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Rethinking Tourism in the Dolomites: Sustainable Pathways from the La Sportiva Outdoor Paradise Project

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Abstract

This thesis analyses *La Sportiva Outdoor Paradise* as a tourism alternative to the mainstream model, considering its potential to promote sustainable development through its environmental, economic, and social impacts on both the local community and the surrounding area.

To achieve this, the thesis will first explore the evolution of the Alps, with a particular focus on tourism dynamics, the ski industry, and the key factors that have fostered overtourism and ski monoculture in the region. The analysis addresses the environmental, social, and economic impacts of mass tourism, emphasising the urgency to rethink alpine development strategies in light of climate change. Central to this discussion are the concepts of limits and the human-nature relationship as a starting point for creating a new sustainable future for the Alps.

Through a combination of literature review and qualitative interviews, the study demonstrates how initiatives like *La Sportiva Outdoor Paradise* can serve as models for reimagining tourism practices. The findings highlight their capacity to balance economic development and environmental sustainability, strengthen local communities, and enhance resilience to climate challenges across the Alps.

Extended summary

Negli ultimi decenni, il turismo ha assunto un ruolo centrale nell'economia e nello sviluppo delle aree montane, contribuendo in modo significativo allo sviluppo infrastrutturale e al mantenimento delle comunità locali. Tuttavia, tale rescita si è basata prevalentemente su un modello intensivo e fortemente dipendente dall'industria sciistica. In questo contesto, i cambiamenti climatici, insieme alla crescente dipendenza dall'innevamento artificiale e alle trasformazioni della domanda turistica, stanno progressivamente compromettendo la sostenibilità a lungo termine del turismo invernale. Queste riflessioni rendono necessario un ripensamento dell'attuale modello turistico e sull'urgenza di sviluppare strategie alternative basate sulla diversificazione dell'offerta e su un utilizzo più sostenibile del territorio.

La tesi, quindi, indaga le dinamiche di sviluppo turistico nelle aree alpine, con particolare attenzione agli impatti ambientali, economici e sociali del turismo, nonché al ruolo delle istituzioni nel promuovere lo sviluppo locale e modelli turistici alternativi a quello tradizionale.

Il caso del Passo Rolle costituisce quindi uno strumento fondamentale per analizzare tali dinamiche. In particolare, ll progetto La Sportiva Outdoor Paradise, proposto nel 2017, ha rappresentato un importante tentativo di ripensare il modello turistico locale attraverso la promozione di attività outdoor a basso impatto e non dipendenti dalla neve. Attraverso un approccio qualitativo, basato su una revisione della letteratura e sull'analisi del caso di studio, la ricerca esamina il progetto da una prospettiva di sostenibilità ambientale, economica e sociale, con l'obiettivo di valutarne il potenziale impatto sul territorio e il suo contributo alla riqualificazione turistica e territoriale del Passo Rolle.

I risultati evidenziano come la mancata realizzazione del progetto rappresenti un'occasione mancata per la riqualificazione del territorio e per l'avvio di un percorso di sviluppo più sostenibile. Al contrario, la scelta di proseguire con il modello tradizionale, basato sul rafforzamento dell'infrastruttura sciistica, conferma la persistenza di un paradigma di sviluppo sempre più vulnerabile alle pressioni ambientali ed economiche.

Preface

Having been born and raised in Val di Fiemme, I regularly spent time in the mountains as a child, hiking and skiing, which helped develop my love for the mountain environment and fostered a sense of belonging and attachment. This bond played a central role in guiding my academic interests and ultimately guided the choice of this research topic.

Over the years, I have had the opportunity to directly observe the development of Val di Fiemme and the transformation that tourism has brought to the mountain areas. On the one hand, tourism has contributed to economic development, the improvement of infrastructure and services and has help to retain the local populations. On the other hand, it also generates environmental pressures, seasonal dependence and social tensions between tourists and local communities. Moreover, I have personally witnessed the growing challenges affecting mountain territories, particularly those related to climate change and the increasing reliance on artificial snowmaking systems. For those living in these areas, such changes are not abstract or theoretical concepts, but tangible realities with direct consequences on everyday life.

In this context, Passo Rolle represents a particularly meaningful case. It is a place well known to all residents of Val di Fiemme, both for its landscape value and for its historical role in the development of tourism and the ski industry in Trentino. As a place I am familiar with, I have observed its gradual decline, characterised by obsolete infrastructure and decreasing tourist flows. Within this scenario, the La Sportiva Outdoor Paradise emerged as a significant opportunity to requalify the area, offering potential benefits for both visitors and local communities.

For these reasons, the decision to analyse this case study was not only driven by academic interest, but also by a personal motivation to better understand the project and its potential implications for the future of mountain regions.

Introduction

Mountain tourism has long represented a key driver of economic development in Alpine regions, with winter sports, in particular, playing a central role in shaping local economic, infrastructural development and territorial identities. For centuries, before the emergence of modern tourism, the Alps were widely perceived as an inhospitable and hostile environment, often occupying a marginal role within broader economic and social systems. It was only from the late nineteenth and early twentieth centuries that the perception of the Alps began to change, driven by the rise of mountaineering, the romanticisation of natural landscapes, and the gradual development of tourism. Within this context, tourism played a transformative role, contributing to the redefinition of mountain territories from peripheral and marginal spaces into economically viable and attractive destinations.

However, these processes of modernisation and tourism development have significantly contributed to the economic growth of the mountain region and, to some extent, helped mitigate depopulation trends. However, they also generated some structural challenges. In particular, they have supported the consolidation of the ski industry as a dominant development model, often characterised by intensive resource use and significant environmental impacts. This has led to the progressive degradation of natural ecosystems, as well as to transformations in social dynamics and cultural traditions. Moreover, the increasing centrality of tourism in local economies has contributed to the emergence of forms of economic monoculture across many Alpine regions, reinforcing dependence on a single sector.

In this context, the emerging challenges that derive from climate change and structural transformations have raised concerns about the long-term sustainability of this model, especially for destinations at medium-low altitudes. These pressures have prompted institutions and tourism operators to seek strategies aimed at mitigating the impacts of tourism activities while ensuring the future viability of ski destinations. Such responses have taken different forms, ranging from technological solutions, such as the expansion of artificial snowmaking systems and the construction of water basins, to behavioural approaches, including the diversification of tourism activities. Within this context, a considerable amount of investments, both public and private, were allocated to technical adaptation strategies, highlighting the inability to recognise the challenges that climate change poses on the traditional tourism development model and the environmental, economic, and social impacts that tourism imposes.

The case study of Passo Rolle provides a particularly relevant example of the tensions emerging between established development paradigms and alternative visions for the future of mountain tourism. Located between the Val di Fiemme and Primiero valleys, Passo Rolle has historically been linked to ski tourism; however, in recent years, the area has experienced a progressive decline in attractiveness and competitiveness, leaving it in a state of obsolescence and abandonment. In response to these challenges, different development proposals have emerged over time, reflecting contrasting perspectives on how to revitalise the area.
Among these, the project proposed by Lorenzo Delladio, La Sportiva Outdoor Paradise, represents a significant attempt to rethink the tourism model of Passo Rolle, and more broadly of the Trentino region, by moving away from traditional ski-based infrastructure towards a more sustainable and diversified approach. The project was ultimately rejected in favour of the cableway connection between San Martino di Castrozza and Passo Rolle, aimed at linking the existing ski areas. This outcome highlights the limited capacity of public administration to fully acknowledge the challenges currently affecting the Alpine territories, as well as the persistence of a development vision that continues to consider the ski industry viable a long-term strategy for mountain territories.

This thesis thus aims to analyse the case of the La Sportiva Outdoor Paradise project, from a sustainability perspective to assess its environmental, economic and social impacts, as well as its contribution to the tourist and territorial requalification of Passo Rolle. Moreover, particular attention is given to the stakeholders analysis, with the objective of examining the interests, roles, and influence of the actors involved, thereby providing a deeper understanding of the governance dynamics and the factors that ultimately led to the rejection of the project.

The thesis is structured as follows. The first chapter provides a historical overview of the emergence of the Alps as a mass tourism destination and of the consolidation of the ski industry, analysing the impacts of tourism development on mountain territories. It also introduces the issue of climate change and its implications for the Alpine regions, followed by a discussion on the future of the Alps, examining the concept of limit and alternative development models. The second chapter investigates the adaptation and mitigation strategies, as well as the role of spatial planning and of institutions and legal frameworks in promoting sustainable development. It also presents examples of good practices already implemented in the Alpine region. The third chapter is dedicated to the analysis of the case study through the presentation of the geographical and socio-economic context of Passo Rolle, with particular attention to tourism dynamics, continuing with an overview of the La Sportiva Outdoor Paradise and a critical

discussion of the case study, addressing its economic, environmental, and social sustainability. Finally, some conclusions are drawn, summarising the main findings and reflecting on their broader implications for the future of tourism development in mountain areas.

1. The Alpine context: tourism development, climate change and emerging challenges

1.1 The Alps

1.1.1 The Alps: an overview

The Alps are a mountain arc of about 1000 kilometres that, after the Mediterranean, forms the second-largest ecosystem in Europe (Permanent Secretariat of the Alpine Convention 2010). It extends from Nice to Vienna, covering an area of 190,000 square kilometres and the territory of eight European countries. They are usually divided into the Western and Eastern Alps, separated by the Rhine and the Splügen Pass in eastern Switzerland (OECD 2007). They are the source of many European rivers, such as the Rhine, Rhone, and Po, and the highest mountains, Monte Bianco and Monte Rosa, exceed 4,000 metres. The Alps also constitute one of the richest biodiversity hotspots in Europe, with over 30,000 animal and 13,000 plant species (OECD 2007).

The Alpine climate is influenced by surrounding regions, including the Mediterranean, the Atlantic Ocean, and North-Central Europe (OECD 2007). Its characteristics are thus shaped by various factors related to its geographical location, where the Alps themselves play a significant role in influencing weather patterns through their elevation, vegetation, and snow cover (OECD 2007). The Alpine climate varies spatially, and its physiography is essential in determining temperature and rainfall. Valley bottoms are generally warmer and drier, with mean January temperatures ranging from -5 °C to 4 °C, and reaching up to 8 °C in the mountains bordering the Mediterranean. Regarding precipitation, the Western Alps are characterised by lower precipitation than the Eastern Alps (OECD 2007). During winter, precipitation above 1,500 metres falls as snow, lasting from approximately November to the end of May at 2,000 metres (OECD 2007). The seasonality of rainfall, however, is more variable, depending on location and orography.

The Alps are home to about 15 million people and are a clear example of a human-shaped environment, whose landscape was forged by centuries of human presence and related social, cultural and economic production (Permanent Secretariat of the Alpine Convention 2015). Population distribution and growth depend on many environmental and socioeconomic factors. Most of the Alpine population is concentrated in the peri-Alpine areas and on valley floors, where settlement appears easier and offers greater opportunities for infrastructure, services, and productive activities (Permanent Secretariat of the Alpine Convention 2015). On the contrary, low-populated areas are primarily located in less accessible regions.

In the late 19th century, many Alpine areas experienced significant depopulation, driven by the abandonment of traditional economic and social practices and by migration to urban areas (Permanent Secretariat of the Alpine Convention 2018). This trend resulted in difficulties in providing basic services and contributed to a decline in the living standards of the local population (Permanent Secretariat of the Alpine Convention 2015). Today, the Alps are deeply influenced by global dynamics such as urbanisation and agglomeration processes (Permanent Secretariat of the Alpine Convention 2018). Depopulation can lead to negative cycles for alpine residents and exacerbate other issues related to tourism and hydrogeological safety. Therefore, safeguarding the presence of the local population is considered essential to preserving the distinctive Alpine characteristics of the inhabited environment (Permanent Secretariat of the Alpine Convention 2015).

The Alps constitute a highly diversified economic space, characterised by multiple sectors, including tourism, services, agriculture, industry and energy (FAO 2012). Some sectors are particularly important for the Alpine area because of its environmental, social, and economic characteristics, as well as for historical reasons (Permanent Secretariat of the Alpine Convention 2018). Tourism is the leading economic driver of the Alps, attracting millions of people each year and providing significant income and employment. Another important economic sector is agriculture. Despite its limited contribution to the overall economy, agriculture is particularly significant for the Alps, ensuring the food security of the Alpine population, helping to maintain and shape the Alpine landscape, and preserving mountain traditions (Alpine Convention n.d.). However, over the last few decades, it has undergone many changes due to migratory flows towards urban centres, the abandonment of many farms, and structural constraints linked to natural conditions and territorial characteristics, leading to a scarcity of arable land and limited infrastructure. Given the particular role of agriculture in the conservation of natural environments and its social significance for mountain communities, targeted strategies and incentive mechanisms are essential to prevent the abandonment of agricultural practices and depopulation in the Alps (Permanent Secretariat of the Alpine Convention 2014).

The Alps possess a rich natural and cultural heritage. From a biological and natural perspective, the Alpine territory is characterised by a range of habitats, including forests, high mountains, and rural and agricultural areas (Permanent Secretariat of the Alpine Convention 2018). Equally significant are its cultural landscapes and its linguistic and cultural diversity. Besides the four main languages, French, German, Italian and Slovenian, there are numerous linguistic minorities and enclaves (Permanent Secretariat of the Alpine Convention 2018). Alpine culture

is expressed not only through language but also enriched by music, literature, craftsmanship, clothing, food, architecture, and historical heritage.

1.1.2 The evolution of the Alps

Enrico Camanni, in *La storia delle Alpi* (2017, pp. 7-8), writes:

> "Flying over the most beautiful and highest mountains of Europe, it becomes clear that the Alps represent a remarkable rupture within a predominantly flat, cultivated and industrialised landscape. The Alps challenge a nature that rebels against a docile, ordered, domesticated world. […] What we cannot perceive from the sky is the human fabric of the Alps, which, despite their wild appearance, has been transformed by human thought and hand. Inhabited up to the edge of the glaciers, they remain today the most populated mountain range in the world. Besides the natural environments scattered among valleys, lakes, forests, meadows, rocks, moraines, and perpetual snow, there lies, or overlaps, a wealth of human environments, settlements, architecture, crossroads, fields, pastures, crops, cultures, traditions and languages. Throughout various historical periods, the Alps have welcomed travellers and refugees from the plains, inspiring forms of civilisation and fostering the most successful adaptation of humankind to high-altitude life."

The words of Camanni accurately describe the Alpine landscape and how, besides its natural features, the Alps also have an essential social and cultural value resulting from a constant interaction and mediation between the wilderness and human society (Nicoletti 2025). This interplay is deeply rooted in the history of the region. Indeed, the evolution of the Alps, marked by processes of glaciation, invasions, migration, and colonisation, has shaped the Alpine landscape as the outcome of a progressive adaptation to environmental conditions.

1.1.2.1 The Alps from Antiquity to Early Modernity

The history of the Alps dates back millions of years, shaped by erosion and glaciation. Human presence began around 10,000 years ago, marking the beginning of the Alpine economy founded on a close relationship between humans and the natural environment (Camanni 2017). For the ancient Greeks and Romans, however, the Alps were considered a barrier and a border territory, without value, culture, or habitability.

With the decline of the Roman Empire, the Alpine region entered a transitional period characterised by Christianisation, migration, and barbarian invasions, resulting in economic, cultural, and linguistic divisions. The Middle Ages brought about a time of innovation and

prosperity, during which the Alpine autonomies developed. Institutions such as the *Magnifiche Comunità* and the *Regole* promoted local community involvement and self-organisation, emphasising territorial needs and encouraging responsible resource management (Nicoletti 2025)[1]. In this way, they learned to rule themselves, following "the perspective of the mountaineer rather than through the lens of urban bureaucracy" (Camanni 2017, p. 49). During the Renaissance, these traditional forms of self-government began to disappear, culminating in the scientific revolution and the rise of nation-states, which marked the end of medieval autonomies and territorial self-government (Nicoletti 2025). This change laid the groundwork for a period of cultural and economic transformation. The Alpine economy weakened, and the Alps began to be perceived as a cursed place (Camanni 2017). Seasonal migrations to urban areas started, reflecting both the decline of Alpine culture and, simultaneously, creating opportunities for economic, cultural, and artistic development.

The 18th century represented a turning point for the Alps, becoming the focus of the illuminists' and romanticists' research and inaugurating the first alpinist expeditions (Camanni 2017). On the one hand, there was a rational, scientific approach to studying the Alps, seeking to dominate and understand Alpine nature; on the other hand, irrationality and feelings prevailed in pursuing the sublime and the infinite (Nicoletti 2025). The concept of wilderness emerged, with the Alps portrayed as an idyllic place. The Alps were no longer considered terrifying mountains but, for the first time, were appreciated for their beauty (Bätzing 2005). In this context, the Grand Tour in the area became very popular, creating two new professional figures among local communities: the hotelier and the alpine guide (Camanni 2017). Practices such as alpinism paved the way for the tourism industry, encouraging a new form of mountain exploitation.

