https://doi.org/10.1016/S0261-5177(01)00010-3">10.1016/S0261-5177(01)00010-3</a>	273	11/87	1/00
SCOTT D, 2012, WILEY INTERDISCIP REV CLIM CHANGE	<a href="https://doi.org/10.1002/wcc.165">10.1002/wcc.165</a>	249	20/75	4/45
HALLMANN K, 2015, J TRAVEL RES	<a href="https://doi.org/10.1177/0047287513513161">10.1177/0047287513513161</a>	150	16/67	3/17
PAGET E, 2010, ANN TOUR RES	<a href="https://doi.org/10.1016/j.annals.2010.02.004">10.1016/j.annals.2010.02.004</a>	144	10/29	2/82
UNBEHAUN W, 2008, TOUR REV	<a href="https://doi.org/10.1108/16605370810861035">10.1108/16605370810861035</a>	118	7/38	3/30
ESSEX S, 2004, PLANN PERSPECT	<a href="https://doi.org/10.1080/0266543042000192475">10.1080/0266543042000192475</a>	117	5/85	4/72
MÜLLER M, 2014, EURASIAN GEOGR ECON	<a href="https://doi.org/10.1080/15387216.2015.1040432">10.1080/15387216.2015.1040432</a>	92	9/20	2/86
RIXEN C, 2011, MT RES DEV	<a href="https://doi.org/10.1659/MRD-JOURNAL-D-10-00112.1">10.1659/MRD-JOURNAL-D-10-00112.1</a>	92	7/08	1/34

TEIGLAND J, 1999, IMPACT ASSESS PROJ APPRAISAL	10.3152/147154699781767 738	87	3/48	1/00
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The top 10 most cited studies in the field of winter sports tourism are presented in Table 3, based on this information, the study by Deccio and Baloglu conducted in 2002 under the title "Non-Host Community Residents' Reactions to the 2002 Winter Olympic Games: Spillover Effects" With 310 citations, compared to other studies in this field, it has been placed at the top and has been introduced as the most influential article in this field. In this study, these two researchers examined several factors, including the perceptions of residents of the non-host community due to the 2002 Winter Olympic Games, the antecedents of these effects, as well as the result of supporting the Olympics. The results obtained from the study of these two show that most people and residents of these areas are not completely in favor or against such events. But it should be pointed out that all these people seek to promote their living area during these games and tend to support the activities of their rural community (Deccio & Baloglu, 2002).

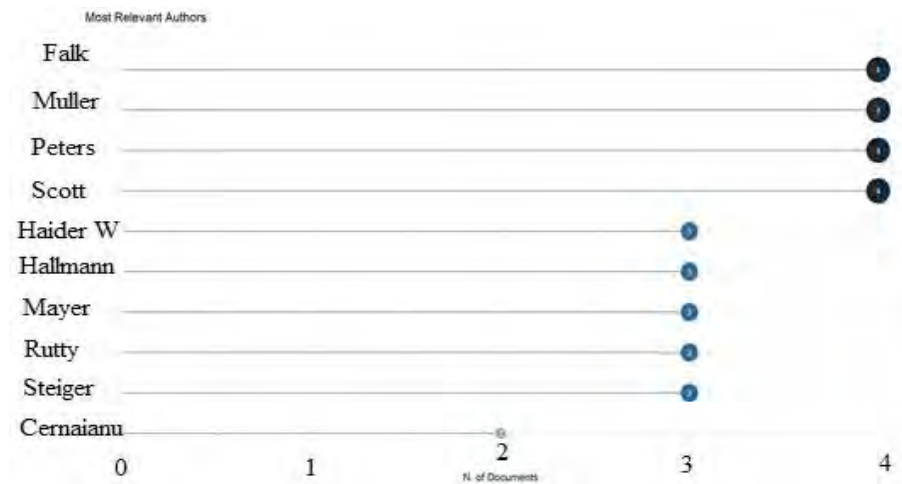
The second influential study in this field was written by Flagestad and Hope in 2001. This research, titled "Strategic success in winter sports destinations: the perspective of sustainable value creation", has very important results in the field of tourism and winter sports. So that this article has been cited 273 times. In this study, these researchers came to the conclusion that the survival and growth and development of winter sports destinations is largely cantered around strategies for laying the groundwork to create a competitive advantage and at the same time comply with the sustainable tourism criteria set by the World Tourism Organization. Also, creating sustainable values as the goal of strategic performance in these destinations was also one of the main suggestions of these researchers who always emphasized it (Flagestad & Hope, 2001)).

