# EVOLUTION AND CHANGE OF WINTER TOURISM: HOW SEASONALITY AFFECTS THE ECONOMY OF LOMBARDY'S MOUNTAIN COMMUNITIES ON THE OLYMPIC ROAD (MILANO-CORTINA 2026)

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**Abstract.** Using municipal data on tourist overnight stays, this paper examines tourist seasonality of Lombardy's Mountain Communities (CCMM) over the last 15 years. In detail, based on the geographical location proximity on the Olympic Road of Milano-Cortina 2026 winter edition, twelve Mountain Communities have been selected. Using widely known statistical indexes, the seasonality of the selected mountain communities was represented. The analyses confirm the presence of two types of seasonality in Lombardy: a growing summer seasonality driven by the lakes and a bi-seasonal one, which appears mostly in the Alpine and pre-Alpine areas, characterized by declining winter tourism flows relatively to the rest of the year. Exploiting the legacy of Milano Cortina 2026 Olympic event, this study intends to offer a contribution to the deseasonalization policies to be implemented in mountain areas.

## 1. Mountain Tourism during Climate change and Sustainability

In recent decades, with the exacerbation of climate change, scholars have questioned the necessity of measuring sustainable tourism, considering its promotion of sustainable well-being from the mere market and statistical perspective of the consumer, to highlight the awareness and engagement of the host communities (Crabolu et al., 2023). As confirmed by the Copernicus Monitoring Services in the Global Climate Highlights 2022 report, 2022 has been the driest and hottest year in Italy (the second in Europe) of the last two centuries, and it has been confirmed that temperature in mountainous areas is increasing more than double the average, even causing the suspension of several ski world cup races due to lack of snow in the same year (Nevediversa, 2023). On this matter, the World Meteorological Organization predicts that by the next 14 years, snow will be too watery even beyond 3000m altitude, facing the risk of impracticability even for well-known ski tracks as "Cortina d'Ampezzo", moreover, daily observations of ground's snow depth in the Alpine area over the last 50 years showed that in addition to the thickness, the duration of the snow has also reduced, decreasing on average by 34 days at altitudes between 1000m and 2000m (Crespi et al., 2021).

Overall, the ski industry has been hit by an irreversible crisis due to the increase in temperatures and the decrease in snowfalls (Mariani and Scalise, 2022), to the point that some scholars, such as Professor Claudio Visentin declared that "[..] winter sports season has no future" (Nevediversa 2024:3).

The ski industry's crise is a challenging mountain tourism economy, which has been historically generated on its economies of scale and currently found it very difficult to build tourism conversion on new products and services. However, as explained by Professor Riccardo Beltrame, areas that can combine both winter offers and summer seasons will enjoy a competitive advantage compared to those that stick to a single product destination market (Nevediversa 2024:107). Despite these warnings, Italy is an alpine country where artificial snow is mostly widespread (90%) (Nevediversa, 2023), even though it results in a very costly adaptation practice in terms of land, water, energy, and money consumption (Willibald et al., 2021; Steiger, 2019), and there are still some discrepancies between the national ministry's climate goals and the actual regional policies. Thus, to study the evolution of winter tourism in Lombardy and its seasonality, this study has been conducted on Lombardy's mountain communities (from now on CCMM), introduced in the following paragraph, as the geographical granularity level for the statistical analysis of tourist overnight stays (TOS), presented later in the second chapter.

### *1.1. Mountain Communities of Lombardy*

Mountain areas are characterized by peculiar attractive drivers, such as a favorable summer climate, suitable for enjoying walks in nature, the geological slope, and winter snow that, if well exploited, can guarantee a strong tourism flow (Macchiavelli, 2006). In fact, thanks to breathtaking panoramas, food and wine culture and the increasingly varied sporting attractions, together with seaside areas, places near mountains are increasingly frequented by Italian and foreign tourists; but how is mountain tourism defined exactly? There is no universally accepted definition, even though the World Tourism Organization (UNWTO) provides an international understanding, which refers to tourism activities conducted in open-air spaces such as hills or mountains, occurring in specific geographical areas characterized by unique landscapes, topography, climate, biodiversity, and local communities, driven by a desire to connect with nature during leisure time. Nevertheless, it is crucial to consider the multiple facets of mountain tourism that, depending on the point of view and the goal to be achieved, drastically change the way it is understood. Indeed, for the statistical purposes of this study, it has been adopted different perspectives of mountain tourism according to administrative definitions, among which draw on geographical and territorial outlook – law n.