[1] Entities of self-government established between the XII and the XIII centuries to manage the collective heritage of a territory, like pastures and forests (Nicoletti 2025). The *Magnifica Comunità* are composed of *Regole,* which represents the municipalities that share both rights and obligations of the *Magnifica Comunità* (Folgheraiter & Zotta 2020). An important example is the *Magnifica Comunità di Fiemme,* an institution that remains active today, is composed of 11 municipalities, two of which are outside the administrative boundaries of the Valle di Fiemme. It was formally established in 1111 with the Patti Ghebardini, by which the Prince-Bishop of Trento recognised the right of the Valle to self-government, allowing its inhabitants to preserve their traditional rights and customs (Folgheraiter & Zotta 2020). The *Magnifica Comunità* can thus be defined as a "rustic republic", autonomous by external authorities.
Within this context, similar forms of collective self-government exist, known as *Regole Feudali*. These institutions are distinct from the *Regole* that constitutes the *Magnifica Comunità*. They are autonomous bodies responsible for managing the collective heritage of a specific territory (Folgheraiter & Zotta 2020). The *Regole Feudali* are composed of the *Vicini*, which are the descendants of the founding families, who collectively hold and manage the agro-silvo-pastoral heritage, together with the related assets, services and the properties accumulated over time.

1.1.2.2 The modernisation of the Alps

The Industrial Revolution and the rise of Liberalism led to several social changes and a new understanding of space and time (Nicoletti 2025). The Alps experienced processes of civilisation, transformation, and modernity, introducing urban values and practices that altered the traditional Alpine fabric (De Rossi 2024). This clearly illustrates the concept Antonio De Rossi defines as Alpine modernism, highlighting the discourses and experiences that reshaped the Alps, resulting in a view of the mountain focused on tourism, infrastructure, and industrial and hydroelectric exploitation. Consequently, mountains were transformed into spaces of leisure and recreation for urban populations, no longer serving local needs (Dematteis & Nardelli 2022). The Alps began to be perceived as an extension of the city, resulting in the emergence of tourism and mass skiing.

Tourism reshaped the region: new high-altitude towns with hotels and leisure centres were built for the urban bourgeoisie, while the local population had to emigrate to the valley in search of work (Camanni 2017). The Alpine territory thus became a blank space open to tourist reinterpretation, and Alpine skiing practices contributed to transforming its aspect into a modern landscape (Denning 2015). Where before there were the pastures, now lie ski lifts, ski slopes and snow-machines (Camanni 2017).

Throughout the 20th century, alpine skiing became a mass sport with the introduction of ski lifts, followed by the creation of *ex nihilo destinations*, the so-called snow towns, and integrated ski resorts (Nicoletti 2025). The rise of consumerism further eroded the Alpine culture, depriving it of its identity and specificities. The ski industry changed how mountains were perceived, turning them into places for mere pleasure, bringing engines, cable cars, and modernity from the cities (De Rossi 2024). They "changed the mountains with three words that did not first exist in the Alpine vocabulary: speed, motorisation, and cement. In other words: skies, automobiles, and apartment buildings" (Camanni 2017, p. 88). Thus, Alpine environments and communities acquired an artificial and standardised dimension, resulting from mass tourism and urban colonisation (Varotto 2020). In this process, the mountain was deprived of its peculiarities and filled with a new socio-economic structure, "enslaved to the urban political and economic logics, previously unknown to mountains" (p. 41), imposing an external model on a once self-sufficient area.

1.1.2.3 Tourism, depopulation and the emergence of environmental awareness

Although the ski industry and mass tourism have significantly reshaped the Alpine landscape and cultural identities, local communities tend to overlook their impacts on the territory, using economic development and salvation from depopulation as justifications.

This is well explained by Camanni (2024):

> "'It is a miracle if we have not had to leave,' said the inhabitants, both blessed and, at the same time, offended by mass tourism, grateful for the outside capital and investments in skiing. Where people do not ski, villages fall apart, and every hope seems to disappear: only the elderly remain, waiting to die. 'Here we have what we need to live and work,' exult the residents of ski resorts, turning a blind eye to the destruction of the territory […]. What urban citizens see as the end of the Romantic dream and the Archaic world appears to many mountain dwellers as a form of redemption for past injustices, an opportunity to bridge the economic gap between the mountains and the cities." (p.53).

As De Rossi (2024) states, mass tourism and the depopulation of mountain valleys are strictly interconnected, and the latter can be contained only by tourist development. This vision precludes other alternatives, which are considered marginal and ineffective. "Besides tourism and depopulation, there is nothing: what is emptying must be substituted and filled up with what is new and modern, that is tourism" (De Rossi 2024, p.490).

The paradigm aligns with the emergence of consumerism, legitimising the transformation of the Alps in the name of tourism and the ski industry, while the "white gold rush" captures the local communities' attention, excluding other valid development options. Buildings and ski lifts are built, and during weekends and holidays, the villages come back to life, offering new job opportunities and creating positive impacts on local communities (De Rossi 2024). However, it is an illusion that will fade over the coming years as the first environmental movements emerge, denouncing the exploitation and colonisation of the mountain.

A renewed attention to the environment and local culture emerged, fostering a new perception of the Alps, viewed as a place of heritage rather than exploitation (De Rossi 2017). Consequently, the relationship between tourism and local development began to be challenged, leading to a more critical understanding of growth and industrial tourism, and to the recognition of the need for limits (Camanni 2024). The deterioration of two defining elements of the Alps, their landscape and natural resources, made the unsustainability of the previous model increasingly evident (Camanni 2017). This ecological breakthrough led to the writing of the

Alpine Convention, which acknowledged the damage caused by mass tourism and environmental exploitation. Its main objective is to promote the preservation and sustainable development of the Alps by recognising the pressures exercised by human activity on the region and its ecological functions (Alpine Convention, n.d.). It therefore seeks to safeguard Alpine ecosystems alongside the region's cultural identity, heritage, and traditions.

1.2 The ski industry and mass tourism

1.2.1 The origins and development of skiing

In describing his day trip from Davos to Arosa in The Strand Magazine, Arthur Conan Doyle was among the first to capture the potential and appeal of skiing, highlighting its heroic and exotic nature (De Rossi 2024). Most importantly, he identified the future success and widespread diffusion of these practices.

> "But granted that a man has perseverance, and a month to spare in which to conquer all these early difficulties, he will then find that skiing opens up a field of sport for him which is, I think, unique. This is not appreciated yet, but I am convinced that the time will come when hundreds of Englishmen will come to Switzerland for the skiing season, in March and April" (Doyle 1894, p. 658).

Although Doyle wrote these words at the end of the 19th century, skiing has a much older origin. The earliest representations of skis date back 3,000 to 5,000 years, when people in Eurasia used them as tools for hunting and transportation (Denning 2015). In 1555, evidence confirmed the use of skis in Scandinavia for the same purposes.

Alpine skiing is the result of two major cultural transformations: the discovery of the winter season and that of the slope (Camanni 2023). The winter season, previously considered by local communities a hostile and deadly period, assumed a new meaning with the advent of tourism in mountain valleys. The first to recognise the potential of winter tourism was the Swiss village of St. Moritz, where the hotelier Johannes Badrutt invited a group of English tourists to stay during the winter months. Within this context, the slope changed its cultural meaning, becoming a space for recreational activities.

Consequently, winter Alpine tourism developed alongside the spread of skiing. The Alps, initially frequented mainly in summer by mountaineers seeking adventure and by aristocratic and bourgeois families for leisure, began to attract visitors during the winter season as well (Macchiavelli 2017). Skiers benefited from the existing tourist infrastructure, while tourist

businesses expanded their offerings, developing a mutually beneficial relationship since the beginning (Denning 2015).

The advent in Italy occurred only in 1896 with the Swiss engineer Adolfo Kind, who imported Norwegian skis to Turin, testing them first in the "Parco del Valentino" and then on the mountains of Piedmont (Macchiavelli 2017). Following the Swiss and Austrian example, the Ski Club of Turin was founded a few years later, leading to a progressive increase in the number of practitioners, especially among the wealthy classes (Dematteis & Nardelli 2022). Since skiing practice originated in cities, the first skiing areas were located in the surroundings of urban centres, such as Turin and Milan (Macchiavelli 2017). Although the Eastern Italian Alps already hosted well-known tourist destinations, they would become a ski locality only a few years later.

1.2.2 The transformation of skiing into a mass tourism industry

The introduction of cable cars and ski lifts has revolutionised skiing practices (De Rossi 2017). With the construction of the first cable lifts and their subsequent proliferation, the sport and the Alpine landscape underwent significant change, reshaping the Alps in the name of tourism (Denning 2015). Ski lifts became an important propaganda instrument for promoting the sport, increasing its popularity and profitability. They were essential to the development of ski resorts, while making skiing more accessible and attractive, removing mental and physical barriers and attracting people of all ages and levels of experience (Denning 2015).

In the Italian Alps, the first ski lift appeared in Piedmont, in Sestriere, where the entrepreneur Giovanni Agnelli, in a range of six years, contributed to the construction of cable cars and a new alpine town at high altitude (Dematteis & Nardelli 2022). Sestriere challenged the Swiss and Austrian model and supremacy in tourism, becoming the first resorts created for Alpine skiing, "where lifts, accommodations and entertainment operated under centralised ownership in a previously uninhabited landscape (Denning 2015, p.157). Sestriere is the perfect example of Alpine modernism, expressing a new way of perceiving the mountain: it represents a new spatial model based on the adaptation of the Fordist city to the Alpine context (De Rossi 2024). As stated by Camanni (2024):

> "With the birth of Sestriere, the geography of the mountain changes, or at least one part: it is not a separate territory anymore and somehow opposed to the plain, but it becomes an extension of the city at high altitude […]. The mass skiing creates another mountain,

transforming it from a place into a facility, from an environment into a backdrop, from a social fabric into a stage" (p. 42).

Until the start of the First World War, the sport remained elitist. Only after the end of the two wars, during the economic boom, skiing became a mass practice and a source of income for the mountain dwellers, who adapted their economic activities to serve a year-round clientele and expand the tourist infrastructure (Denning 2015). The profits generated by industrial development in the post-war period were reinvested in highland areas, where the traditional economic model based on agriculture and silvopastoral activities was no longer sustainable (Dematteis & Nardelli 2022). These investments found a fertile ground for generating greater profits in the ski industry, which was growing in response to the emergence of mass tourism. Ski destinations experienced substantial growth and development after the Second World War, with small to medium ski areas emerging in the Alpine region (Dematteis & Nardelli 2022). In the '70s, with the increase in the number of practitioners, the size of ski slopes and ski lifts became insufficient to meet demand (Macchiavelli 2017). The solution was to develop larger slopes and upgrade the lift network, often at the expense of the surrounding environment. However, this was not sufficient, and in the following years, the first connections to different ski areas were established, allowing skiers to move across a broader territory (Dematteis & Nardelli 2022). Dolomiti Superski, established in 1974, represents a perfect example of this model. In 2025, it constitutes the largest ski consortium in the world, including 450 lifts stunning 1200 km of slopes in winter, grouped in 12 ski areas, including Val di Fassa, Alta Badia, Val Gardena, Cortina d'Ampezzo, Tre Cime, Val di Fiemme, and San Martino di Castrozza.

Skiing became a mass practice, and consequently, the ski resorts multiplied. Investment in the construction industry integrated those in the ski industry and mass tourism, leading to infrastructure development, especially in hospitality (Macchiavelli 2017). Hotels and accommodations experienced significant growth, and the residential real estate market also developed significantly. The growth of family income, boosted by the economic boom, supported property purchases in tourist destinations, and many Alpine valleys were transformed into second homes for urban citizens (Camanni 2017). Urban colonisation took place in the Alpine valleys, where cement and asphalt were used as means of valorisation, encouraging a development that did not suit the fragile Alpine environment and culture (Camanni 2024). As Camanni (2024) observes, "every citizen seems eager to sit at the conquerors' table to occupy a fragment of the mountains, even if their presence lasts two months a year and for the

remaining ten, the localities turn back into empty beds and abandoned walls of ghost villages" (p. 50). The Italian Alps were particularly affected by these trends, especially in Piemonte and Lombardia, followed by Veneto and Trentino. Alto Adige, however, was an exception; at the end of 2021, it counted 13,894 second homes (ASTAT 2023), compared with 44,951 in Trentino (ISPAT 2022).

While the number of skiers and ski destinations continued to increase, natural snowfall began to decline. The sector has become so profitable and capitalised that a lack of snow on the slopes could put the entire system at risk, potentially leading to financial disaster. The snow has to fall in the right places and at the right times to make the capital investment in infrastructure and services profitable. In this sense, as Denning (2015) stated, snow represents both a blessing and a curse for the ski industry.

The first winters without snow date back to the 1980s (Dematteis & Nardelli 2022). However, winter tourist destinations were expected to ensure adequate snow coverage throughout the season to remain attractive to Alpine skiers (Denning 2015). Consequently, rather than leaving the matter to nature, investments were made in systems to produce snow artificially. The snow cannon was invented in 1950, combining water and pressurised air to spray artificial snow. Initially developed to supplement natural snowfall, it has undergone substantial technological development and has become the primary source of snow on many slopes (Daidola 2006). In the 1980s, it began to be installed on a massive scale across all Alpine resorts, and by 2006, 30% of ski slopes in the Alps were maintained by artificial snow (Denning 2015). Today, Italy alone has 3,200 kilometres of ski slopes, 72% of which have snowmaking systems (Dematteis & Nardelli 2022). According to Legambiente (2023), the costs to ensure snow-covered slopes amount to around 242-565 million euros, consuming 96 million cubic metres of water and 720 GWh of energy.

By the end of the 20th century, ski resorts reached the limits of lift and slope extensions, transforming the sport into a multibillion-dollar industry (Dematteis & Nardelli 2022). Investments in the ski industry and winter tourism were so massive that any other economic alternative was imaginable (Denning 2015). The landscape, understood as a social and cultural construction, is now subjugated to mass consumption, implementing the unlimited growth model, based on the vision of tourism as a heavy industry and on technological domination over nature (Dematteis & Nardelli 2022). The impacts are evident: the pastures have been transformed into sports facilities, and the landscape is filled with roads, parking slots, and second homes (Camanni 2023). Mountain culture and traditions deteriorate in parallel with the

degradation of natural environments, both exploited and subordinated to the demands of tourism. “The mountain chases the tourist”, writes Trevisan (2024), transforming the Alps into a playground and constructing an idealised image of itself. In this picture, past and local traditions are not taken into account; they serve only to shape the image of the mountain the tourist desires. In this research on authenticity and identity, as Denning (2015) highlights, the Alps have evolved into a monocultural, fictionalised landscape serving tourism.

1.2.3. The decline of the ski industry

The last decades of the 20th century marked the decline of ski supremacy (Camanni 2017). Factors such as lack of snow, the paradox of ski resorts being crowded in winter but deserted in summer, and the increasing awareness of climate change have shifted attention back to the Alpine environment. As a result, there was a growing recognition that intensive tourism projects, such as those in the ski industry, monopolised the landscape, establishing a development model that is neither economically nor environmentally sustainable (Camanni 2017). The environmental thinking of the 1970s revealed the contradictions in mass tourism and the ski industry, emphasising the need to set limits and respect the rights of nature. However, issues such as soil consumption, second homes, and the ongoing expansion of ski lifts and snowmaking systems remain unquestioned, and even though the need for a more sustainable approach is recognised, the ideology of unlimited growth continues to prevail, driven by the belief that no viable alternatives exist (Camanni 2024).

The 21st century also marked a phase of stagnation in tourist flows. Indeed, the ski industry entered a period of crisis caused by the global expansion of tourism and the resulting changes in consumption patterns (Dematteis & Nardelli 2022). This trend was the consequence of processes of globalisation and liberalisation, which led to the opening of borders, the emergence of new destinations and a decrease in air travel costs (Bätzing 2005). The rise in winter holiday costs and the loss of distinctiveness in certain features of the Alpine tourist offer exacerbated this process (Macchiavelli 2006).

In addition, the first decades of the new century were characterised by a cultural transformation of the tourist, moving from a passive consumer to an active one (Legambiente 2025). The post-Fordist travellers were not “interested in a place conceived as an object of consumption, they are looking for a narrative that carries soul and meaning, one that does not end throughout the holiday” (Camanni 2017, p. 316). They sought an emotional experience that can be found only by connecting with local communities, their culture, and the landscape, and a model that differs from the industrial paradigm on which the ski industry is based, favouring more community-

oriented, locally grounded, and environmentally sustainable approaches (Dematteis & Nardelli 2022).

The decline of the ski industry was accelerated by the COVID-19 pandemic, which exposed the vulnerabilities and the unsustainability of mass winter tourism, which is progressively losing its dominance in favour of summer tourism (Legambiente 2025). The pandemic reinforced the perception of mountains as uncontaminated and narrow environments that offer opportunities for diverse outdoor activities and experiences while avoiding crowding and confined spaces (Dematteis 2020).