Another article that has been placed as the third article in the list of the most influential articles in the field of winter sports tourism is by Anne Scott and her colleagues who published their study in 2012 under the title "International Tourism and Climate Change". Although this article was published ten years after the two previous articles that were mentioned, it has managed to attract the opinion of many researchers and has 249 citations. Tourism has been introduced in this research as an effective industry in the economy, and on the other hand, it has been shown to be very sensitive to the climate. In this study, Scott and his colleagues tried to explain the complex interrelationships between climate change and multiple components of the international tourism system. The results of these people's research showed that although significant progress has been made in this field in the past few decades; but some gaps in this knowledge still exist. The risks of climate change and adaptation capacity show that the tourism sector in the current world is not well prepared for the challenges of climate change and special attention should always be paid to this issue (Scott, Gössling, & Hall, 2012).

#### ***What are the most influential authors in winter sports tourism research?***

Figure 4 shows the top 10 authors and authors in the field of winter sports tourism, and as it is known, Falk, along with Muller, Peters and Scott, are known as the most influential authors and authors in this field by publishing 4 studies. Other authors who are in this list have been placed in the next ranks by publishing 3 studies in this field.





**Figure 4.** 10 authors with the largest number of scientific productions in the field of winter sports tourism.

Of course, it should be noted that a greater number of scientific productions does not always mean receiving more citations. This topic is one of the scientific qualitative indicators that is discussed in bibliographic discussions. Nevertheless, the quality of scientific productions is still a multidimensional concept and only the number of citations cannot provide it (Aksnes, Langfeldt, & Wouters, 2019).

#### ***What are the most influential institutions and universities in the field of winter sports tourism?***

Based on the data in Table 4, the University of Innsbruck in Austria has been introduced as the most influential university and institute by publishing eleven articles in the field of winter sports tourism. The University of Innsbruck is the eighth best university in Austria, which according to the information available on the website <https://www.scimagoir.com/> has been registered as one of the Q1 universities. This university, which started its activity in 1669, has a long and turbulent history. This university has always been known as the main pillar of Tyrolean society and has had a significant impact on the region. The unique importance of this university as a research and educational institution can be seen from the many successes achieved by its current and former graduates and scientists. This institution has hosted many advanced discoveries and wonderful scientific researches (<https://www.study.eu/university/university-of-innsbruck>).

**Table 4.** The top organization/university with the most scientific production in the field of winter sports tourism

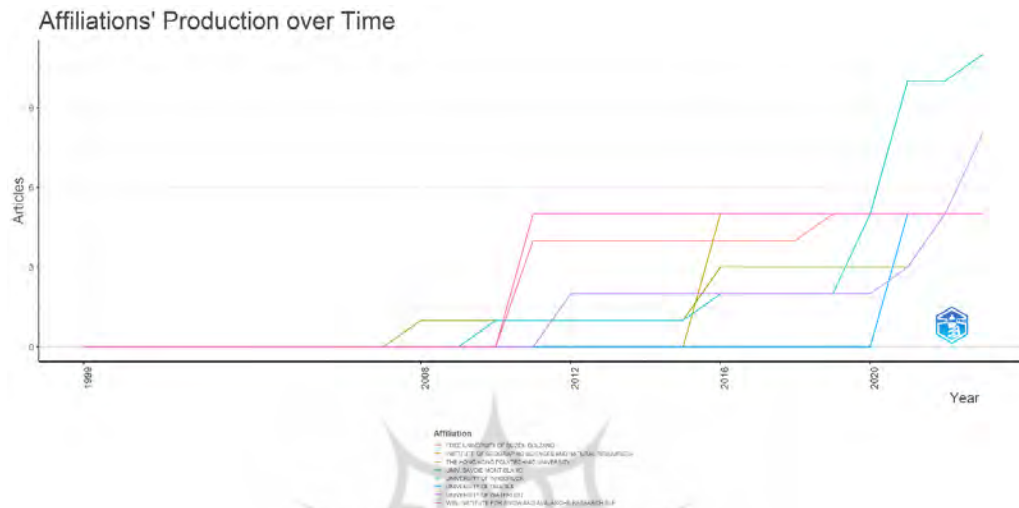
Organization/University	Number of articles (n)
UNIVERSITY OF INNSBRUCK	11
UNIVERSITY OF WATERLOO	8
AZAD UNIVERSITY OF BOZEN-BOLZANO	5
INSTITUTE OF GEOGRAPHIC SCIENCES AND NATURAL RESOURCES	5
THE HONG KONG POLYTECHNIC UNIVERSITY	5
UNIVERSITY OF SAVOIE-MONT-BLANC	5
UNIVERSITY OF ORADEA	5
WSL INSTITUTE For SNOW AND AVALANCHE RESERCH SLF	5
UNIVERSITY OF BUCHAREST	4
UNIVERSITY OF GENOA	4