991/1952 – in terms of altitude (above 600m), municipalities are categorized in three categories, "totally mountainous," "partially mountainous" and "non-mountainous"; then, a more tourist perspective, has been detected from the Italian Institute of Statistics (ISTAT) – following law n. 77 of July 17, 2020 – establishing a new classification for Italian municipalities based on tourism vocation, which considers both the potential for tourism development and the existing level of tourist activity in each location. The latter includes 501 municipalities classified as "municipalities with a mountain vocation" at national level (mostly located in Northern Italy), and 240 municipalities which are classified as "municipalities with mountain and cultural- historical-artistic-landscape vocation". A final socio-economic balanced view was provided by Lombardy Regional Law 19/2008, where mountain tourism is expressed through the so-called "Mountain Communities" (CCMM), such as local territorial public institutions, organized in "homogeneous areas", established for the promotion and valorization of mountain tourism, for the exercise of conferred functions and the associated exercise of municipal functions (Regional law 19/2008, art. 1, comma 2), from which the Lombardy Region recognizes and allocates an economic contribution every year[1].

Lombardy has 23 CCMM[2] that differ in terms of territorial extension, number of belonging municipalities, and geographical location. This characteristic, together with other factors, such as the availability of hotels and ski lifts, influences the ability of territories to be attractive to visitors, which, in terms of tourism flows, the situation of CCMM appears extremely different. For instance, Alto Garda Bresciano and Alta Valtellina represent a destination that counts over 3 million TOS per year, while others, such as Scalve and Valle Trompia, have much smaller numbers with less than thirty thousand TOS per year (Dal Bianco, Caprino, 2023).

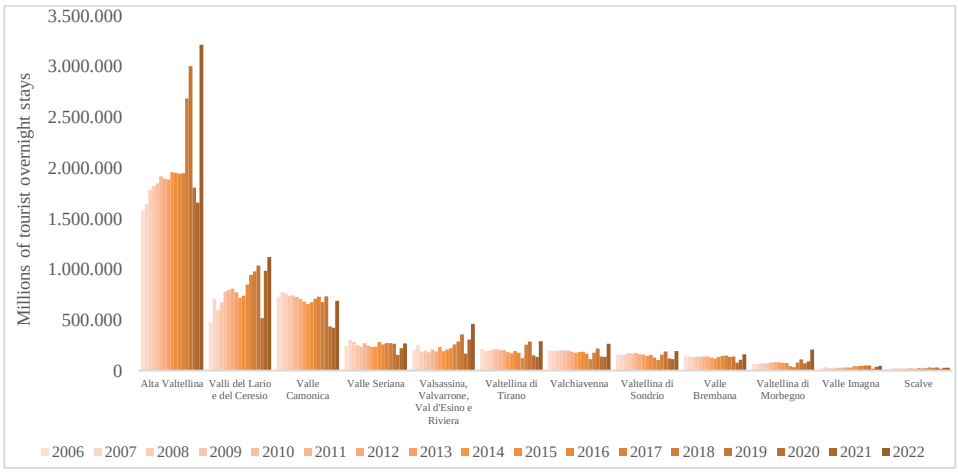
Considering the heterogeneity of CCMM and their different territorial extensions, in this study, particular attention will be focused on 12 selected CCMM localized on the Olympic Road of Milano-Cortina 2026 winter edition as the geographical granularity level for the statistical analysis of TOS (see Chapter 2). Following this method of identification, through the seasonality analysis of ISTAT municipality data on TOS from 2006 to 2022, the study will offer an interpretation aimed at identifying policies for mountain tourism promotion.

Therefore, as showed in Figure 1, CCMM selected for this study are the following, ordered by the average number of TOS recorded between 2006 and 2022. Even among this group, the sample included 232 municipalities categorized into nine typologies according to the ISTAT tourism vocation criteria, and 78 municipalities (30%) represented the mountain vocation degree, highlighting a significant difference between attractiveness and accommodation preferences.

[1] In 2023, the contribution is 11.5 million euros (dgr 7817 of 01/23/2023) (Regione Lombardia, 2023).
[2] List available at *Le Comunità Montane della Lombardia* (Regione Lombardia, 16/06/2023).