However, this perception is increasingly undermined by the growth of summer tourist flows and the consolidation of social media as a driver of tourism demand. The circulation of so-called "instagrammable" images and experiences has indeed played a crucial role in amplifying the visibility of certain Alpine destinations, often leading to overcrowding (Nevediversa 2025). Social media shapes tourists' travel motivations, who no longer choose their destination for its characteristics and distinctiveness, but for its reputation and its worthiness to be posted. Contemporary tourists, as observed by Camanni (2025), often look for the planned experience, consciously seeking crowds and queues. It is precisely through these mechanisms that mountains are transformed into an idealised place. In this context, awareness of mountain environments and local communities is often lacking, while their culture, values, and identity are increasingly commodified (Camanni 2025).

At the same time, social media can also serve as a means to mitigate these dynamics. When used strategically, digital platforms can be a powerful tool for raising environmental and sustainability awareness, promoting more responsible behaviours, and educating tourists about the Alpine environment, culture, and traditions (Lonardi 2025). Moreover, social media can be used to suggest alternative destinations, redirecting tourists to reduce overcrowding, and give visibility to local communities, enabling them to voice their concerns and opposition to overtourism and to denounce its social and environmental impacts.

1.2.4 Impacts of mountain tourism

Despite the economic crisis, the Alps remain among the most famous tourist destinations in the world, hosting around 120 million tourists each year (WWF n.d.). Tourism activities generate around 50 million euros and account for 10-12% of jobs, with over 600 ski resorts and 10,000 ski installations (ClimateChangePost, n.d.). The principal ski destinations in Europe are France, Switzerland, Austria, and Italy, representing 85% of Europe's skiing area.

Although tourism emerged as an integrative economic activity, it has now become the primary economic source around which everything revolves in most mountain areas (Dematteis & Nardelli 2022). However, it is not priceless; it consumes both natural and cultural resources and entails several contradictions. The landscape is transformed, the mountain gradually loses its cultural identity, the relationship between local communities and tourists deteriorates, and destinations experience overcrowding during peak seasons, followed by desertification in the off-seasons (Casanova 2020). As highlighted by a study by Eurac Research (2013), cited by Camanni (2017), the region is at a turning point: environmental pressure from tourism, rising temperatures that jeopardise the future of the ski industry, depopulation, and growing internal competition are all threatening the economic future of the area. Tourism has embraced the ideology of no limits, affecting the Alpine environment, landscape, and cultural and social dynamics, exerting additional pressure on already fragile areas. Tourist flows are constantly increasing, making their management difficult, and local communities feel like strangers in their own territory (Camanni 2024). Therefore, it is appropriate to talk about overtourism, defined by the World Tourism Organisation (2018), as "the impact of tourism on a destination, or parts thereof, that excessively influences perceived quality of life of citizens and/or quality of visitors' experiences negatively" (p.4).

Reflecting on the quality of tourism is thus crucial for both the local economy and the preservation of natural environments (Casanova 2020). It is essential to rethink the social, environmental, and economic sustainability of tourism and to manage tourist flows to ensure that the organisation of physical spaces goes beyond consumption, respects the environment, and promotes sustainability (Legambiente 2025).

1.2.4.1 Environmental impacts

The ski industry is highly invasive, leading to significant alterations in the environment, ecosystems, and biodiversity (CAI 2021). The construction of ski resorts produces several environmental impacts, including soil erosion, noise pollution, land loss, and habitat and landscape degradation. The management and preparation of ski slopes also alter the ecosystem, progressively modifying the characteristic Alpine vegetation (Furlani 2013). Vegetation deterioration becomes particularly severe when slope preparation involves mechanical compaction of snow, thereby affecting soil quality, reducing species diversity, and degrading biodiversity (CAI 2021).

Among the various impacts associated with the ski industry, artificial snow is particularly significant due to its intensive consumption of energy, water, and landscape (Casanova 2020). According to Legambiente (2025), the Alps count around 25,000 hectares of ski slopes. Covering them with artificial snow requires around 95 million cubic meters of water and 3.5 kWh per cubic meter of snow produced. Based on these amounts, the cost ranges from 150,000 to 200,000 euros per hectare, excluding management expenses. These costs vary considerably depending on the quality of the system, climatic conditions, temperature, air humidity, and other local factors (Casanova 2020).

The impacts of snowmaking systems concern both infrastructure development and snow production itself (Legambiente 2023). The construction of artificial water basins entails major landscape modifications, extensive excavation works, and deforestation. The basins also affect the landscape, reducing the land available for pastoral activities and often requiring special interventions, such as the building of access roads and the use of helicopters to transport materials, given the remoteness of mountain sites. Moreover, the installation of pipelines for water, air, and energy distribution can further damage wildlife, soil, and vegetation (Legambiente 2023).

The intensive use of water for artificial snow further exacerbates the fragility of hydrological systems (Legambiente 2023). Water is generally drawn from nearby streams and diverted to artificial basins or tanks, altering natural flow regimes and depriving other ecosystems of essential resources. In some cases, this practice threatens the availability of drinking water and affects the quality and quantity of water flows, increasing soil erosion.
Artificial water basins are rapidly proliferating; today, in Italy alone, 165 basins can be identified, covering an area of around 1,896,317 sqm (Legambiente 2025).

Beyond winter tourism, the growth of summer tourism is also affecting the Alps, with significant environmental impacts. It is thus appropriate to talk about overtourism also during the summer season, characterised by crowded trails, mountain huts flooded with tourists, and Alpine passes congested with traffic (CAI 2025).

As noted earlier, the pandemic led to increased tourist flows in mountain regions, particularly for activities such as trekking, mountain biking, and climbing, transforming outdoor tourism into a mainstream phenomenon (CIPRA 2020). However, outdoor activities can negatively

impact the environment, generating substantial waste and pollution and altering the Alpine ecosystems. In its first two years of operation, the CleanAlp project, designed to analyse plastic pollution in mountain areas, collected approximately 200 kg of waste along hiking trails, including tissues, cigarettes, food packaging, clothing, and plastic bags (Dossi 2024).

Transportation also significantly contributes to climate change, accounting for 26% of total gas emissions in the Alpine region (CIPRA 2010). Approximately 75% of emissions are attributable to tourism-related mobility, mainly driven by the predominance of private car use, which represents about 84% of tourist travel. Both individual and freight traffic, as well as air traffic, negatively affect the climate, the environment, and people through pollutant emissions and noise (Permanent Secretariat of the Alpine Convention 2022). Transport infrastructure also consumes great amounts of land, contributing to landscape fragmentation and soil sealing.
According to Cavallaro et al. (2017), traffic volumes are expected to grow exponentially, particularly during the summer months, as a result of the growing attractiveness of Alpine destinations during the warm season and the challenges currently affecting winter tourism. This trend is especially critical on peak summer days, when traffic congestion, pressure on the infrastructure, and capacity constraints become increasingly evident.

An illustrative example is provided by the mountain passes in the Dolomites, which, on the one hand, constitute an important landscape resource but, on the other hand, are affected by the pressure of intensive tourist flows (Scuttari & Bassani 2018). Traffic volumes vary significantly by season, with automobile traffic showing a dual seasonality, in summer and winter, while motorcycle traffic is primarily concentrated in the summer months. During the summer period, Dolomitic passes such as Passo Gardena and Passo Sella record around 4.500 and 3.500 daily transits, respectively, resulting in significant impacts, including congestion, noise and air pollution, and environmental degradation (Scuttari & Bassani 2018).
Beyond the environmental impacts related to transport, the social and cultural consequences are equally important. In a letter to the President of the Autonomous Province of Bolzano, the mayors of Alta Badia highlighted the urgent need for regulations and mitigation measures to address traffic-related pressures (Ciprian 2025). Excessive traffic volumes on the Dolomitic passes are not only causing noise and pollution but also negatively affecting local communities and the tourist experience, and leading to a deterioration of the identity of the Dolomites as sustainable destinations. In this context, mountain passes are often perceived as “no man's land” or mere transit destinations (Lacasella 2025). This conception is reflected in tourists’ behaviour, which usually takes a consumerist form of travel characterised by rapid visits and photographs

of iconic places, with little interest in understanding and respecting the surrounding environments or engaging with local contexts.

Tourism can generate additional environmental pressures, such as disturbance to wildlife, light and noise pollution, and soil compaction (Casanova) 2020). Such effects often derive from tourism-related activities, such as restaurants, mountain shelters, and large-scale events, that have led to the anthropisation of even the highest mountain areas, placing the environment under constant pressure (Casanova 2020). Moreover, tourism accelerates settlement and urbanisation, intensifying soil consumption, territorial fragmentation, and habitat degradation (CAI 2021).

1.2.4.2 Economic and social impacts

Besides its environmental impacts, tourism also affects the economic, social, and cultural dynamics, contributing to the homologation of the mountain territory (Casanova 2020). The impacts that tourist monoculture has on local communities cannot be overlooked.

From an economic perspective, tourism, in particular the ski industry and winter tourism, requires considerable investments in order to realise and maintain the infrastructure, making entire mountain areas dependent on exogenous capital (Mazza 2023). Currently, most public investments are assigned to modernising and preserving ski lifts and snowmaking systems (Legambiente 2025). In Italy, the Ministry of Tourism allocated around 430 million euros to compensate resorts for economic losses and provide non-repayable funding to ski lift operators. This approach reflects the belief that technology is the only possible solution to counter the effects of climate change and to postpone the decline of mass tourism based on the ski industry, securing a future for many Alpine areas, where tourism remains the foundation of the local economic system (Legambiente 2025). Moreover, mass tourism led to high specialisation and the development of a tourist monoculture in many Alpine destinations, with significant impacts for local communities, including rising rental prices, the abandonment of family-run accommodation in favour of large international enterprises, and the development of tourism models prioritising visitor numbers over quality (Benedikter 2025). The establishment of a tourist monoculture has also contributed to the decline of other local economic sectors, such as mountain agriculture, silvo-pastoral activities, and craftsmanship, thereby making local communities more economically vulnerable and reducing their capacity for resilience (Mazza 2023).

Despite the positive effects that tourism can bring, the deterioration in the quality of life for local populations is leading to increased hostility toward tourism development (Benedikter 2025). In Alto Adige, for instance, which hosts around 8.7 million tourists every year, a significant share of residents opposes further expansion of the tourism sector, recognising that current tourism models negatively affect their quality of life, particularly mobility, access to services, and local economic conditions.

From a cultural perspective, ski tourism is becoming increasingly exclusive and expensive, creating social disparities. It is turning against the local communities, excluding them from their own territory (Lacasella 2025). Cortina d'Ampezzo provides a clear example: properties are bought by foreign investors, and only one-third of the hotels are managed by locals. In this context, tourism contributes to depopulation, turning the town into a "case of gentrification, a place where locals have become strangers in their own land" (Legambiente 2025, p. 220). Tourism can also lead to the commodification of the Alpine landscape and local culture, with traditions and values conforming to the expectations of tourists.

The increase in summer tourist flows also leads to overexploitation of several Alpine sites, particularly those easily accessible by car or within short walking distance (Dematteis 2020). The results are long queues along hiking trails and severe overcrowding at popular locations. Such pressures are especially evident in areas promoted through social media, where the circulation of images contributes to visitor concentration and exacerbates overcrowding. An emblematic example is Seceda in Val Gardena, where a video showing thousands of tourists waiting to access hiking trails sparked several controversies. While some in the public debate attributed the phenomenon to social media, which disseminates idealised images of Alpine landscapes, others traced the origin of the issue to the way tourism is conceived, which is often reduced to a digital performance (Gasca 2025). As Gasca argues:

> "This is the result of a model that measures tourism success in quantitative terms rather than in sustainability. It is the outcome of forms of territorial marketing that promote mountains as amusement parks. Responsibility is shared by everyone when we transform the experience into a checklist of places to share. […] The mountain should be lived slowly, without haste and with respect. It is not a commodity to be consumed, but a place to be understood" (Gasca 2025).

Another example of cultural commodification is the mountain hut. Historically, these structures were conceived as high-altitude shelters or, in some cases, as sites for scientific research, as exemplified by Capanna Regina (Da Pra Pocchiesa 2025). Their users were usually mountaineers, researchers, or wealthy mountain enthusiasts. With the emergence of alpinism and Alpine tourism, mountain huts gained visibility, but their use remained limited to individuals who were physically prepared and possessed a high degree of environmental awareness and familiarity with the risks of the Alpine context. However, over time, mountain huts have undergone significant transformations. The evolution of infrastructure, such as roads and cableways, has reduced physical and social barriers to access, leading to an important increase in tourist flows (Da Pra Pocchiesa 2025). As a consequence, the social function and cultural meaning of mountain huts shifted, and they began to be perceived as merely restaurants or hotels at high altitude. This transformation reflects a broader process of erosion of mountain identity, leading to a deterioration of "hiking ethic", which is traditionally aware, responsible, and respectful of the environment and local communities (CAI 2025). As highlighted by the President of the CAI, Antonio Montani, "thanks to cable cars and new parking facilities, tourists can walk for half an hour and then assume that the mountain hut is a hotel and demand luxury" (CAI 2025). It is therefore not surprising that tourists arrive unprepared on the hiking trails, wearing flip-flops and with the wrong equipment and clothes, or that, once arrived at the huts, they ask for luxury services, private rooms, or gourmet menus.

The causes of this phenomenon can be traced in the post-COVID-19 expansion of mountain tourism, which, as observed earlier, revitalised the image of the Alps as accessible and quiet places for leisure and wellbeing. However, this rapid growth in tourist numbers was not accompanied by appropriate education efforts aimed at fostering environmental awareness, cultural understanding and responsible behaviours in mountain territories (CAI 2025). This resulted in, on the one hand, a significant increase in accidents and emergency interventions at high altitude, and, on the other hand, a progressive distortion of mountain culture and traditions, which are reshaped to meet tourist demand and expectations.

1.3 Climate change

1.3.1 Climate change in mountain areas

Climate change is "a long-term shift in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions" (United Nations n.d). However, since the 1800s, human activities have been the main driver of climate change, primarily through burning fossil fuels such as coal, oil, and gas, which produce greenhouse gas emissions. Scientific evidence shows that humans have been responsible for all global warming

over the last 200 years, significantly increasing atmospheric carbon dioxide concentrations (NATO n.d.). As stated by the Intergovernmental Panel on Climate Change (IPCC) (2023), it is unequivocal that human activities are the leading cause of changes in the atmosphere, oceans, cryosphere and biosphere.

Global temperatures have risen rapidly over the last few decades. As reported by IPCC (2023), the global surface temperature from 2001 to 2020 was approximately 1.1 °C higher than in the period 1850–1900, representing an average increase of 0.99 °C. Moreover, it has been observed that the decade from 2015 to 2024 was the warmest on record, with temperatures increasing faster since 1970 than during any other 50-year period over at least the last two millennia. Increased greenhouse gas emissions from unsustainable energy use, land use, and consumption and production patterns primarily drive this trend.

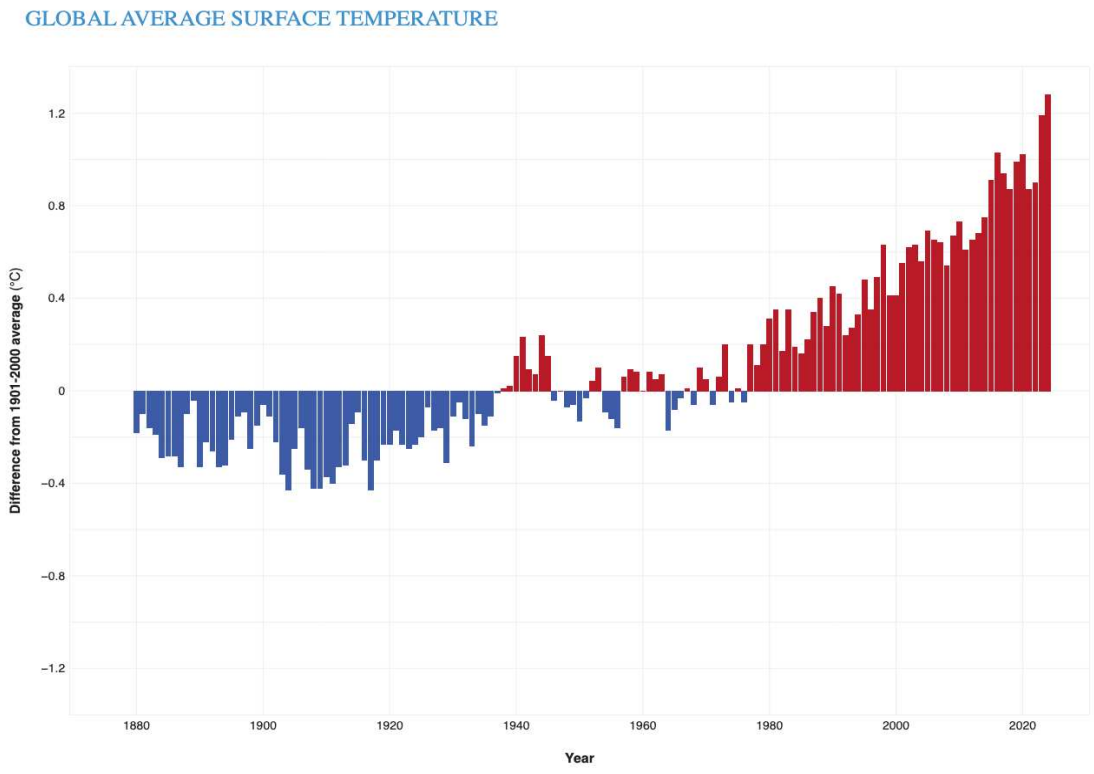

Figure 1: Yearly surface temperature from 1880–2024 compared to the 20th-century average (1901-2000). Blue bars indicate cooler-than-average years; red bars show warmer-than-average years. (Source: NOAA Climate.gov graph, based on data from the National Centers for Environmental Information).