Canada's University of Waterloo has also been recognized as the second most influential institution among all institutions active in research related to winter sports tourism by publishing 8 articles in this field. This university is the sixth best university in Canada, which is considered among the best

universities in this country for studying. According to the information of the site that was mentioned in the previous section, this university is ranked Q1 among all universities.

Also, the six Azad universities of BOZEN-BOLZANO, the Institute of Geography and Natural Resources, the Hong Kong Polytechnic, SAVOIE-MONT-BLANC, Orada and the WSL Institute, with the publication of 5 articles in the relevant field, are the next most influential institutions and universities in this field.

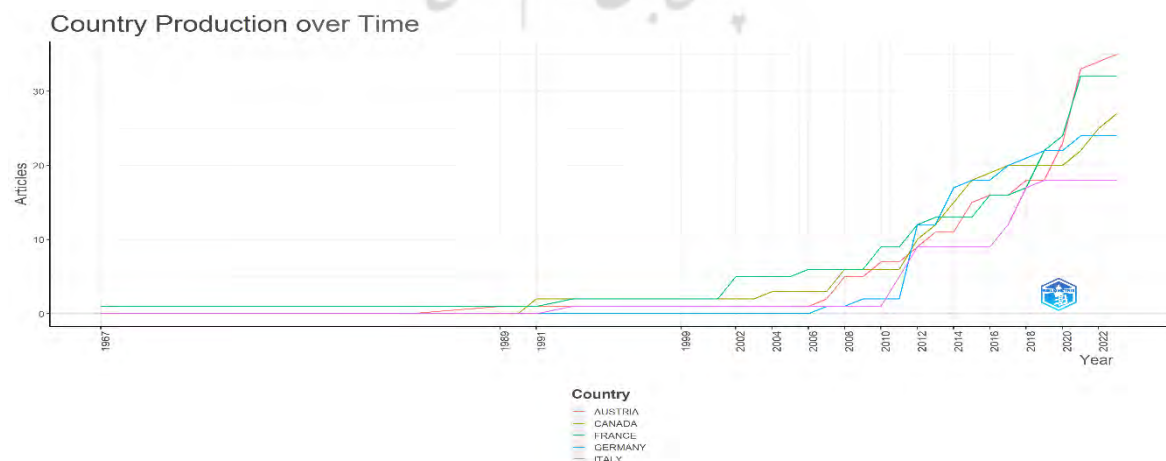
Figure 5 shows the growth of scientific productions of scientific institutions, and based on this graph, it is clear that the University of Innsbruck has the highest growth rate compared to other institutions. The University of Waterloo is ranked next after this university; therefore, it is clear that this graph also confirms the data in table four.