In addition, 26 municipalities (11%) represent the lake tourism vocation, and Valli del Lario e del Ceresio is the mountain community (CM) with the highest lake tourism prevalence (67.86%) (Dal Bianco, Caprino, 2023).

**Figure 1** - *TOS growth of the selected twelve Lombardy's CCMM on the Olympic Road '26 (years: 2006 -2022).*




Polis Lombardia – ISTAT data elaboration

Therefore, different models of tourist attractiveness reflect the diverse capacity of territories to develop a diversifies tourist offer, intercepting flows in every season of the year; hence, as recalled in Figure 1, tourist offer increased heterogeneously over 15 years, rising from 4 to almost 7 million TOS. Climate has always played a fundamental role in influencing the concentration of TOS and available activities, depending on the weather conditions (Baum and Hagen, 1999). In recent years, with the increase in temperatures and the consequent decrease in snowfall, tourists are increasingly encouraged to enjoy attractions at high altitudes even in summer, as ski lifts - the main mountain infrastructure–are exploited all year and not just for skying (Macchiavelli, 2022). However, not all CCMM are well equipped, and some are particularly threatened by the risks associated with climate change; on the other hand, festivities and institutional events also appear to be a fundamental factor, as it can influence the availability of free time of tourists (Nadal et al., 2004). To better understand this aspect, in the following section, the seasonality of CCMM tourist flows is analyzed.

## 2. Seasonality in CCMM of Lombardy

Seasonality is often an inevitable phenomenon that involves the concentration of peaks in tourist intensity in a certain territory and period of the year. It is often caused by a favorable climate, but also by other factors such as the coexistence of other tourism, proximity to national borders or creating demand centers, and foreign tourism (Candela and Figini, 2010). Even though at the national level, the greatest tourism flow is generated by seaside locations and, therefore, the most relevant season is typically concentrated in the summer months from June to September (Candela et al., 2007), there is a second type of seasonality, typical of mountain tourism, which is characterized by its concentration in two specific periods of the year: winter for the ski season and summer for natural excursions (Baum and Lundtorp, 2001). It is generally recognized that tourism can bring various benefits to the local economy, such as increased sales of goods and services, profits, income, tax revenues, or creation of new jobs (Nadal et al., 2004). However, when the phenomenon is concentrated in concise periods, negative effects tend to emerge, such as increasing inflation and the crowding-outeffect[3], as well as externalities that impact the environment, such as degradation and pollution (Donato, 2007).

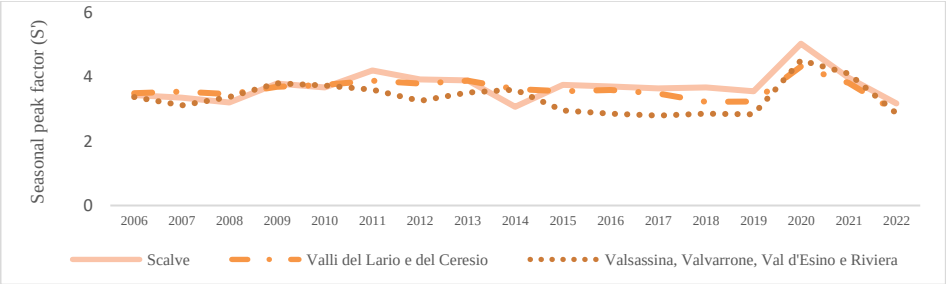
In particular, the UNWTO defines the phenomenon of overtourism as the detrimental effects of excessive tourism on a destination, significantly diminishing residents' perceived quality of life and overall visitor experience. Thus, seasonal tourism forces tourism operators to minimize management costs to alleviate the temporary season loss effect, negatively impact employment, and discourage investments (Butler, 1994). Statistically, the seasonality of Lombardy's CCMM can be represented by different indices; three of them have been selected because of their wide use in the literature (Ciccarelli, 2018). The first adopted index is the seasonality rate, which is based on the simple ratio between the maximum and minimum TOS recorded in a year and can represent the disparity of TOS of a given area in one year.

$$\text{Seasonality rate} = \frac{\text{Max } Overnight\ Stays}{Min\ Overnight\ Stays}$$

This index does not consider the relative size of tourist flows; therefore, it risks being excessively affected by periods in which attendance is minimal – typical trend of mountain's tourism. Indeed, in statistical terms, to adjust this denominator's instability, it is recommended that the seasonal peak factor (S'), an index that relies on the average TOS in the whole year (Figure 2).