Besides the rise in temperatures, climate change is leading to several other effects on the environment: the retreat of glaciers, the exacerbation of rainfall and flooding, changes in water availability reducing water security, sea-level rise, biodiversity loss, ecosystem degradation, food insecurity, health risks, and increasing poverty and displacement (United Nations n.d.). In

addition, economic damages have been observed in climate-exposed sectors, such as agriculture, forestry, fishery, energy, and tourism (IPCC 2023).

These trends are particularly evident in mountain regions like the Alps, which are experiencing climate change more intensively than other regions (Permanent Secretariat of the Alpine Convention 2018). The Alps are subjected to a double warming compared to other areas, with a temperature increase of 2 °C in the last decades (CAI 2021), and they are expected to increase by about 1-5 °C in the summer and about 1-3 °C in the winter by 2050 (OECD 2007). These conditions will result, on one hand, in an increase in tourist numbers during the summer, favouring mountain regions over seaside destinations where temperatures are rising excessively. On the other hand, they will lead to extended summer seasons, boosting leisure and holiday activities during spring and autumn (Cavallaro et al. 2017). In winter, temperature changes will result in reduced snow cover and durability, especially at low elevations, and in the retreat of glaciers, which have already lost 50 % of their volume (Bonzanigo et al. 2016). A study by the University of Trento and Eurac Research, cited by Legambiente 2025, reports that snowfall in the Italian Alps has decreased by 50% over the past century, while its average duration has decreased by about one month. As shown in Figure 2, snowfall decreased mainly between 1980 and 2020, due to rising air temperatures (Legambiente 2025).

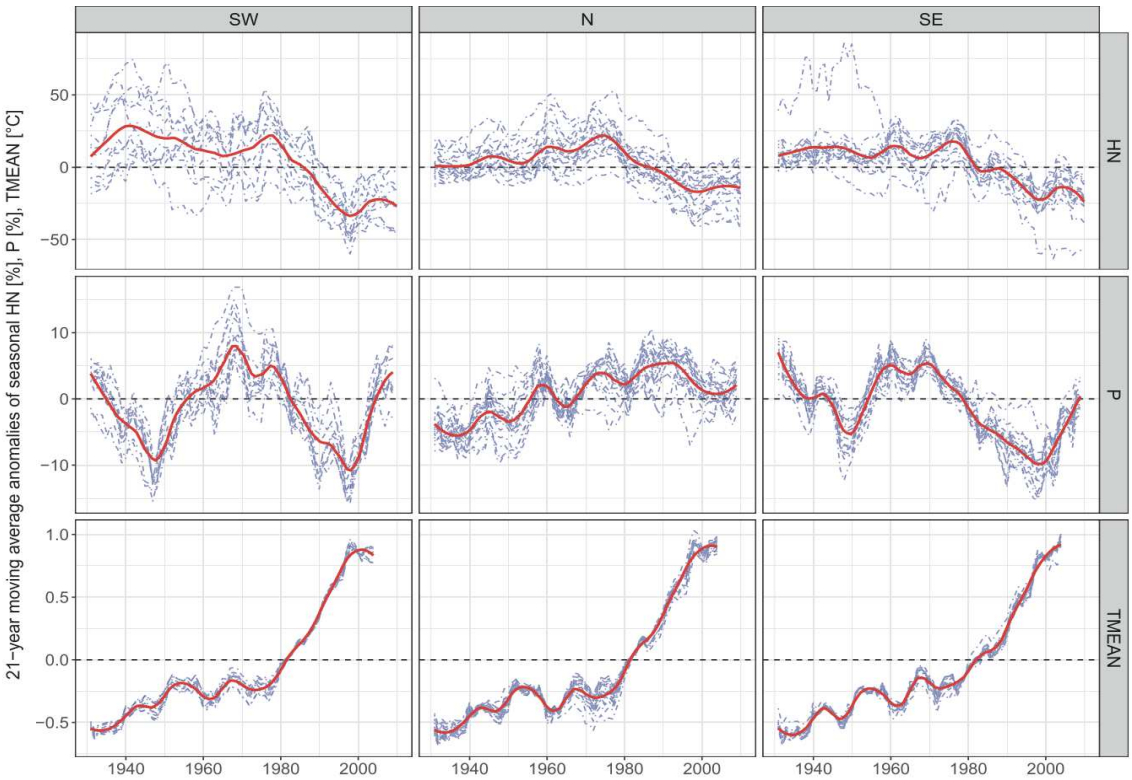

Figure 2: 21-year moving average anomalies of seasonal snowfall (HN), precipitation (P) and mean air temperature (TMEAN) (blue) for the 1920–2020 period. The red bold thick line indicates the local polynomial regression fitting.
Source: Long-term snowfall trends and variability in the Alps (Bozzoli et al. 2024)

Snow cover acts as a crucial natural water reserve, regulating hydrological flow and ensuring water availability for both environmental and human purposes (Legambiente 2025). For this reason, mountain chains are often described as the water towers of the world, ensuring, with glaciers and snowmelts, a water supply to the valleys. The reduction in snow quantity and duration will thus affect the ecosystem, impacting human well-being and undermining the accessibility of mountain environments.
Moreover, climate change is raising the lower limits of permafrost occurrence, leading to slope instability and rockfall activity. Other effects of climate change in the Alpine region include changes in watercourse regimes, a decrease in hydrological resources, variations in agricultural practices, biodiversity and landscape deterioration, and an increase in natural risks, such as floods and landslides (Pipan and Urbanc 2011).

The Alpine Convention acknowledged the issue of climate change in the 2006 Declaration of the Sixth Alpine Conference on Climate Change in the Alps, recognising the need for mitigation actions and adaptation strategies for specific economic sectors, such as tourism, transportation, agriculture, and forestry (OECD 2007). Similarly, the European Environment Agency (EEA) identified the principal vulnerabilities in the Alps due to climate change: increased economic losses in winter tourism, exposure of settlements and infrastructure to natural hazards, variation in biodiversity and ecosystem stability, and changes in the water balance.

Climate change is affecting both natural and anthropogenic systems, transforming the natural and human landscape. For the scope of this thesis, the analysis will focus on the impacts of climate change on tourism.

1.3.2 Climate change and the ski industry

Considering the Alpine context, winter tourism is one of the most vulnerable sectors affected by climate change, whose economic stability depends on climate conditions. Indeed, climate change will decrease snowfall and snow cover days, affecting snow reliability across most Alpine ski destinations, particularly at low elevations (Mitterwallner et al. 2024). In the European Alps, snow cover will decrease annually by 42% by 2071-2100; similarly, ski areas will experience a significant reduction. These projections are partly applicable to ski

destinations that are implementing snowmaking systems, which will be progressively increased to compensate for the scarcity of natural snow and ensure economic profitability (Mitterwallner et al. 2024).

An important concept for understanding the impacts of climate change on the winter tourism industry is the notion of natural-snow reliability, as defined by the 100-day rule. The latter argues that "in order to operate a ski area successfully, a snow cover sufficient for skiing should last at least 100 days per season" (OECD 2007, p.29). According to the 100-day rule in Italy, with a 30 cm snow depth threshold, the line of natural snow reliability has been set at 1500 m. According to climate projections, the natural snow reliability limit is expected to rise by 150 m for every increase in temperature of 1 °C, reaching 1,650 m (+1 °C), 1,800 m (+2 °C), and 2,100 m (+3 °C). According to ARPAV (2022), under the RCP8.5 scenario[2], temperatures during the period 2021-2050 are projected to increase by 3.5 °C to 5 °C in winter and by 4 °C to 5.5 °C in summer (ARPAV 2025). In terms of snow cover, the same scenario indicates that, over the period 2071-2100, the number of snow days[3] is expected to decrease by 35 days.
The line of natural snow reliability represents a valuable tool for determining trends and patterns. However, other local factors besides temperature must be considered, such as the orientation and gradient of the ski slope, which significantly influence snow cover (OECD 2007). Generally, snow reliability in low-altitude ski destinations will progressively decline, and without artificial snow, at least 250 ski resorts in the Alps will disappear (Dematteis & Nardelli 2022). In Italy, if the line rose by 300 m by 2050, the proportion of ski areas with natural-snow reliability would drop to 68%, corresponding to 59 of 87 Italian resorts (OECD 2007).

These projections highlight the vulnerability of the ski industry to climatic variations. Indeed, climate change is causing a decrease in the opening period of ski resorts, shifts of skiable areas to higher altitudes, and an increase of snowmaking systems, followed by a rise in the number of water basins (Dematteis & Nardelli 2022). These interventions are intensifying the anthropic pressure in high-altitude areas, which are among the most fragile mountain environments (Casanova 2020).

[2] RCP8.5 corresponds to a high-emissions scenario, characterised by a continuous increase in CO2 emissions in line with current trends. The geographical area considered for the analysis is North-West Italy (ARPAV 2025).
[3] Regarding snow days, ARPAV defined them as days characterised by an average temperature below 2 °C and daily precipitation exceeding 1 mm.

1.3.3 Climate change and summer tourism

Climate change is also contributing to an increase in tourist flows during the summer season, as climatic factors play a decisive role in shaping tourism demand and determining the attractiveness of destinations for specific activities (Abegg & Steiger 2011). As temperatures increase, a spatial shift in summer tourism is expected, favouring destinations at higher latitudes and elevations, where climatic conditions are more favourable. In fact, according to Amelung and Viner (2006), climate change is projected to enhance the summer competitiveness of regions in Northern and Western Europe at the expense of the Mediterranean region. Using the Tourism Climatic Index (TCI)[4], the authors evaluated the impacts of climate change on climatic suitability and forecasted the future climatic attractiveness of numerous regions globally. While the effects in the 2020s appear to remain moderate, changes in subsequent decades (2050 and 2080) will be more significant. Specifically, the Mediterranean region is projected to transition from very good or excellent summer climatic conditions to good or acceptable conditions in the 2080s, or potentially to worse conditions. Conversely, Northern Europe is moving toward a region characterised by very good or excellent conditions. Concerning the Alps, Amelung and Viner (2006) noted that "while this region currently achieves low TCI values in summer, it will have one of the highest scores by the 2080s" (p.356). Therefore, climate change is expected to significantly affect beach destinations, which, during the peak summer months, will become excessively hot, leading tourists to shift their holiday preferences from beaches to mountain regions.

Domestic tourism and short stays in the Alps are also expected to increase, as urban populations, particularly those in perialpine regions, may travel more frequently to the mountains to escape urban heat (Abegg & Steiger 2011). Moreover, the diminished reliability of snow cover is likely to influence winter overnight stays, encouraging tourists to reallocate their expenditures from the winter season to the summer period (Cavallaro et al. 2017). In the 2023 report "Il Turismo della Montagna," Andy Varallo, President of Dolomiti Superski, notes a significant increase in summer tourism. While tourist flows were previously distributed 70% in winter and 30% in

[4] The TCI, initially used to measure the influence of climatic conditions on the physical wellbeing of humans, was first applied in recreational and tourism-related activities by Mieczkowski (Amelung and Viner 2006). The index is based on five sub-indices, describing daytime thermal comfort, daily thermal comfort, precipitation, hours of sunshine, and wind speed. Mieczkowski classification of TCI scores is organised as follows: values above 60 indicate good climatic conditions; values above 70 corresponds to very good condition; values above 80 represents excellent conditions; and values of 90 or higher corresponds to ideal climatic conditions (Amelung and Viner 2006).

summer, current trends indicate a shift toward a more balanced pattern, with 55% in winter and 45% in summer.

1.4 Rethinking the future of the Alps

The Anthropocene, a concept defined decades ago, denotes “the current interval of time on Earth in which many key processes are dominated by human influence” (Zalasiewicz et al. 2011, p.835). It is a geological phenomenon, but, in contrast to other eras, the driving force for Earth transformations lies in human behaviour. Some of these changes occurred with agricultural practices, intensive farming, and the Industrial Revolution, causing increases in CO2 emissions and temperatures, resulting in the deterioration of biodiversity, soil desertification, hydrological crises, the retreat of glaciers, and the rise of sea levels (Nicoletti 2025).

The picture described highlights the need to redefine the relationship with nature, challenging the belief that natural resources are unlimited and renewable forever. It requires a radical change in thinking and the ecological conversion of productive systems, questioning modern development, production, and consumption models (Nicoletti 2025). Therefore, it is necessary to move beyond an anthropocentric vision of nature and foster a reciprocal, interdependent connection between humans and the natural world.

1.4.1 The concept of limit

The Anthropocene calls for a transformation and an urgent need to establish limits to the exploitation of nature. In this context, mountains represent fertile ground for redefining the relationship between humans and the environment and proposing alternative ways of conceiving the Alps.

Historically, Alpine communities could effectively respond to territorial challenges posed by climatic conditions and resource scarcity, making high-altitude areas liveable (Nicoletti 2025). Moreover, they found an equilibrium between natural resources and communities’ needs, limiting the exploitation and use of raw materials.

However, this vision rapidly changed. The relationships between humans and the environment evolved, placing humans at the centre, in a position of absolute power and commodification of the natural world (Nicoletti 2025). This shift coincided with the rise of the modern idea of progress. While in ancient cultures infinity was considered negatively and the notion of limit was associated with perfection, with the advent of Positivism, this perspective completely changed, viewing the limit as something that can always be exceeded (Dematteis & Nardelli,

2022). The idea of limit acquired a negative meaning and has been progressively removed from our vocabulary.

In this context, Michele Nardelli (2022) wonders whether there is still time to change or if we have already entered an irreversible condition. He challenges the ideology of unlimited material growth, stressing the need to rethink production dynamics and to redefine our relationship with nature. However, despite the impacts and evidence of climate change, we still refuse to evolve, blindly believing that technology will provide solutions that allow us to maintain our unsustainable development model and way of life.

This reflection aligns with the words of Pope Francis in *Laudate Deum* (2023), where he addresses the issue of climate change and the notion of limit, highlighting the role of human activities in creating the phenomenon. The Pope refers to the technocratic paradigm that "consists in thinking as if reality, goodness and truth automatically flow from technological and economic power as such," based on the idea of human beings with no limits (Laudate Deum §20). Technological progress, however, has not been accompanied by a development in responsibility and conscience, leaving humanity without the instrument to control this unlimited. It is not, therefore, surprising that such power "is capable of destroying life, while the mentality proper to the technocratic paradigm blinds us and does not permit us to see this extremely grave problem of present-day humanity" (§24). As Pope Francis affirms:

> "Human beings must be recognised as a part of nature. Human life, intelligence and freedom are elements of nature that enrich our planet, part of its internal workings and its equilibrium. For this reason, a healthy ecology is also the result of the interaction between human beings and the environment, as occurs in indigenous cultures and has occurred for centuries across different regions of the earth. Humans have often created the environment, reshaping it in some way without destroying it or endangering it. […] We need to rethink the question of human power, its meaning and its limits. Our power has increased rapidly over the past few decades. We have made impressive and awesome technological advances, and we have not realised that at the same time, we have turned into highly dangerous beings, capable of threatening the lives of many beings and our own survival." (Laudate Deum §§26,27,28).

This consideration emphasises the need to reconsider the human-nature relationship, recognising that humans are an essential component of nature.

From a philosophical perspective, the need to rethink the human-nature relation can already be identified in the works of Nietzsche and Heidegger, who were among the first to challenge the positivist and rationalistic understanding of nature. Nietzsche proposes a conception of reality that positions humans in a marginalised place with respect to nature and the universe, suggesting a way to conceive the mountain as a space for meeting and union between the spiritual and physical dimensions (Nicoletti 2025). The philosophy of Nietzsche calls for a more relativistic approach to knowledge, and the notion of limit is the assumption of change. Similarly, Heidegger criticises Western metaphysics and proposes a more spiritual interpretation of nature that goes beyond the biological and physical dimensions. In his philosophy, an authentic relationship with nature is possible, providing the foundation for ecological theories and emphasising values such as quality, cooperation, and conservation over competition, unlimited growth, and domination (Nicoletti 2025).