**Figure 5.** Top organizations/universities with the most scientific production in the field of winter sports tourism

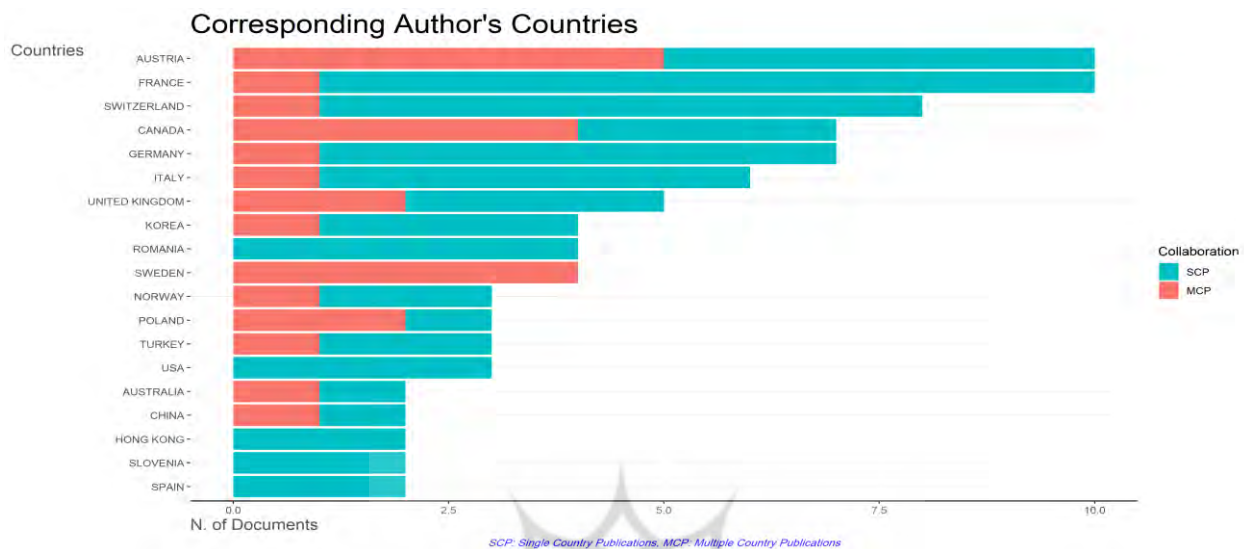
### ***Which are the most influential countries in the field of winter sports tourism***

The linear trend of the growth of scientific production in this field is presented in chart six, based on the figure below, the 5 countries of Australia, France, Canada, Germany and Italy have the largest number of scientific productions in this field. Paying a little attention to the graph, it can be clearly seen that the number of documents published in Australia and France is somewhat higher compared to other countries. Since more than 68% of these studies have been carried out in the form of domestic and international collaborations among authors; considering the frequency of frequency, the number of scientific productions of these two countries in the field of winter sports tourism is more than the other three countries.



**Figure 6.** The linear growth trend of the scientific production of winter sports tourism

A point that should be given special attention is that the number of scientific productions by countries alone does not cause their influence in different fields. Moreover, the international cooperation of writers can also be an important factor in this; therefore, the authors of the countries should always try to communicate with each other and carry out international cooperation to write articles and studies. These collaborations show the high level of scientific studies and can provide the necessary platform for increasing collaborations (Askun & Cizel, 2020). Due to the importance of international cooperation, the researcher in this section, using Figure 8, has pointed to single-country studies and international multi-country studies in the field of winter sports tourism.



**Figure 7.** Cooperation of writers from different countries in the field of winter sports tourism

According to this Figure 7, it can be seen that the countries of Australia, Canada, Sweden, Great Britain and Poland are among the countries where a significant part of their scientific production has been done by international cooperation. In the meantime, Sweden has a very favorable situation, so that all the scientific productions of this country in the field of research have been done in the form of international collaborations, and there is no single-authored article among the published articles of this country.

It can be safely said that using this method and using international cooperation among authors is one of the best ways to increase the chances of receiving study opportunities in the future. How these countries communicate with each other, as well as the cooperation formed between them, is shown in Figure 8. In this form, the collaborations made to write the article about winter sports tourism have been fully shown. With a more general view in this way, the relations between some countries can be observed in such a way that the relations between Australia and Canada, Sweden with Canada, Germany, France and the United Kingdom are clearly visible.