[3] By crowding-out effect it is meant the possibility that tourism becomes an activity capable of making the other economic activities of the area, no longer competitive, causing an economic monoculture (Costa, 2001).

**Figure 2 –** *Top three Lombardy's CCMM on the Olympic Road '26, based on seasonality peak factor (S'), (years: 2006-2022).*

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However, because of their different extensions and tourist flows, it is more appropriate to analyse the seasonality of CCMM in relative terms as a percentage of the annual total, allowing a more accurate comparison of seasonal patterns.

$$\text{Seasonality peak factor (S')} = \frac{\text{Max } Overnight\ Stays}{Average\ Overnight\ Stays}$$

Furthermore, for some CCMM, it is necessary to calculate the tourist concentration in both the winter and summer. In this regard, it is possible to use the Gini index, which is more precise for calculating the inequality of distributions and comparing it with the curve of perfect equality and Lorenz Curve (Duro, 2016). The formula can be expressed as follows as done in Lundtorp (2001)[4].

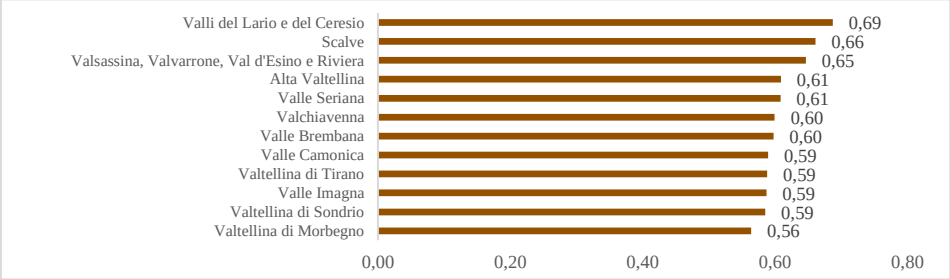
$$\text{Gini Index} = \frac{2}{n}\sum_{i=1}^{n}(xi - yi)$$

To show the seasonality of the selected CCMM, as generally applied at the regional level, municipalities' analyses were collected within their CM. S' shows the top three CCMM with the greatest tourist concentration during the selected years: Valli del Lario e del Ceresio (3,70) and Valsassina, Valvarrone, Val d'Esino e Riviera (3,60), both located near lakes, because they mainly attract tourists in summer. On the other hand, Scalve (3,36) does not seem to have a great source of tourist attraction, maintaining a modest TOS mainly in two peaks of the year (Figure 1 and 2). Similarly, adopting the Gini Index, Valli del Lario e del Ceresio was confirmed to be the CM with the highest average concentration of tourist flows (Gini Index:

[4] Gini Index:
n = the number of fractiles, months, weeks, days or other units
xi = the rank of fractiles, for example 1/12, 2/12… when using months, or when using weeks 1/52, 2/52…, or days 1/365, 2/365… etc.
xi = i/n
yi = the cumulated fractiles in the Lorenz curve

0.69), followed by Scalve (Gini Index: 0.66) and Valsassina, Valvarrone, Val d'Esino, and Riviera (Gini Index: 0,65) (Figure 3).

**Figure 3 -** *Ranking of twelve Lombardy's CCMM on the Olympic Road '26, based on the average GINI Index, (years: 2006-2022).*

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Since the definition and measurement of seasonality has been presented, in the following paragraph, the evolution of seasonality curves of CCMM will be observed, representing two different clusters and focusing on the relative monthly distribution of TOS (in annual percentage).

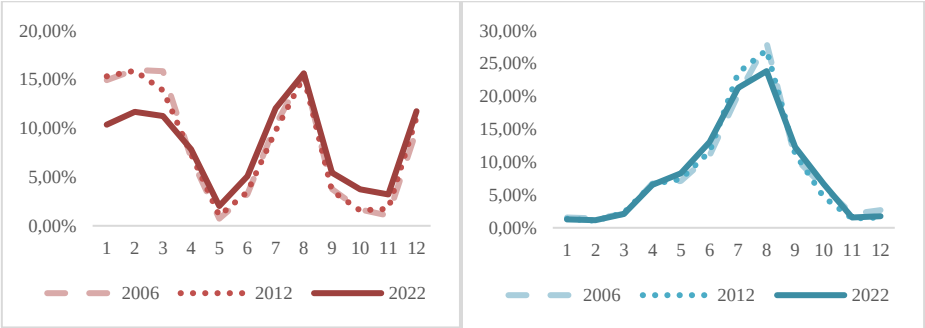
### *2.1. Evolution of seasonal tourism in Lombardy's CCMM*