Beyond their role as a space of reconciliation between humans and the environment, mountains also embody a profound spiritual dimension. Since ancient times, the mountain has represented the meeting point between humans, nature, and divinity (Nicoletti 2025). However, the mountain, considered a spiritual place, is not part of Western culture but historically belongs to ancient Eastern traditions (Camanni 2024). In the Western world, nature is not considered sacred, and environmental heritage is treated as a resource to be exploited and wasted. As stated by Camanni (2024), "natural resources, except when the national and regional law does not explicitly protect them, lie in the limbo of common heritage, used by everyone and safeguarded by anyone" (p.9). Conversely, in countries like Nepal, Tibet, and India, some mountains are considered inherently sacred, and this is reflected in how they are conceived and lived. They are not something to conquer; the approach to the mountains is seen as a transformative path that does not involve the idea of victory.

The challenge posed by the sacred mountain calls for setting limits where none currently exist. This notion has generated several debates, especially within the environmental movements, encouraging Western society to adopt the values and behaviours other cultures have long internalised (Camanni 2024). As Camanni writes:

> "The keyword is limit, the greatest taboo of Western society. Limit, our unknown. We never speak about it, as we avoid talking about illness, old age, death, or any other form of ending. The economic doctrine founded on endless growth has shaped the minds and thoughts of consumers. Alongside the image of infinite development in a finite world has also grown the

> illusion of eternal youth or of perpetual incompleteness, creating a fragile culture that can no longer face its own fragility." (p.128).

According to Camanni (2024), the Alps perfectly represent the Western world and its development model, revealing how far the limits have already been exceeded and how urgent it is to slow down. Recognising and accepting the limits is the starting point for change and securing a sustainable future for the Alps.

1.4.2 The Alps as a laboratory for sustainable development

Within the theoretical framework outlined above, the Alps emerge as an ideal laboratory for developing an innovative model grounded in a renewed perception of mountains and for implementing good practices that recognise the significance of limits and sustainability. (Nicoletti 2025). The Alpine region, shaped by continuous interactions between humans and the environment, is an appropriate setting for redefining the relationship between humans and nature at the ecological, social, and economic levels (Dematteis & Nardelli, 2022). Being highly industrialised and anthropised, the Alps present both a challenge and an opportunity for evolution and for experimenting with alternative forms of development (Camanni 2002). This potential arises not because the Alps are an untouched area, but because they have been directly affected by industrialisation and consumption processes. As Camanni (2002) observes, "it would make little sense to talk about a laboratory if the Alps, like many other mountain chains in the world, had not experienced industry, pollution, tourism, urbanisation, environmental degradation, and cultural homogenisation" (p.99). Therefore, the mountains can serve as a space for reconciliation between nature and humans, transforming limits into opportunities to rethink development and to foster circular economies and innovative, sustainable practices (Nicoletti 2025).

The Alps have undergone various natural and cultural transformations that have shaped collective perceptions of the mountains: from hostile lands inhabited by "savages" to romantic paradises, and finally to industrialised landscapes driven by tourism (Ferrari 2023). It is thus essential to reflect on which perspective to adopt when approaching the Alps, whether they are viewed merely as an economic resource and source of profit, or as natural and cultural assets possessing intrinsic value that must be preserved. Overcoming the prejudices that still influence the perception of Alpine territories is necessary to move beyond a consumerist and recreational image of the mountains, often reduced to mere advertising.

1.4.2.1 Beyond the ski industry

The economies of mountain areas have developed around tourism and Alpine skiing, providing significant opportunities for growth and local development. As Legambiente (2025) notes, no alternative economic model has achieved results comparable to those of traditional tourism, and it is difficult to abandon the development model that allowed several Alpine communities to overcome poverty (Ferrari 2023). The challenge, therefore, lies in recognising the limits and contradictions of mass tourism and redefining the model sustainably, seeking a balance among economic, social, and environmental dimensions to secure a viable future for the Alps. As Casanova (2020) highlights:

> "Nowadays, mountains can only survive the current dynamics if they are sustainable and progressive. It is necessary, then, to move away from the industrial economy based on numbers and models that involve continuous growth. This is the past. Today, there is a need for an economy rooted in experiences and values to find alternatives within an increasingly challenging context. […] The proposals for the future of mountain tourism can only be developed by considering the concept of limits. The limit in the mountains is real: the limit of the habitable space, altitude, resources, and accessibility. Especially in this historical period, any vision for tourism cannot ignore the physical and conceptual reality of the limit." (p. 112-113).

Such an evolution must be supported by new evidence and arguments demonstrating that alternatives exist. Change implies adaptation, whereas remaining unchanged means increasing dependence on skiing monoculture and public subsidies, subjected to "useless therapeutic obstinacy" (Ferrari 2023). Considering the current context, marked by the evolution of the winter tourism market and climate change, the expansion of ski resorts and the construction of connections between the skiable areas appear inappropriate (Dematteis & Nardelli 2022). Conversely, the reorganisation of the tourist offers, and the improvement and maintenance of the existing facilities seem more coherent.

Two contrasting visions of the mountains therefore emerge: the consumerist and industrial model versus a new, responsible way of experiencing and visiting the highlands, one that is aware of their needs and specificities (Camanni 2024). It is worth asking why we keep investing in facilities that will soon be unsustainable, further binding communities to fragile economic systems. As Ferrari (2023) points out, "the answer is always the same: because that is the way it has always been done, and change requires imaginative energy, vision, and conviction to

overcome resistance" (p.120). Similarly, Legambiente (2025) acknowledges that continuous investments in snowmaking systems and ski lifts are reasonable, given the current vision of mountain tourism. At present, alternatives to the ski industry are not sufficiently attractive to replace the traditional model, as they are unaware of the long-term benefits they could lead to (Camanni 2024).

Alternatives to mass tourism and good practices exist, centred on developing a model based on a different conception of Alpine skiing that does not harm the environment, whether through artificial snow or ski lifts (Daidola 2006). Several initiatives have already been implemented, grounded in the principles of the green and slow economy (Ferrari 2023). These projects offer a more conscious approach to mountain tourism, requiring fewer investments and less infrastructure, while providing greater resilience in the face of climate change (Daidola 2006). Such models also foster awareness of local culture, the environment, and sustainable practices.

However, this does not imply disregarding the historical and socio-economic significance of Alpine skiing, which has played a crucial role in community development; instead, it allows us to reconsider its role and actively encourage alternative strategies to address modern challenges (Dematteis & Nardelli 2022). It is necessary to abandon the simplistic dichotomy of "harmful skiing", recognising that the final goal is not to dismantle all ski resorts in the Alps, which are a fundamental economic resource for mountain regions, but to stop investing in a system that is no longer sustainable (Legambiente 2025). The aim, therefore, is to integrate traditional Alpine skiing with forms of slow and diversified tourism, fostering a model tailored to the specific needs and characteristics of each territory (Camanni 2024). De Rossi (2024) advocates for diversification and coordination among different approaches, consumption patterns, and perceptions of the mountains, facilitating the integration of innovative practices and values with traditional ones. As Ferrari (2023) highlights, the starting point is the specificities of each location, acknowledging that there are no right solutions; rather, the alternatives proposed must be consistent with the context.

1.4.2.2 The third way

Building on this vision, sustainable Alpine development must be based on balanced and multifunctional relationships with mountain environments that reject the logic of exploitation (Casanova 2020). As Camanni (2002) observes, both traditionalist approaches, which led to the museification of landscapes, and modernist ones, which contributed to the rise of mass tourism and the expansion of the ski industry, have failed to address the current challenges posed by

climate change and cultural transformations. These visions correspond to two opposing perceptions of the mountain: as untouched wilderness and as a recreational playground. According to Varotto (2020), the only way to overcome this dual perception is to identify an alternative approach that goes beyond the dichotomous condition of the mountain, which is, on the one hand, enslaved to dynamics of exploitation and colonisation, and, on the other hand, marginalised. Both visions deprived mountains of self-determination, remaining dependent on external forces. The future of the Alps thus lies in what has been defined as a "third way": a new perspective that goes beyond the stereotypical view of the mountain as either a museum or a playground. It offers an alternative to the model of unlimited consumption and the trend of abandonment and re-naturalisation of the area (Nicoletti 2025).

Today, urban dynamics remain too central in mountain regions, leading to the homogenization of Alpine culture and erasing the specificities of each territory (Casanova 2019). Imagining an alternative scenario implies halting the urban invasion of the Alpine space, limiting the proliferation of second homes, ski slopes, and ski lifts, and allowing the Alps to maintain their diversity and identity, free from subordination to urban and touristic demands (Ferrari 2023). This approach envisions sustainable development and establishes a model that aims to transfer the values of mountain communities into urban contexts, rather than bringing the city into the Alps (Camanni 2017). According to Dematteis & Nardelli (2022), the alternative to the dominant model lies in a return to a nature-based economy, where territories regain a central role, fostering a vision grounded in interdependence and cooperation among different territorial systems. This perspective strengthens the relationship between production and consumption areas, establishing a model based on continuous interaction between local communities and natural resources. It promotes a vision of natural environments as common goods and calls for collective responsibility for their preservation.

The Alps should then be transformed into a political and cultural laboratory to develop and implement effective, sustainable practices for the mountains, foster open dialogue, and regain influence with institutional actors (Casanova 2019). It is fundamental to overcome the idea of mountains as disadvantaged areas; they must be seen as independent territories, full of potential and diversity, that encourage resilience.

1.4.3 The Manifesto di Camaldoli for a new centrality of the mountain

The Manifesto di Camaldoli was elaborated during the convention organised in Camaldoli in November 2019. It has been promoted by the "Società dei Territorialisti e delle Territorialiste"

and signed by many organisations and associations, including Legambiente, Mountain Wilderness, and CIPRA Italia (Casanova 2020). It is addressed to Italian citizens to raise awareness of the environmental, social, and economic characteristics of the mountains, as well as the challenges they face due to climate change and cultural transformations. As the Manifesto emphasised, mountain areas are highly diverse, and recognising this diversity is essential to address their issues appropriately and context-specifically. From this perspective, the future of the Alps does not lie in disregarding human activities in the territory, but in establishing a "long-term coevolutionary relationship" with ecosystems (Casanova 2020). The mountain should be understood as a living testimony to the interaction between humans and the environment, based on the recognition and respect of limits. The rewilding is not an adequate solution to safeguard the Alps, but it should be maintained inhabited and repopulated.

As stated in the Manifesto, the mountains represent an opportunity to develop a "new civilisation", capable of challenging the urban mindset and promoting values such as a culture of limits, solidarity, and civic sense. Traditional and historical knowledge can support the creation of both new settlements and productive systems, as well as forms of social and institutional organisations adapted to various environments (Casanova 2020).

The interactions between local communities and the mountain environment have historically generated forms of social and institutional organisations founded on participative democracy, autonomy, solidarity, cooperation, and the community management of resources (Manifesto di Camaldoli 2019). The common good, through civic uses, common laws, and institutions such as the Regole and the Magnifiche Comunità, held economic, ecological, and ethical significance, preserving a balance between natural resources and local community needs, preventing the overexploitation of resources, and strengthening a sense of community. (Varotto 2020). The processes of modernisation and industrialisation led to the dissolution and marginalisation of these traditional forms of self-governance, facilitating the intensive use of resources, the emergence of mass tourism, and the development of an unsustainable consumption model. These transformations also played a central role in creating the already discussed dichotomy of the Alps, which contributed to relegating the Alps to a subordinate position, overlooking the interests of the mountains and their inhabitants and contributing to the decline of traditional economic activities and the erosion of forms of self-management and autonomy (Nicoletti 2025).

Reversing this trend requires what Nicoletti (2025) defines as a "new Alpine Renaissance, ": a process aimed at renewing public policies, revitalising communities and cultural practices, and

developing strategies to encourage new forms of settlement. This transformation also includes reaffirming fundamental values such as civic responsibility, the prioritisation of collective interests over individual ones, and the recognition of mountain heritage as a common good (Manifesto di Camaldoli 2019).

1.4.3.1 The return to forms of communitarian self-government

Following the example of historical institutions like the Regole, the objective is to establish political and social bodies grounded in the values of autonomy and mutual consent, capable of managing common goods through coordinated and cooperative practices (Casanova 2019). Such organisational forms are crucial for restoring social cohesion and promoting bottom-up and community-led democracies. Without the renewal of widespread democracy and local governance, the mountains will risk becoming urban agglomerations, losing their ability to respond to the complexities and needs of peripheral regions (Casanova 2019). This concern emerges clearly in the Manifesto of Camaldoli (2019), which emphasises that:

> "Today, a certain level of governing autonomy is reserved only for regions and metropolitan cities, which means that in most areas, the actual management of mountain regions depends on other locations, characterised by different priorities and values. Developing forms of self-governance specific to mountain territories that consider the particular features of each context is essential to avoid dependence and to foster autonomous relationships within internal territories, with the major cities of the plains, and with the rest of the world. To this end, specific autonomies are needed, with different arrangements from those of non-mountain areas, which are also necessary to promote the return of residents and producers." (p.4).

In this context, restoring forms of self-government and community democracy is a crucial step towards strengthening the autonomy of Alpine communities. These elements support the development of innovative, place-based solutions that can address territorial needs and challenges, enabling mountain regions to overcome their current marginal condition and regain a central role with respect to urban areas (Manifesto di Camaldoli 2019).

1.4.3.2 The new mountain dweller

The renewal of these institutions is also profoundly connected to the challenge of repopulating mountain areas. Indeed, establishing forms of autonomy and collective responsibility is

fundamental for creating sustainable living methods in the mountains, allowing these regions to valorise and responsibly manage their resources independently.

Depopulation and the abandonment of the highlands, as emphasised by the *Manifesto di Camaldoli* (2019), do not rely on natural causes but are a consequence of the modern development and growth model, which has not adequately understood or valorised the mountain fabric. However, in recent decades, an opposite trend has emerged, marked by the return of former residents and by the so-called "new mountain dweller," who has deliberately decided to settle in mountain areas. The newcomers are mountain inhabitants by choice and are aware of both the benefits and the limits of the consumerist model, thus promoting new ways of living in the Alps, such as the restoration of traditional agricultural practices, respect for natural resources, and sustainable development (Camanni 2002). They are driven by ecological and ethical motivations, favouring and preserving mountain values over those of the city, like slowness, silence, and a sense of community (Camanni 2016). Moreover, they transform the qualitative structure of the Alpine population, introducing new experiences and knowledge and countering the belief that the mountains are only for tourism workers and the elderly (Varotto 2020). The newcomers are professionally qualified, have innovative ideas, are open to technological innovation, and, at the same time, are respectful of the environment, local communities, and the landscape. Their perception of the mountain is thus different from that of recreational and tourist places but perceive them "as a living space that serves as the basis for professional and existential projects grounded in the centrality of dwelling" (Varotto 2020, p. 153).

The return to the mountains has to be accompanied by new forms of cooperation, restoring the values that characterised traditional mountain institutions. Community cooperatives have already emerged as expressions of intergenerational solidarity, bringing together those who wish and choose to settle in the mountain regions (Varotto 2020).

However, the repopulation of mountainous areas, and in particular the strengthening of these new community organisations, should be encouraged through innovative policies and strategies to support both native residents who wish to remain and newcomers seeking to relocate. This is what the *Manifesto di Camaldoli* (2019) claims, calling for collaboration between the national government and territorial and local institutions to support projects that encourage the repopulation of the mountains in a multifunctional perspective. They should also promote the establishment and improvement of essential services and infrastructure, provide incentives for settlement and stimulate circular economy and supply-chain models that respect the

environment and the mountain heritage. Moreover, the various strategies should be developed with consideration of the specificities and needs of each territory and should directly involve local communities in the decision-making process and implementation (Manifesto di Camaldoli 2019).

In light of these reflections, it is evident that it is necessary to move forward with the current development model and rethink the relationship between humans and the environment by recognising limits, territorial identities, and specificities. The challenges posed by climate change and the crisis of the dominant tourism model highlight the need to move beyond the role of the mountains as the urban periphery, Europe's playground, and a geographical barrier (Camanni 2016). The future of the Alps lies, as stated before, in the third way, aiming to restore autonomy and diversity to Alpine communities and establish a renewed alliance between the conscious mountain dweller and the responsible tourist. Alternative approaches should follow what Alex Langer, as cited by Camanni (2002), defined as "lentius, profundius, sauvius" (slower, deeper, sweeter), accompanied by a cultural and civic transformation.
This is the message that the dossiers, publications and projects of institutions such as Legambiente, CIPRA and the Alpine Convention aim to disseminate, supporting a new vision of mountain tourism and promoting alternative adaptation and mitigation strategies that better align with changing climate conditions and behavioural patterns (Dematteis & Nardelli 2022). What emerges is a clear change in attitudes towards tourism, favouring alternative practices which promote the distinctiveness of places and more unique experiences.