**Figure 8.** Cooperation between the top countries in the field of winter sports tourism

### ***What are the most influential publications in the field of winter sports tourism?***

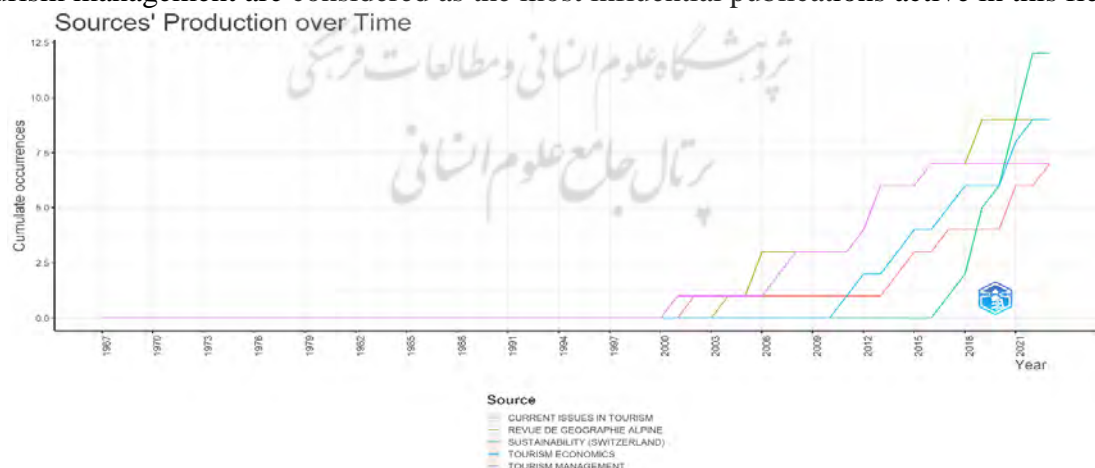
As mentioned in the general information section of the articles, the final 130 articles that passed the Prisma protocol were published by 59 journals. Table 5 shows the top journals in the field of winter sports tourism. Of course, in the meantime, it should be noted that some of these journals may have used some unethical strategies to improve their rankings, which has caused many criticisms in this field (Archambault & Larivière, 2009).

**Table 5.** The best journal with the most scientific production in the field of winter sports tourism

Journal	Number of articles (n)
SUSTAINABILITY (SWITZERLAND)	12
REVUE DE GEOGRAPHIE ALPINE	9
TOURISM ECONOMICS	9
CURRENT ISSUES IN TOURISM	7
TOURISM MANAGEMENT	7
TOURISM REVIEW	5
JOURNAL OF SUSTAINABLE TOURISM	4
JOURNAL OF TRAVEL RESEARCH	4
TOURISM RECREATION RESEARCH	4
EUROPEAN JOURNAL OF TOURISM RESEARCH	3

As mentioned, Table 5 presents 10 authoritative publications that are the most influential publications in the field of winter sports tourism. According to the data in this table, the Swiss Sustainability Journal, which is one of the most prestigious publications in the world in the field of study, has been determined as the most influential journal and publication by publishing 12 works in this field.

Figure 9 shows the growth of top and influential publications in the field of winter sports tourism until 2023. This chart also shows the information in Table 5 in general, and the five publications that were at the top of Table 5 are also shown in this chart. It is also observed that the journals of sustainability (Switzerland), review of Alpine geography, tourism economy, current issues in tourism and tourism management are considered as the most influential publications active in this field.



**Figure 9.** The growth of scientific production in the field of winter sports tourism in publications

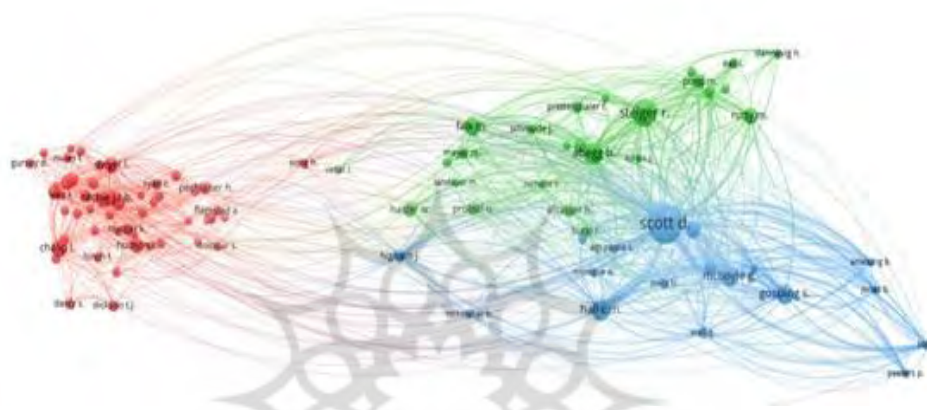
The interesting thing to note in this graph is that, unlike the other four publications that were growing since the early years, the magazine of sustainability (Switzerland) has witnessed growth and development in this field since 2015 and is known as the most influential journal in this field. Is. From 2016 to 2021, the number of scientific productions of this journal in the relevant field has increased from zero to 12, which is a significant growth. It should also be noted that from the previous findings,



it can be seen that out of 130 studies published in all publications that are active in this field, 64 articles are the contribution of these 10 top and influential publications. In other words, it can be said that about 50% of articles published in the field of winter sports tourism have been published by these magazines.