As already mentioned at the beginning of chapter 2, it is commonly believed that mountain areas benefit of tourist flows in two periods of the year however, analyzing the seasonality curves of CCMM, it is possible to classify them in two distinct groups: a "Bi-Seasonality" cluster (two peaks), which appears mostly in the Alpine and pre-Alpine areas (Figures 4-left) and a "Summer seasonality" cluster (one peak), which mostly occurs in areas close to lakes (Figure 4-right). Taking Alta Valtellina's peaks as an example of the "bi-seasonality" cluster (Figure 4-left), and Valsassina Valvarrone Val d'Esino and Riviera for "summer seasonality" (Figure 4-right), it is clear that in the former case, the seasonality curve rose in spring (April and May), summer (June–August), and autumn months (September–December) compared to the previous years, while in winter months (January–March), the curve decreased, resulting in two high points.

On the other hand, for the second case, the seasonality curve rose in spring and autumn months belonging Valsassina Valvarrone Val d'Esino and Riviera in "summer seasonality" cluster, due to the exclusively and visible increase in those periods. Hence, especially in the former case of Alta Valtellina it is possible to

imagine a better distribution of TOS over the year and therefore, a possible de-seasonalization phenomenon in progress. Thus, if TOS increased over the last 15 years in absolute terms, how did seasonal TOS evolve relative to the rest of the year? To offer a correct reading of the relative data, it is necessary to adopt a climate change perspective. Consequently, in meteorological terms, we can assume that the winter and autumn seasons will shrink, with the increasing risk of some CCMM losing skiing tourists. Similarly, with rising temperatures, it is reasonable to imagine that visitors will start to enjoy mountain areas, even in spring and autumn, bringing more tourists as a new trend.

**Figure 4 -** *Seasonality curves in Alta Valtellina (left) and Valsassina, Valvarrone, Val d'Esino e Riviera (right.).*

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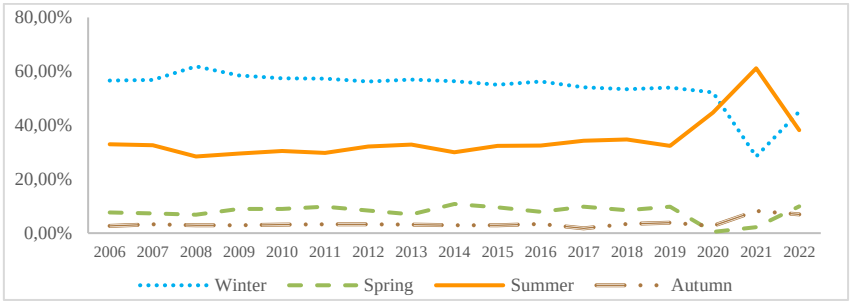
From this perspective, the following analyses rely on an alternative division of seasons by gathering months as follows: December, January, February, and March to identify winter and June, July, August, and September for the summer season. Afterwards, the spring season was shortened, including only April and May, as well as for the autumn season, with October and November (Figure 5).

**Figure 5 -** *Evolution of tourism overnight stays (% of the year) – Alta Valtellina.*

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Adopting this criterion, it is notable that for CCMM belonging to "Bi-seasonal" cluster (two peaks), such as Alta Valtellina (Figure 5), summer and winter remain the most important seasons in terms of tourist flow, with a reverse trend recorded in the last three years, probably influenced by mobility restrictions during covid pandemic emergency. Furthermore, new growing spring and autumn tourist trends have also appeared.

## 3. Conclusions and final remarks

Tourist attractiveness models of Lombardy's CCMM is different because of geographic location, weather conditions and many other factors. Analysis of tourist flow data during the study period between 2006 and 2022 of the selected 12 CCMM located on the Olympic Road confirmed an increase in absolute numbers of TOS from 4 million in 2006 to over 6, 5 million in 2022. Then, observing the seasonality curves, the presence of two typologies is demonstrated: a "Bi-seasonal" cluster (two peaks) mainly present in Alpine areas and a "Summer" cluster (one peak), typical of CCMM located near lakes, both characterized by an ongoing deseasonalisation phenomenon. However, in relative terms, a decreasing winter attendance trend has been shown, together with a stable growth in summer and an emerging growth in spring and autumn. This leads to the belief that identifying the causes that characterize the seasonality of mountain tourism is essential to understand whether and how to control this phenomenon, implement policies to deseasonalize tourist flows, lengthen the winter season and live with climate change.