The following chapter takes these considerations as a starting point to analyse potential adaptation and mitigation strategies, with a particular focus on the roles of spatial planning and institutions and organisations in fostering innovative and sustainable pathways in the Alpine region.

2. Adaptation strategies, spatial planning and institutional challenges

2. 1 Adaptation and mitigation strategies

As discussed in the first chapter, climate change constitutes one of the major challenges Alpine tourism will face, calling for adaptations and a transition towards new development models that better align with climatic conditions and environmental necessities and limits (CIPRA 2011). Winter tourism and the ski industry are among the sectors most affected, as the progressive rise in temperatures will lead to a substantial decrease in snow reliability and a reduction in the skiing season (CIPRA 2017). However, some considerations must also be made for summer tourism, as rising visitor numbers have raised concerns about the management of tourist flows and transportation, resulting in overtourism[5].

Adaptation strategies are usually divided into two categories: technological and behavioural (OECD 2007). Technological adaptations involve measures such as the installation of snowmaking systems, snow and slope management and landscaping, and the concentration of ski activities in favourable areas, such as north-facing slopes and glacier skiing (OECD 2007). Behavioural adaptations, on the other hand, include operational practices, financial tools, diversification of activities, and the development of year-round tourism (OECD 2007).

2.1.1 Technological adaptation strategies

Most ski resorts have addressed climate change by investing in snowmaking systems and artificial basins (Legambiente 2025). The implementation of snowmaking systems has enabled ski destinations to ensure facility operations, extend the ski season, and mitigate the effects of increasing climatic variability. Artificial snow is indeed the dominant adaptation strategy adopted by ski area operators, shifting from a luxury to a necessity within just a few years (OECD 2007). Today, Italy shows the highest dependence on snowmaking among Alpine countries, with 90% of ski slopes covered by artificial snow, followed by Austria (70%), Switzerland (50%), and France (39%) (Legambiente 2023).

Although artificial snow can mitigate the impacts of climate change, growing reliance on this resource makes the ski industry increasingly unsustainable, both environmentally and economically. Indeed, snowmaking systems not only entail high maintenance and operational costs but also require ongoing investments in water networks and basins, along with significant energy and water consumption, thereby diverting resources from other ecosystems (Pievani &

[5] Overtourism is defined by Weber (2017, p. 315), as cited by Chaney & Seraphin (2023), as "*the phenomenon of overcrowded tourism destinations, where the (mainly social) carrying is exceeded.*

Varotto 2021). Moreover, rising temperatures will lead to greater reliance on artificial snow as natural snow cover declines, further increasing energy and water demand and costs (OECD 2007). Most Alpine ski destinations today depend on artificial snow, necessitating continuous investment in snowmaking technologies, as well as in covering the costs of water and energy supply, making any strategic changes even more difficult (Legambiente 2023).

Therefore, given the current climatic trends, it is reasonable to ask whether the development of snowmaking systems is worthwhile. In this context, artificial snow cannot be considered a long-term solution, given its significant reliance on water resources, climatic conditions, and energy consumption (Mitterwallner et al., 2024). As CIPRA (2011) reported, rising temperatures are expected to increase dependence on artificial snow, but under more precarious and less efficient conditions, thereby compromising snow production itself. At the same time, water availability will decline over the coming years, making it increasingly difficult and costly to secure the water resources required for snowmaking operations, while energy consumption is expected to rise accordingly.

Another technical adaptation strategy is slope and snow management and landscaping. These strategies aim to optimise the management of available snow, both natural and artificial (CIPRA 2011). In particular, they enable a reduction in the required snow depth for ski operations and, consequently, the amount of snow needed for snowmaking (OECD 2007). Such measures include installing snow fences to retain snow and snow deposits to conserve it, creating shaded areas, and contouring or smoothing slopes by draining wetland areas, levelling the surface, and removing obstacles such as trees or rocks.

Although these interventions could help preserve snow and reduce energy and water consumption, they significantly impact the environment and landscape, contributing to vegetation deterioration and erosion (CIPRA 2011). In Bavaria, 27% of the skiable area was modified through landscaping and slope development operations, which involved machine grading and forest clearing (OECD 2007). It has been shown that these modifications affected the area's sensitivity to erosion, with 63% of damage attributable to erosion in the modified slope sections. Moreover, the use of bulldozers and similar machines significantly impacts vegetation, which is heavily damaged or removed. Given the impacts on the Alpine environment, such measures should be reevaluated. However, they are likely to increase, particularly in landscaping, to strengthen snowmaking (CIPRA 2011).

Ski areas may also choose to concentrate ski operations in favourable locations with a climatic advantage, such as north-facing slopes, moving to the highest parts of existing ski areas, or new areas at higher elevations, including glaciers (OECD 2007).

However, there are some limitations to these approaches that should be mentioned. In many cases, relocating ski activities to higher elevations is not feasible, either because they are already intensively exploited or because they are unsuitable for hosting ski activities due to weather conditions or high avalanche risk (CIPRA 2011). Moreover, infrastructure construction at higher elevations could be more expensive and logistically complex. The expansion of ski areas through new connections or the development of new ski resorts often involves the exploitation of intact and fragile environments and is therefore widely regarded as controversial (CIPRA 2011). This issue becomes particularly critical in protected areas and national parks, where protection norms constrain the creation of new facilities, which are often bypassed under the justification of climate change adaptation.

This could be the case of the extension of ski areas on glaciers. Glacier skiing, originally a niche summer skiing market, became an essential resource for winter skiing due to snow deficiency (OECD 2007). However, enlarging ski areas to glaciers cannot be considered a sustainable solution in the long term, given the rapid retreat of Alpine glaciers. In 1850, glaciers covered approximately 4,500 km² of Alpine territory, whereas in 2010 this area had declined to 1,800 km² (Dematteis & Nardelli 2022). According to Zekollari et al. (2019), Alpine glaciers are projected to lose approximately 45% of their area by 2050. However, projections can significantly vary depending on the emission scenario adopted in climate models. Under the RCP8.5 high-emission scenario[6], by 2100, Alpine glaciers will have lost about 94% of their volume and 91% of their area with respect to 2017. In the Italian Alps, over the past 60 years, an area loss of about 170 km² (Legambiente 2025) has been observed.

Therefore, although glacier skiing confers a competitive advantage on ski destinations, glacier retreat constrains ski operations (CIPRA 2011). To ensure ski operations, snowmaking systems have been implemented on glaciers, and ski areas have begun using geotextile sheets to reduce solar radiation and prevent ice melt (OECD 2007). These actions, along with numerous proposals to expand ski infrastructure in high-mountain environments, prompted reactions from many environmental organisations. While ski operators regard such technology as an effective tool for reducing snowmaking requirements, environmental groups have raised concerns about the lack of regulations that limit its use (OECD 2007). Indeed, there is a risk that the use of

[6] See footnote 2 in chapter 1

sheets may follow the development of snowmaking systems, evolving from sporadic measures to widespread practice (CIPRA 2011).

2.1.2 Behavioural adaptation strategies

Operational practices involve managing the timing and duration of the ski season, adjusting opening dates, or concentrating activities within a specific ski area by increasing lift capacity or limiting slope availability. Another option is to promote forms of cooperation within ski areas in order to reduce market competition and costs (OECD 2007). This allows the sharing of equipment and personnel and, at the same time, to benefit from better conditions and the exchange of know-how.

Given the considerable costs of maintaining ski areas, financial support is essential, primarily from the public sector, to subsidise ski operations through periodic or occasional contributions, concessional loans, or a share in the business (CIPRA 2011). In most cases, these subsidies cover deficits and help sustain ski areas. Most of them are now used to finance the construction or improvement of snowmaking systems.

In the context of climate change, financial support is likely to play an increasingly significant role in sustaining ski tourism (OECD 2007). In response to both climatic and tourist flow crises, ski areas have invested in snowmaking systems, artificial basins, and other technologies, resulting in a substantial increase in operating costs (Legambiente 2025). These investments were made possible primarily through public funding, justified by the perception that the ski industry is the key pillar of the mountain economy (OECD 2007). Other financial tools include snow insurance and weather derivatives, which aim to protect ski resorts from economic losses due to insufficient snow.

Another important strategy is diversifying activities by developing alternative offerings or promoting summer tourism (OECD 2007). These efforts aim to reduce dependence on the ski industry by promoting snow-related activities, such as snowshoeing, trekking, and sleighing, as well as those unrelated to it, including wellness centres, festivals, concerts, and gastronomic and cultural tours (CIPRA 2011). Diversification strategies offer several benefits, including the enhancement of the tourist experience by enabling tourists to engage in alternative activities unrelated to the ski industry. Additionally, these strategies facilitate the expansion of tourism benefits to other economic sectors, such as agriculture and craftsmanship (CIPRA 2006).

Although skiing, snowboarding and cross-country skiing remain the main attractions, the number of non-skiers is increasing, representing a significant and expanding market section

(OECD 2007). Recent data confirm this trend: during the winter season 2024/2025, a considerable reduction in time spent on the ski slopes was observed, accompanied by a growing preference for alternative leisure activities (Legambiente 2025).

In response, many ski resorts have diversified their winter offer by investing in non-skiing activities, particularly winter hiking, tobogganing, and snowshoeing (OECD 2007). However, a structural limitation remains: most of these alternatives still depend on snow, thereby failing to reduce reliance on the resources. As highlighted by Lacasella (2025), although such activities are promoted as more sustainable, it is essential, given the ongoing rise in temperatures, to develop offerings that do not depend on snow. Moreover, non-snow-related activities are unlikely to fully replace snow-based tourism, despite their valuable role in broadening the tourism offer (OECD 2007). Unfortunately, the revenue generated by these activities generally does not match that of alpine skiing, which remains the principal economic driver of many mountain destinations.

Additionally, many tourist destinations remain heavily dependent on the winter season, thereby exacerbating their vulnerability to snow deficiency and climatic variability (OECD 2007). Climate change and the progressive decline of winter tourism thus call for adaptation and the strengthening of year-round tourism, promoting weather-independent activities and bolstering summer tourism (CIPRA 2011).

In this context, the withdrawal from ski tourism should also be considered as a potential adaptation strategy, particularly in low-altitude ski areas whose survival is jeopardised by climate change (OECD 2007). The debate around this approach is polarised between those advocating the downsizing or dismantling of non-profitable and abandoned ski areas and those who argue that, given their economic importance, such facilities should be maintained. Within this controversial discussion, some organisations strongly recommend the reconversion and, where appropriate, the removal of abandoned infrastructure to reduce environmental and landscape impacts (CIPRA 2017). The dismantling of ski lifts, combined with territorial requalification, can significantly reduce reliance on snow-based activities, thereby facilitating the transition towards a more sustainable tourism model and improving the overall quality of visitor experience (BeyondSnow 2024). However, infrastructural removal alone is not sufficient. As exemplified by the case of Piani d'Erna (Italy), this approach must be complemented by diversifying tourist activities, reassessing winter tourism practices, and promoting year-round tourism. In this way, mountain destinations can strengthen their long-term resilience and move beyond structural dependence on unreliable climatic conditions.

Overall, it is essential to encourage more sustainable forms of tourism that are better aligned with climate change and ongoing market and cultural transformations in order to enhance the resilience of ski destinations to these evolving challenges (CIPRA 2011). The implementation of sustainable tourism practices thus represents both a strategic advantage for ski resorts and a necessary response to changes in tourist behaviours that favour more environmentally and climate-friendly activities. In this context, the development of slow and low-impact tourism, alongside the diversification and strengthening of local economies, is fundamental to securing a future for many mountain tourist destinations (CIPRA 2011).

2.1.3 Mitigation strategies

In addition to adaptation strategies, actions to mitigate climate change may be implemented, especially given the rise in CO2 emissions. It is thus crucial to prioritise energy and transportation management (CIPRA 2011).

Tourist transport is one of the primary sources of CO2 emissions in Alpine tourism, as both round-trip journeys and mobility within the destination significantly affect people and the environment. The expansion of summer tourism, characterised by increasing visitor numbers and the growth of day tourism, has further exacerbated transport-related traffic congestion and pollution. For these reasons, promoting sustainable mobility is a key strategy in order to mitigate climate change and reduce its impact on the Alpine environment (CIPRA 2017).
In accordance with the Transport Protocol of the Alpine Convention, sustainable transport serves as the foundation for creating strategies that better align with climate and environmental goals (Permanent Secretariat of the Alpine Convention 2022). The aim is to reduce environmental impacts and transportation-related risks, decreasing the use of natural resources and the levels of emissions and noise across all modes of transport, and optimising transport systems and infrastructure. The proposed strategies range from financial interventions, including adjustments to fuel prices, transport taxes, tolls, and parking fees, and economic incentives to encourage tourists to use alternative modes of transportation to automobiles, to regulatory instruments such as restrictions or bans (CIPRA 2010). They also include the enhancement of environmentally-friendly transport, promoting the use of public and low-emissions transport and fostering bicycle tourism, as well as mobility planning and awareness-raising initiatives.

Regarding traffic congestion, particularly along mountain passes, Scuttari & Bassani (2018) identify four key measures for managing mobility in these areas: the introduction of toll

systems, the strategic planning and management for parking facilities at the passes, the coordination of tourist activities with transport services, and the implementation of traffic closures. Toll systems, even if they may contribute to the economic sustainability of mobility management, do not necessarily reduce traffic volumes or associated impacts (Scuttari & Bassani 2018). In order to be effective, they should be accompanied by other measures, including proper promotion of the territory, alternative mobility options, and limitations on vehicle numbers. Similarly, the regulation of parking facilities can serve as a tool to control visitor numbers and discourage private car use through parking fees (Scuttari & Bassani 2018). However, the mere availability of parking infrastructure may implicitly encourage car use, thereby discouraging public transport. At the same time, excessively high fees may incentivise short stops and increase the number of vehicle passages, leading to the opposite result and exacerbating traffic pressure.

The coordination of tourism-related activities and mobility aims to encourage the use of public transport through integrated strategies (Scuttari & Bassani 2018). These include the provision of additional bus stops in proximity to the hiking trails, the improvement of transport infrastructure to ensure the continuity and reliability of services, and the introduction of tourist cards that combine public transport with complementary services such as restaurants, cableways and rental facilities.

Finally, traffic closures represent one of the most effective measures for reducing both environmental and social impacts, while enhancing the quality of the tourist experience by limiting the number of vehicles accessing the area (Scuttari & Bassani 2018). However, this strategy, in order to effectively reduce traffic congestion, should be accompanied by adequate coordination and promotion of public transport alternatives, and the timing of closures should align with periods of highest traffic intensity. A similar approach is the implementation of controlled or limited access systems, including temporary closures during peak periods or events, in order to prevent congestion and mitigate related pressures.

Concerning energy management, reducing CO2 emissions and promoting renewable energy are key priorities (CIPRA 2011). In this context, CIPRA highlights the need for measures allowing a more efficient management and use of energy resources. A central issue is the provision of heating and hot water in tourist accommodations and second homes, which account for the majority of energy consumption. Mitigation strategies should include the modernisation of heating systems, the reduction of indoor temperatures, the installation of thermomechanical systems, and the implementation of renewable energy.

2.1.4 Institutional recommendations

Since the late 20th century and the early 2000s, institutions have highlighted the need to rethink tourism development models in the Alps in response to climate change. In 2002, in the second Report of the State of the Alps, CIPRA already recognised the challenges that climate change poses to the tourist sector, particularly to ski resorts, stressing the urgency for tourist destinations to adopt alternative adaptation strategies to address the ongoing and future changes. Similarly, the 2011 Compact emphasised the importance of Alpine tourism to better align with evolving climatic conditions and to promote more sustainable patterns of growth in the tourism industry. The Tourism Protocol of the Alpine Convention (2005) further reinforces this perspective by highlighting the central role of sustainable development in Alpine regions where tourism represents a key economic pillar. Its objective is to promote a tourist model that valorises the natural and cultural heritage of the Alps while respecting environmental limits and local communities. This necessity has become even more evident following the COVID-19 pandemic, which exposed the vulnerability of the tourist sector to external factors and emphasised the importance of transitioning to more sustainable and resilient tourism models (CIPRA 2021).

The position of institutions such as CIPRA and the Alpine Convention is thus clear: socio-economic development and the promotion of sustainable tourism are necessary to ensure a future for Alpine tourism (CIPRA 2017). Building on this vision, they outlined a series of recommendations and measures to guide mountain destinations and governance toward more resilient and sustainable alternatives.