***What are the most effective co-referencing patterns in the field of winter sports tourism?***

Co-citation patterns are patterns that show how articles and authors in a similar field refer to each other. In general, these patterns represent a collection of articles and authors that are related and refer to each other. Thus, co-citation patterns enable us to better understand the relationships and connections between articles and authors. To write about effective co-citation patterns, we first need to find patterns that have a high number of references and the number of articles that have used them. Then we have to review the related articles and analyses the connections between them. For this purpose, bibliometric tools such as Web of Science (WOS) or Scopus were used to identify co-citation patterns and then analyses them. Figure 10 shows the most effective patterns of co-citations that exist in the field of sports tourism.



**Figure 10.** Co-citation patterns in the field of winter sports tourism

***What are the most effective vocabulary patterns in the field of winter sports tourism?***

In the structure of the keyword simultaneity network, after analysing 130 articles in this field, it was observed that 13 words as keywords that had the most frequency in these articles together made the keyword simultaneity network. Figure 6 shows how these words are related to each other, as well as the size of each node. The larger the size of a node, the higher the frequency of that word.



**Figure 11.** Coincidence of keywords with the highest frequency in the field of winter sports tourism

- The **Yellow** cluster consists of the keywords destination management, winter sports resorts and Switzerland, which are linked together.

- The **Blue** cluster, which is considered as one of the largest clusters in this network, has the most used word tourism in its center, and two other words, the Olympic Games and Austria, accompany this word.
- In the **Red** cluster, which is the largest cluster of this network, the term winter sports is placed as a word with a high frequency, and the terms sports tourism, ski resorts and winter tourism are also linked to each other to form this cluster.
- But the **Green** cluster, which has climate change modification, which is the most frequent compared to other words, has placed in its heart and has established a connection with the words of adaptation and sustainability.

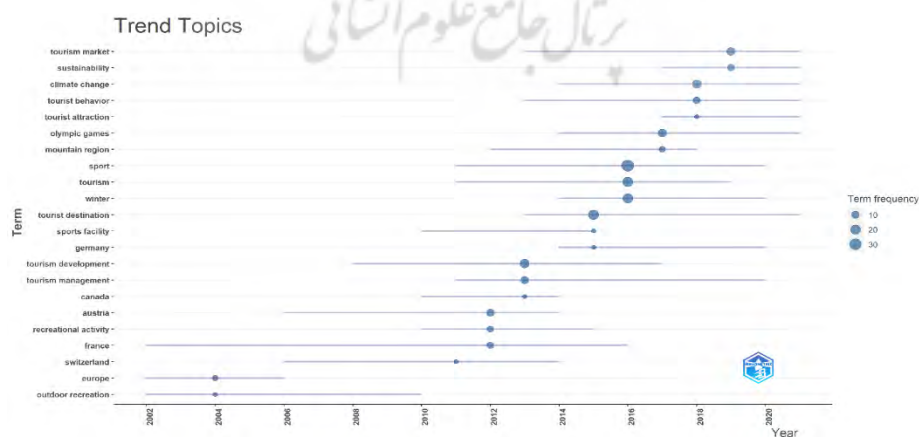
Of course, we must point out that each cluster, despite having different colors, is still connected with each other. In such a way that if we pay attention to the form with a more specialized view, we will see the connection of the term winter games which is placed in the red cluster with other words such as destination management in the yellow cluster or tourism in the blue cluster.

### *What are the most effective patterns of synonyms in the field of winter sports tourism?*

Keywords in a document are an important part of the content that the author makes important and prominent. These words are able to be useful for researchers and help them to identify popular or less interesting topics in a field. In other words, keywords can help researchers to search for the studies and research they need more carefully and quickly (Pesta, Fuerst, & Kirkegaard, 2018). Also, the statistical analysis of key words, in addition to recognizing new fields and scientific trends, can show to what extent these fields have been influential in advancing the scientific frontiers in that field and are able to act as a foundation for new paths in science and research. In other words, statistical analysis of key words can help researchers to find the best solutions and research strategies to advance science and research in various fields (Aksnes et al., 2019).