In general, seasonalization adjustment interventions are based on the increase in tourist demand beyond the main season, and these include, among others, the diversification in the destination of the tourist product with the valorization of other tourist resources, the extension of the high season times, applying a consumer-oriented marketing strategy, targeting their free time as a resource to dedicate for tourism purposes during all periods of the year (Candela et al., 2007; Macchiavelli, 2004), or even offering alternative attractions exploiting specific events, such as impacting and private organized events, such as Floating Piers in Iseo Lake in 2016.

Historically built on the ski-tourism environment, mountain tourism has been particularly affected by climate change, which currently represents the main challenge and unfortunately, artificial snow is becoming a very expensive adaptation strategy that does not allow all ski areas to lengthen the ski season.

Certainly, the remote geographical location and difficult accessibility of some mountain areas represent one of the most influential elements for seasonality, however, although it is not possible to seek a definitive solution to the problem, there

are deseasonalization strategies that, if applied, would bring significant socio-economic and environmental benefits, such as the diversification of tourist service, followed by the optimization of school, liturgical, and job calendars, as well as the exploitation of large attractive drivers, such as big events and festivals.

Although this study only focused on the tourist demand side, the literature suggests that to better understand the dynamics of seasonality and to precisely identify effective and targeted deseasonalization policies, it is necessary to integrate analyses from the tourist supply side (for example, it is widespread to adopt the occupancy rate of tourist facilities (Morrison, 1998; Jeffrey et al., 2002).

However, it is also appropriate to point out that in addition to the classic empirical evidence, based on objective criteria, it has proven to be fundamental also to adopt innovative and subjective analyses, measures and evaluations of performances, often based on the direct opinion of the hospitality facilities' business owners, whose approaches, behaviors and perceptions in contrasting seasonality, often find to be highly heterogeneous. Therefore, capturing such information means being able to cluster and map such diversity and therefore avoid concerns that *may lead to ill-focused broad-brush strategies and consequent misallocations of resources*, and above all, being able to report to policy makers, where it is necessary to implement general support, such as training in marketing and management skills, especially for entrepreneurs who find difficulties as they do not know how to counteract the phenomenon of seasonality (Koenig-Lewis & Bischoff, 2010).

In addition, as mentioned in this study, sporting and cultural events organized at the local, national, or international level are catalysts of both positive factors - especially at the economic level - and negative factors, such as overtourism and a trend of degrowth after the event, especially if the initiatives of innovation and maintenance are not implemented. Thus, it suggests thinking about policies not only in favor of the local economy, but above all to a situation of constant socio-economic well-being, considering not only the purely tourist aspect but also the local and climate. Even when considering overcrowding phenomena, in the literature is demonstrated that stakeholder behavior and engagement directly impact the perceived sustainability of major events. Consequently, by understanding these perceptions, the challenges of overtourism can be better addressed (Gon et al., 2019).

Along these lines, Milan-Cortina 2026 Olympic Winter Games legacy, together with the international fame of Lombardy's mountains, could represent an unmissable opportunity to relaunch mountain tourism in Lombardy and focus deseasonalization policies aimed at Lombardy region growth. In this context, policymakers should also pay attention to successful initiatives that can be adopted to overcome overtourism in host destinations for mega sports events, for example as adopted by UK Government during London 2012 Olympic year, leveraging stakeholder advance thinking, spreading domestic tourism, showcasing destinations outside the host city

and promoting regional collaboration (Mhanna et al., 2019). In conclusion, in future studies, authors suggest to investigate the correlation between temperature trends, snowfall levels, and seasonal TOS over time to study the relationship between climate change and winter tourism in Lombardy. It would provide further evidence for the implementation of deseasonalization policies, focusing on the diversification, adaptation, and extension of tourism offerings beyond traditional winter sports, towards emerging tourism demands, as in Ponte di Legno Tonale and Madesimo ski areas are attempting through snowkiting experiencies.

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