Firstly, for tourism to be sustainable, it should operate within limits, respecting both social and natural resources (CIPRA 2017). As highlighted in the Tourism Protocol (Alpine Convention, 2005), tourist development must be undertaken with full respect for and protection of the environment and the landscape, and with due regard to the specific characteristics and available resources of the area. This requires the adoption of innovative and holistic approaches capable of valorising the natural and cultural Alpine heritage while fostering interconnections between tourism and other economic sectors, such as agriculture, craftsmanship, education and wellness-related activities (CIPRA 2017). Following this perspective, another key point is to prevent the expansion of tourism exploitation into glaciers and other untouched territories. A decline in snow reliability should not lead to increased exploitation of Alpine environments for the construction or expansion of ski resorts. Connecting ski areas, as highlighted by CIPRA (2017), not only significantly impacts the environment but is also not economically advantageous, as it does not guarantee an increase in visitor numbers. Tourist development must thus be

accompanied by territorial planning and visitor flow management in order to preserve the environment and landscape, ensuring that tourism respects ecological thresholds (CIPRA 2025).

Regarding ski lifts and slopes, the Alpine Convention (2005) recommends implementing strategies aligned with economic, environmental, and landscape needs, prioritising the dismantlement of existing infrastructure and promoting rewilding. Likewise, developing, maintaining, and using ski slopes should consider the landscape and natural balance.

Another essential measure is to reduce CO2 emissions and traffic congestion, promoting forms of sustainable mobility (CIPRA 2025). The guiding principle is "avoid, shift, reduce," limiting transport capacity where necessary to meet ecological and social limits, strengthening public transport, and offering incentives for car-free journeys. The aim is to reduce traffic volumes by encouraging the use of environmentally friendly means of transport and strengthening the existing transport infrastructure (Permanent Secretariat of the Alpine Convention 2022).

To ensure the effectiveness of the transition to sustainable tourism, CIPRA (2017) emphasises the need to re-examine subsidy policies, given the significant role that financial support plays in shaping tourist development. Therefore, public funding should be directed towards strategies that promote sustainable and innovative approaches, fostering the diversification and reconversion of tourist activities and supporting destinations in transitioning from snow-dependent tourism to alternative models (CIPRA 2025). Continued investments in technological measures, such as snowmaking systems, only increase dependence on the ski industry rather than enhancing the resilience of Alpine destinations.

2.1.5 From guideline to implementation

Despite the continuous recommendations from various institutions, discourse on tourism development in Alpine regions remains dominated by ski operators who insist on consolidating ski tourism and maintaining the status quo by investing in technological solutions such as artificial snow, while underestimating the potential for diversification (CIPRA 2011). In this context, the priorities of many ski destinations appear evident: rather than using climate change as a catalyst to diversify tourism offerings and develop alternative and more resilient models, it has primarily been invoked to justify the expansion and reinforcement of ski-industry infrastructure and services (CIPRA 2002). This results in the persistence of a tourist model that is increasingly incompatible with climatic and environmental conditions and that continues to rely on strategies which, rather than mitigating environmental and social impacts, tend to exacerbate them. It is thus appropriate to refer to tourist overexploitation, with the Alps serving as an example of unsustainable and destructive development pathways (CIPRA 2007). As noted

by CIPRA (2011), the uncritical perpetuation of a unilateral development model fails to acknowledge the heterogeneous nature of mountain territories. By concentrating on a single resource, such as snow and ski-related activities, this approach reinforces dependence on massive investment and sustains a monocultural economic model.

The urgency of rethinking current tourism models is further reinforced by evolving patterns of tourist demand. Throughout the 2024/2025 winter season, although Alpine skiing remained the predominant activity, both time spent on ski slopes and the number of Alpine skiers declined significantly, accompanied by a growing interest in other activities, including cross-country skiing, ski mountaineering, and snowshoeing (Legambiente 2025). These trends highlight the need to embrace ongoing transformations by promoting new tools and approaches that better align with the complex relationship between nature, climate, and society (Bonardo 2025).
In response to these challenges, many tourism operators, institutions, and associations adopted more sustainable tourism approaches and developed new models of mountain development (Casanova 2020). This shift led to the implementation of several best practices across the entire Alpine arc and in many Apennine destinations. “They are virtuous examples”, as stated by Casanova (2020, p. 104), demonstrating that a zero-impact and quality tourism is possible, one that respects the environment, “without further artificializing the mountains and without wasting considerable amounts of energy, water and land”. They are valuable local development initiatives that encourage the ski industry to recognise the limits of mountain environments and to rethink winter tourism, given the challenges the Alps are facing. The initiatives implemented support the transition to a slower and more sustainable approach to tourism, addressing the crisis of the contemporary development model and encouraging an ecological transition (Legambiente 2025). They exemplify what, in the previous chapter, was defined as the third way, effectively combining the economic, social, and environmental dimensions.

Nevertheless, despite these diversification efforts, public funding remains largely concentrated on technological adaptation measures aimed at sustaining the ski industry (Legambiente 2025). In light of multiple challenges and negative impacts affecting mountain territories, the continued allocation of resources to expanding ski infrastructure seems inappropriate. Rather than supporting economically unstable measures, strategies should be oriented towards more innovative projects (CIPRA 2011). This issue is particularly critical when public funds are involved, as their allocation should consider and adhere to multiple criteria, such as profitability, sustainability, and climate compatibility. As observed by Lacasella (2025),

investments should be directed toward human capital in order to foster innovation and support the development of place-based strategies in close cooperation with local communities.

From this perspective, the development of alternative tourism models becomes essential to overcoming the vulnerabilities associated with tourism monoculture and enhancing territorial resilience (Lacasella 2025). More holistic and integrated approaches are required, aimed at diversifying tourist offerings, reducing dependence on snow conditions and promoting nature-based and summer activities (Beggiolini et al. 2023). Diversification initiatives that are properly developed and incentivised have the potential to facilitate the transition to alternative, more sustainable tourism models in both winter and summer seasons (Casanova 2020). This approach also calls for collaboration and innovation, fostering a vision capable of integrating environmental protection and sustainable territorial development (Bonardo 2025). This transition not only contributes to climate change adaptation and mitigation but also represents an opportunity to transform tourism into a competitive advantage capable of renewing offerings and attracting visitors who are more environmentally and socially conscious (Casanova 2020).

2.2 The role of spatial planning

In light of these considerations, the reorganisation of governance structures and the development of coherent territorial planning strategies emerge as equally important dimensions. The Alpine Convention identifies spatial planning as a key instrument for ensuring balanced land use and fostering sustainable development (CIPRA 2002). As highlighted in the Spatial Planning and Sustainable Development Protocol (1994), its primary objectives include integrating resource use with ecological needs and encouraging development strategies that are compatible with the environment and the interests of local communities. In light of climate change and the increasing frequency of natural hazards in the Alpine region, spatial planning thus assumes a central role in territorial and resource governance, guiding institutions towards more integrated and innovative visions, fostering intersectoral synergies, and setting limits to mass tourism development. Moreover, given the impacts of climate change on land use and ecosystems, spatial planning can significantly contribute to both mitigation and adaptation strategies by coordinating sectoral policies and influencing long-term land-use trajectories (Kruse & Pütz, 2013). The importance of spatial planning is further emphasised in the *Action Plan on Climate Change* (2009), which highlights its role in promoting resilience to the current and future climatic conditions while supporting sustainable development across economic activities.

The Alps are characterised by very heterogeneous land-use patterns, which are strongly constrained by topographic conditions (Chilla et al. 2024). As observed in the previous chapter, during the Middle Ages, mountain communities developed an environmentally sustainable model of local development, integrating anthropogenic landscapes with natural environments and achieving a balanced coexistence between natural resources and human activities (CIPRA 2002). With modernisation and industrialisation, this balance is deteriorating, leading to conflicts over land use among sectors such as settlements, agriculture, tourism, and transportation infrastructure. Within this context, two contrasting trends can be identified. On one hand, signs of underdevelopment are evident, characterised by depopulation and the abandonment of agricultural practices; on the other hand, mass tourism and settlement development lead to the overexploitation of natural resources and environmental deterioration. These dynamics indeed contribute to the progressive loss of agricultural land in favour of residential developments and tourist infrastructure. In particular, the continuous expansion of tourist facilities intensified the overexploitation of natural resources and the occupation of open spaces[7] (Chilla et al. 2024). The resulting reduction of open spaces in the Alpine territory may lead to several negative impacts, including soil sealing, landscape and habitat fragmentation, and increased traffic volume (Hasslacher et al. 2022). It therefore becomes clear that the existing development and spatial planning approaches do not align with the complexities of the Alpine region (CIPRA 2002). Spatial planning is often absent in numerous national and territorial governance frameworks and when present, it tends to address only specific elements rather than all pertinent factors. This calls for a more integrated and strategic framework capable of adequately balancing environmental, social, and economic interests. The development of sustainable development strategies, particularly within the tourism sector, is essential, highlighting the central role of spatial planning and destination management in addressing pressures arising from rising tourist demand, climate change, and resource exploitation (Chilla et al. 2024). Moreover, in the Alpine region, spatial planning is embedded within a multi-level governance system involving different policies and institutional levels (Meyer et al. 2022). As a result, regulations and planning instruments vary considerably across Alpine countries,

[7] Generally, open spaces refer to areas characterised by a limited degree of anthropogenic intervention (Meyer et al. 2022). In the context of spatial planning, the concept does not imply the exclusion of human use, but rather the limitation of intensive forms of land use. Open spaces can therefore be defined as "areas outside housing/settlement areas, commercial/industrial areas and other special designated areas (e.g. golf courses and leisure parks) that are kept free from building developments of any kind, which are not predominantly developed (punctual, linear or planar infrastructure) and are widely free of soil sealing, ideally free of traffic or largely reserved for non-motorised traffic and thus noise free. Technical infrastructures not belonging to the landscape structure are either non-existent or hardly existent" (Meyer et al. 2022, p. 17). The function of open space is "the protection and guarantee of the natural foundations of human life (soil, water, climate, air, landscape, fauna and flora) and the functionality of the ecosystems (conservation and regeneration)" (Hasslacher et al. 2022).

operating at different administrative levels and under different legislative frameworks and resource constraints. It is thus fundamental to develop effective approaches and strategic guidelines for spatial development by involving both the public and all stakeholders.

2.2.1 Spatial planning as a tool for sustainable development

Despite this heterogeneity, a set of guiding principles can be identified to ensure a balanced integration of economic, environmental and social dimensions. First of all, the role of human settlements in the conservation of Alpine ecosystems must be acknowledged; at the same time, processes of urbanisation should be regulated through land-use planning principles in order to avoid further damage on agricultural areas (CIPRA 2002). Similar considerations apply to other economic activities, particularly tourism and transport, whose infrastructures require clear limits and careful management to prevent environmental and social impacts. Moreover, large-scale infrastructural development, such as road and ski lift construction, should be replaced or complemented by more environmentally compatible solutions, aimed at reducing traffic volumes and the expansion of ski areas. Finally, strengthening interregional cooperation and ensuring the active involvement of local communities are essential to develop place-based development strategies (CIPRA 2002).

Regarding the management of intensive tourism development, spatial planning plays a crucial role in defining development limits, identifying priority areas, and establishing clear criteria for the expansion of tourism-related projects. Its objective is to regulate and reduce the proliferation of tourism infrastructure in order to prevent environmental degradation (Meyer et al. 2022). Planning regulations should therefore not only determine whether infrastructure development is tolerated in a given area, but also under which conditions, with particular attention to nature conservation objectives, economic viability, and climate change adaptation. In this sense, spatial planning represents a key factor for preserving the environment and natural areas from the long-term effects of overtourism and overexploitation (Meyer et al. 2022). Spatial planning also plays a fundamental role in safeguarding landscape and environmental qualities by limiting the expansion of technical infrastructures and reducing anthropogenic footprint. This latter aspect is particularly critical for maintaining valuable ecosystem functions and biotope networks, which are increasingly exposed to development pressures (Meyer et al. 2022). Spatial planning strategies should therefore be developed in order to balance the landscape transformation and use with the protection of the environment (CIPRA 2002).

Building on these principles, spatial planning strategies can be differentiated according to territorial structure, spatial characteristics and the specific challenges faced by the Alpine regions. For the purposes of this thesis, the analysis will focus on mountain areas characterised by low levels of fragmentation as well as territories that have been significantly modified by tourist development or that are experiencing a progressive intensification of recreational use. In both cases, increasing pressures derive from tourism expansion, existing facilities and ski slopes and the construction of new infrastructure (Meyer et al 2022).

Mountain areas considered near-natural are often subject to nature conservation regulations aimed at limiting or prohibiting building and infrastructure development, such as in natural parks or Natura 2000 sites. In this context, spatial planning plays a crucial role in reinforcing and safeguarding fragile areas. Moreover, spatial planning is a key instrument for preserving Alpine open spaces by establishing quiet areas, enabling nature-based recreation activities, and preventing the emergence of intensive tourism development patterns (Meyer et al. 2022). On the other hand, territories that are more intensively modified by tourist development are affected by landscape alteration and environmental degradation. In particular, the ongoing expansion of existing ski areas exerts additional pressure on already fragile ecosystems, thereby representing one of the most critical challenges faced by many Alpine regions. In this sense, spatial planning should define clear development boundaries and, in light of climate change, prioritise the reduction of risks and environmental pressures. Equally important is the adoption of an integrated approach that combines spatial planning with visitor management strategies, initiatives to raise awareness about environmentally responsible recreational practices and the dissemination of good examples and models (Meyer et al. 2022). Therefore, in addition to spatial planning regulations, complementary governance measures should also be implemented, including financial support instruments and communication-oriented approaches.

2.2.2 Spatial planning as a tool for regulating tourism development

There are many examples of policies and good practices that Alpine regions have implemented in order to preserve open spaces and limit tourism growth, especially in fragile areas, through spatial planning strategies.

A relevant example aimed at regulating tourism development is the Alpine Plan, part of the Bavarian State Development Programme adopted in 1972. The plan was designed to regulate infrastructure development in the Bavarian Alps, including roads, cableways, ski lifts, and ski slopes (Hasslacher et al. 2022). Its primary objective is to integrate residential and economic

land use with recreational and tourism activities, while ensuring the protection of the natural environments. One of the most innovative aspects of the Alpine plan lies in its territorial approach. Spatial planning and decision-making processes are not conducted on a case-by-case basis; land-use is assessed across the whole Bavarian Alpine territory.

The area is subdivided into zones based on existing land use patterns, ecological characteristics, and long-term development perspectives (Hasslacher et al. 2022). Therefore, each zone represents a specific area with distinct functions and development opportunities. Zone A comprises areas characterised by settlements and intensive land use and is therefore considered suitable for infrastructure development for residential purposes, tourism growth, and other recreational activities. Zone B serves as a buffer zone, where development projects are permitted only under specific conditions and requirements, giving particular attention to environmental impacts. Finally, Zone C, also known as the Alpine quiet area, is designated as a protected area. In this zone, development projects are limited and prohibited, except for interventions necessary for agricultural, forestry, or landscape purposes. From a tourism perspective, only non-intensive practices, such as hiking, cycling, and cross-country skiing, are permitted. Overall, the Alpine Plan has made a substantial contribution to protecting the Alpine environment from overexploitation and the expansion of intensive tourism infrastructure, while not undermining the viability of tourism activities (Hasslacher et al. 2022). By enforcing clear spatial limits on tourism growth, the plan has played a key role in safeguarding natural areas and significantly reducing the development of new ski areas (Barker 1994). However, this approach has not prevented the progressive expansion of existing ski areas, where capacity has increased over time through the modernisation of lifts, emphasising the need for continuous adaptation and the importance of spatial planning strategies.

Another example of a spatial planning strategy implemented in the Austrian Alps is the Tyrolean Quiet Area. According to the Tyrolean Nature Conservation Act:

> "Quiet areas are situated outside built-up areas and are particularly suitable for peaceful recreation and relaxation. They are free from noise-generating enterprises, public passenger transport and public roads. They are characterised in particular by clear bans with no exceptions: no establishment of noise-generating enterprises, no installation of cable car tracks for public transport, no ski lifts, no new roads for public transport, no significant noise generation and no off-field landing or take-off motorised aeroplanes for tourist purposes" (Hasslacher et al. 2022, p. 29).

Quiet Zone, thus defined, marked the limit of infrastructural tourism development, serving as a useful tool for safeguarding open spaces and natural areas and for limiting ski areas. Eight quiet areas were approved in Tyrol by the federal state government, covering a territory of 1,370.94 km2, representing the 10.84% of Tyrol's land, most of it in Alpine regions. It has been demonstrated that the Tyrolean Quiet Zone significantly helped in protecting fragile Alpine environments and defining spatial limits to intensive tourism (Barker 1994).

However, despite the positive outcomes achieved with the Alpine Plane and the Tyrolean Quiet Areas, their effectiveness remains constrained by the lack of cross-border coordination. Because Alpine ecosystems and tourism dynamics transcend national administrative boundaries, fragmented spatial planning undermines environmental protection measures. This structural limitation thereby underscores the necessity for a coordinated Alpine spatial planning strategy, particularly in relation to tourism development and the preservation of Alpine regions (Hasslacher et al. 2022). CIPRA (2002) emphasised the importance of establishing shared objectives and specific measures to be adopted, with the aim of using available resources more efficiently and in a coordinated manner.