In these 130 researchers analysed, the word "sports", which is one of the important and key words in the research field and also in the title of the research, has the largest share with 9% and 33 repetitions. Other frequently repeated keywords identified in this research are words such as "tourism", "tourist destination", "winter" and "tourism development", which together with the measurement and analysis of the confirmatory factor, even reliability, have a direct and close relationship with the words. They have a key area in mind. In general, the obtained results are important and fundamental for all researchers in all disciplines and encourage them to use modern software and suitable tests for structures.

Figure 12 confirms what was said in the previous sections and shows that some terms are more frequent than other words and the authors used them in their research in the field of winter sports tourism. The words sports, tourism, tourist destination, winter and tourism development are the words that have the highest frequency compared to other words.



**Figure 12.** The movement of keywords over time by calculating the weight of topics

## Discussion and Conclusion

This study offers an in-depth evaluation of recent research on winter sports tourism indexed in the Scopus database, highlighting key trends, influential works, and leading contributors in the field. The bibliometric analysis provides valuable insights into the evolution and current status of winter sports tourism research, uncovering significant themes and areas of interest such as destination management, winter sports resorts, and the impact of the Olympic Games. The study emphasizes the growing significance of this niche tourism sector, which is reflected by the increasing number of relevant research papers, guiding future authors in their work (Roziqin, Kurniawan, Hijri, & Kismartini, 2023). Additionally, it aims to guide scholars interested in winter sports tourism by offering more scope for contextual papers. Developing countries or those aspiring to develop winter sports tourism can use models from countries with the highest number of publications, such as Australia and Canada, as references. These initiatives can be fostered through collaboration between institutions like the University of Innsbruck, Austria, and the University of Waterloo, Canada, along with countries and practitioners in the winter sports tourism industry, to conduct research and publish in journals such as Sustainability Journal (Switzerland). Scholars such as Falk, Muller, Peters, and Scott can further improve conditions and meet practical needs in the field.

Moreover, the present study employs bibliometric analysis, employs the VOSviewer, and can offer visualization analysis to researchers with an interest in winter sports tourism. The Scopus database contains 130 documents analyzed, and the co-occurrence, co-authorship, and bibliographic coupling features are examined. Additionally, this investigation utilizes bibliographic coupling and co-word analysis, revealing significant past, present, and future themes, and the increasing concern regarding winter sports tourism necessitates an examination of how scientific research has adapted to new realities. The two bibliometric analyses reveal similar clusters, such as destination management, winter sports resorts, Switzerland, the Olympic Games, Austria, and the terms sports tourism, ski resorts, and winter tourism, as drivers towards winter tourism sites. These similar themes suggest that the field is still in its nascent stages and requires further research to delve into the fundamental knowledge of the subject. Nonetheless, the significance of winter sports tourism is paramount, particularly in the local community affected by winter events, and is vital to nation-building and the proliferation of social well-being.

Also, the study highlights the increasing importance of this niche tourism sector, reflecting a surge of interest in recent years as indicated by the rising number of relevant research papers. The review also underscored how vital bibliographic studies are to comprehending the landscape of winter sports tourism. The findings provided a roadmap for prospective researchers, flagging the necessity of keeping pace with the evolving realities of winter sports tourism.

Based on the findings and acknowledged limitations of this study, several future research directions are suggested to improve the understanding and advancement of winter sports tourism. Research should prioritize cross-country comparative studies to examine how regions with different climates, economic conditions, and cultural backgrounds manage and promote winter sports tourism. This approach can uncover best practices and innovative strategies that could be adapted elsewhere. Additionally, to address the limitation of relying solely on the Scopus database, future studies should incorporate data from multiple sources such as Web of Science, Google Scholar, and others, providing a more comprehensive and robust dataset that captures a wider range of research outputs and trends. By exploring these areas, future research can build on the foundation established by this study, enhancing the understanding and development of the winter sports tourism industry.

## Ethical Considerations

### *Compliance with ethical guidelines*

Ethical points have been observed

### *Funding*

No specific financial resources have been used.

### Authors' contribution

All authors have contributed to the design and implementation of this study.

### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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