2.2.3 The right to access mountain areas

Another important issue concerns the right of access to mountain areas. This right is closely linked to the concept of freedom and the considerations regarding whether and how to experience the mountains and is grounded in principles such as inclusion and individual responsibility (CAAI, n.d.).

Across all Alpine countries, national legal frameworks recognise and guarantee the right of individuals to access mountain environments for recreational purposes (CIPRA 2002). However, the emergence of mass tourism and the intensification of tourist flows have fostered largely unrestricted access to mountain areas, often pushing human pressure beyond ecologically acceptable limits (Crovella 2020). In the context of increasing resource overexploitation, environmental pressure, and growing land-use conflicts, the right of access is therefore increasingly being questioned, prompting broader reflection on who has the right to access mountain areas and whether it is an absolute right. As a result, access limitations are expected to become more widespread, driven by rising environmental awareness and the challenges posed by overtourism, with the aim of preserving natural environments and reducing anthropogenic pressure on mountain territories. Within this context, the introduction of regulatory measures becomes necessary. The concept of limits thus becomes central once again,

with limits on transport, cableways, tourist numbers, and access to hiking tracks (Bussone 2022).

One commonly adopted approach involves restricting or prohibiting access to specific areas, which are often accompanied by entry fees (Crovella 2020). These measures are intended to balance the right of access with environmental protection objectives, ensuring the long-term conservation of fragile mountain ecosystems. Such strategies have been adopted in several destinations in the Dolomites, including Lago di Braies, Val Gardena, and Madonna di Campiglio, where access to hiking trails and ski slopes is regulated through booking systems to reduce overcrowding and associated environmental pressures. The aim is thus to align tourist development with environmental conservation, promoting a more sustainable use of mountain territories.

However, these strategies often conflict with the freedom of individuals to access mountain areas and practise outdoor activities, leading to debates about whether limiting freedom is effectively democratic (Bussone 2022). Starting from this assumption, the other approach argues that imposing access bans is unfair and that each individual has the right to freely access all mountain areas, favouring human needs over environmental necessities (Crovella 2020). Considering the progressive degradation of the natural landscape and ecosystems, and the impacts of climate change, this option is long-term unsustainable, and the absence of bans and limitations will only contribute to irreparably damaging mountain environments and increasing natural hazards. As highlighted by Bussone (2022), the need for new legislation and cultural frameworks for mountain territories is evident, ensuring that safety, environmental protection, and freedom are adequately addressed. It is fundamental to reflect on the kind of local development and tourism that is desired for the territories (Andreazza 2022). The limitations should not be understood as a form of exclusion but as a necessity to protect the environment and mitigate the impacts of climate change. As Andreazza (2022) observes, if the experience is mediocre, its quality value diminishes; but more importantly, it jeopardises the safeguarding of a territory that we have only on loan, and that is constantly put at risk. Public debate has often seen overtourism as a phenomenon predominantly impacting urban or coastal destinations. However, mountain regions are equally exposed to these dynamics and therefore require a profound cultural rethinking of how they are accessed, experienced, and governed. Within this framework, spatial planning and visitor management strategies play a crucial role in translating this cultural transformation into effective practice. By controlling access and establishing land-use regulations, it is possible to reconcile the right to access mountain areas with environmental protection and the preservation of the quality experience.

Austria provides a particularly exemplary case in this regard, where conflicts among hunters, forest services, mountaineers, hikers, and other user groups have challenged the principle of free access to mountain areas, which was established in 1975. These tensions arise from opposing claims over land use and concerns that sport and tourism activities are exerting pressure on the natural environment, thereby necessitating limitations (CIPRA 2002). As a result, new protected zones and restricted hunting areas were designated, alongside the implementation of tourist flow management systems. By 2000, approximately 45% of Austrian territories had been classified as restricted-access zones, characterised by bans on leaving the marked hiking track, on hunting activities, and on general access. The example of Austria demonstrates that, in mountain regions, safeguarding natural environments and preventing resource degradation often require the introduction of access limitations.

Such measures can be effectively implemented through spatial planning instruments and the coordinated involvement of all relevant stakeholders. In this sense, spatial planning emerges not as a mechanism to restrict rights per se, but as a governance tool that combines different interests and reconciles public access with long-term environmental protection (CIPRA 2002).

2.3 The role of institutions and legal frameworks

As discussed above, adaptation and mitigation strategies should be accompanied by more integrated approaches and by an evolution in mountain governance. This need becomes particularly important in the context of climate change and increasing environmental and social pressures affecting Alpine regions.

2.3.1 The Alpine Convention and the pursuit of sustainable development

The Alps constitute a highly heterogeneous territory, characterised by complex landscapes and diverse natural, cultural and socio-economic features (CIPRA 2002). Consequently, Alpine policy frameworks must consider all interests and stakeholders involved in addressing the challenges related to tourism development, demographic growth and resource management. As highlighted by CIPRA (2002), well-implemented and coherent Alpine governance has the potential to foster sustainable development pathways that are able to take into account the specific needs and characteristics of individual territories. Within this framework, the Alpine Convention emerges as a key instrument for supporting transnational cooperation, policy alignment, and coordinated action, particularly in guiding the tourism sector towards more sustainable and resilient development models.

The concept of Alpine governance emerged in the early 1970s, when environmental organisations began to denounce the growing ecological pressures on the Alps resulting from tourism development, urban expansion, and increased traffic volumes (CIPRA 2002). These concerns highlighted the need to promote collaboration among Alpine regions and for the establishment of shared policy frameworks and coordinated actions. This process ultimately led to the creation of the Alpine Convention. For the first time, the Alps were recognised as an integrated territorial system, fostering the implementation of joint initiatives and projects, as well as the creation of transnational networks. Through the Framework Convention, the signatory countries have committed in "pursue a comprehensive policy for the preservation and protection of the Alps by applying the principles of prevention, payment by the polluter and cooperation, after careful consideration of the interests of all the Alpine States" (1995, p. 55), agreeing in specific objectives in several sectors, including tourism, transport, spatial planning and environmental protection.

However, despite the stated intentions and objectives of the Alpine Convention, the continued degradation of the landscape, the decline of traditional economic practices and the ongoing expansion of tourist infrastructure demonstrated an evident failure to achieve the objectives defined in 1995 (CIPRA 2002). This highlights the need to move beyond declaratory principles and to translate the objectives into tangible, measurable outcomes (CIPRA 2011). Only through concrete actions can the Convention strengthen its credibility and political relevance, thereby demonstrating the importance of a coherent and effective common Alpine governance. In this perspective, the Alpine states should cease to perceive the Convention as an "annoying document for environmental protection" and instead integrate its principles into the core of policy and decision-making processes and promote development projects aligned with sustainability goals.

A central limitation of the Alpine Convention is its non-binding nature, as it lacks enforcement mechanisms or sanctions for non-compliance (Camanni 2024). As a result, signatory countries have often disregarded the guidelines, particularly regarding transport, tourist infrastructure development and soil and resource consumption, thereby ignoring the limits established in the Protocols and jeopardising the transitions towards more sustainable development models. Moreover, the potential of integrated and transnational approaches promoted by the Alpine Convention has frequently been undervalued or perceived as a restriction and a top-down imposition on national legal and administrative independence, as well as on economic development, with environmental protection being favoured over the other sectors (Camanni

2024). This resistance has further limited the effectiveness of the Convention, highlighting the tension between supranational governance interests and national development priorities.

2.3.2 The role of non-governmental organisations

In light of the limited effectiveness of the Alpine Convention in ensuring the implementation of the objectives established in its various Protocols, non-governmental organisations and transnational collaborative networks across the entire Alpine arc have assumed an increasingly significant role. The political importance of the Alpine Convention has been progressively decreasing, as Del Biaggio (2009) observed, and networks have sought to compensate for institutional gaps by fostering coordination, knowledge exchange, and bottom-up initiatives to translate the principle of the Convention into concrete actions (CIPRA 2002). Among these initiatives, interregional working communities were established with the aim of overcoming territorial fragmentation and cultural and linguistic division, thereby strengthening coordination across borders. Prominent examples include Arge-Alp, Alpe-Adria Working Community, and the Working Community of the Western Alps. Another example of network-based cooperation is the Alliance in the Alps, an association that brings together local authorities and regions across the Alpine area, including around 300 municipalities. Its primary objective is to implement the Alpine Convention on the local level by promoting sustainable development practices and place-based strategies (CIPRA 2002). Through the adoption of shared environmental policy principles, local administrations aim to develop coherent and concrete actions aligned with the objectives of the Convention. The Alliance seeks not only to safeguard and enhance the natural and cultural landscapes but also to strengthen climate adaptation, support local economic resilience, and reinforce the attractiveness of Alpine territories through cross-border projects (Alliance in the Alps, n.d.). In this context, its role in providing support and expertise, and as a representative body for municipal interests, facilitates coordination among local organisations and fosters the active involvement of local communities.

Public debates on Alpine networks often emphasise their role in sharing experience and expertise (Del Biaggio 2009). However, this reflects a broader ambiguity regarding their political relevance. In principle, working communities bring together regions with operational and legislative competencies, which should enable them to act autonomously in the development and implementation of cross-border measures (CIPRA 2002). In practice, the absence of formal decision-making authority and dedicated financial resources significantly limits their political influence. As a result, their role often remains marginal and confined to consultation, coordination, and knowledge-sharing, rather than extending to executive or

regulatory functions. Consequently, their capacity to act as empowered governance actors remains limited. As CIPRA (2002) observed, the potential of working networks is substantially reduced by their lack of tangible competencies and adequate resources, which prevents them from translating dialogue into structural change. Within this context, Alpine networks aim to move beyond technical exchange and to strengthen their political voice and their institutional positioning within multi-level governance systems. To improve their effectiveness and capacity, there is a need for clearer mandates, greater institutional recognition, and more consistent allocation of resources that connect normative principles with operational strategies.

2.3.3 Financial priorities and the contradictions of sustainable development policies

A broader reflection is needed on financial support mechanisms and resource allocation, as significant discrepancies often emerge between the objectives formally defined in strategic plans and the actual distribution of public funds.

As early as 1996, CIPRA urged the Alpine countries to implement the Convention Protocols and to provide adequate financial resources to translate the agreed objectives into concrete action (CIPRA 2002). Regarding tourism development, the Tourism Protocol explicitly states that contracting parties should, where possible, promote only those projects that respect the landscape and are environmentally compatible. Accordingly, in allocating incentives, states are called upon to consider ecological requirements both in the development of new tourist projects and the expansion of existing tourist infrastructure. However, although financial strategies are required to consider environmental safeguarding and sustainable development in the elaboration and implementation of tourism projects, these principles frequently conflict with other sectoral interests, relegating environmental considerations to a secondary role in favour of economic interests (CIPRA 2007). A similar dynamic characterises the public debate, in which climate change is often marginalised or overlooked, despite multiple pieces of evidence of its impacts on mountain territories (Legambiente 2023). As Andrea Omizzolo, cited by Baumgartner (2024), highlights, many destinations continue to ignore the issue, as if refusing to acknowledge or discuss it might make it disappear. Consequently, public funds are often allocated without considering this phenomenon, as climate change did not exist. In 2025, 218 ski areas in Italy were classified as subject to “therapeutic obstinacy”, meaning that they continue to receive financial support despite their structural fragility (Legambiente 2025). Yet, despite the continuous financial injections, many of these areas are destined to die, revealing the inadequacy of institutions to effectively address current challenges. As Omizzolo further argues (Baumgartner 2024), this persistence reflects above all a political choice. Politics lacks a clear vision of the future, hindering its ability to take the necessary decisions to address

climate change challenges efficiently (Legambiente 2023). This lack of strategic foresight represents one of the most critical challenges, both politically and across society as a whole, where resistance to change delays the transition towards more resilient development models.

In Italy, the National Strategy for Adaptation to Climate Change (SNACC), adopted in 2015, defines the national framework for addressing climate change. The strategy identifies the actions and key principles aimed at minimising the impacts of climate change, protecting public well-being, preserving the natural heritage, and promoting adaptation strategies that enhance resilience in the face of new climatic conditions and related challenges. With specific regard to tourism in the Alpine and Apennine regions, the SNACC outlines a range of measures intended to support the diversification of tourist activities, with particular focus on winter tourism and the ski industry, in response to the progressive decline in snow reliability and the increasing vulnerability of snow-dependent destinations (Legambiente 2024). In this perspective, diversification strategies and adaptation initiatives should be prioritised over other measures, promoting low-impact practices and encouraging the exchange of good practices across mountain regions (SNACC 2015). Moreover, the strategy highlights the need to strengthen the monitoring and analysis of tourist flows and the economic performance of ski resorts by collecting more accurate data and applying cost–benefit analyses. Considering the infrastructural development, SNACC (2015) emphasises that revitalising and supporting ski facilities should consider their feasibility, profitability and snow cover conditions. Ultimately, the success of adaptation measures depends on the quality of governance processes, which need better coordination, transparency, and long-term strategic alignment in the execution of climate policies. Similarly, the Italian Tourism Strategic Plan for the period 2023-2027 states that actions should aim to diversify tourist practices and favour year-round activities. The promotion of sustainable practise should thus be a priority, reducing the energy and water consumption, safeguarding and valorising the intangible heritage, and implementing strategies to periodically evaluate the impacts of tourism on the local communities and environments. Given these objectives, financial support mechanisms are therefore expected to favour projects that promote a renewed vision of mountain development centred on sustainability, reduced environmental pressure, and greater seasonal balance in tourism demand.

In light of these considerations, it might reasonably be assumed that national and regional strategies, as well as broader tourist measures, would prioritise diversification strategies and environmentally sustainable activities. However, this is not the case. In 2024, the Italian Ministry of Tourism allocated approximately 148 million euros to the expansion and

modernisation of snowmaking systems and ski lifts, compared with four million euros for the promotion of sustainable tourism (Legambiente 2024). In addition to these funds, the Italian Law n. 197 (2022) allocated approximately 200 million euros over the period 2023-2026 to ski lift operating companies for modernisation, maintenance, and restoration interventions (Mountain Wilderness Italia 2023).

In Piemonte, public subsidies allocated to snowmaking systems increased from around 29 million in the 2022-2024 period to 32 million in 2023-2025. A similar trend can be observed in Veneto, Lombardia, and Trentino-Alto Adige, where substantial public funds have been invested in the modernisation and maintenance of ski resorts, the expansion of snowmaking systems, the construction of artificial water basins, and the development of interconnections within ski areas. In Veneto, around 33.5 million euros were allocated to connect the Civetta Ski Area to the Cinque Torri area and to create new artificial basins for snow production. Lombardia allocated over 14 million euros to Valmalenco for a new ski lift, presented as a project for requalification and sustainable development, without considering the snow cover conditions of the area, which are progressively decreasing (Mountain Wilderness Italia 2025). In Trentino, the eligible expenditure for snowmaking systems increased from 2 to 2.5 million euros and around €8 million was invested in constructing a new ski lift in the Alpe Lusia ski area (Legambiente 2024).

The institutional approach to climate change and tourist adaptation thus appears clear. Public funding continues to be predominantly directed toward supporting large ski areas and revitalising low-altitude resorts where snow cover is expected to decrease each year. Environmental and economic sustainability considerations often remain secondary, while priority is given to new infrastructure development rather than improving existing facilities or diversifying tourism offerings. These patterns reveal the inability of public institutions to effectively address and adapt to climate change, relying on obsolete, inefficient strategies and delaying structural transformation. The current strategies perpetuate economically and environmentally unsustainable trajectories while underestimating the potential of diversification and long-term resilience measures.

2.4 Good practices in the Alps

In light of these considerations, adaptation strategies, particularly when integrated with coherent spatial planning policies, emerge as crucial instruments for fostering more sustainable and resilient models of tourism. They offer the opportunity to promote a renewed vision of mountain territories, capable of balancing environmental limits and economic activities and

pursuing the so-called third way outlined in the first chapter. However, the implementation of this paradigm shift often remains theoretical. In many cases, institutional actors persist in preserving the status quo, failing to acknowledge the challenges imposed by climate change and the progressive decline of the ski industry. This results in the continued allocation of public resources to short-term and technological solutions, thereby reinforcing development models that appear increasingly unsuitable in the current context.

Against this backdrop, several examples across the Alpine arc demonstrate that alternative development models exist and can be effectively implemented. These cases of good practices reveal that tourist activities can align with environmental and social necessities, challenging the assumption that ski-related tourism models are the only feasible for mountain regions. As highlighted by Vanda Bonardo (2024), such experiences of alternative tourism embody "a new model of living and experiencing the mountains in the era of climate change, where the common thread is the ability to innovate the tourist offer, diversifying the activities in harmony with the valorisation of natural environment, local expertise and the historical and cultural heritage".
Within this perspective, the cases of Dobratsch and Val d'Isère offer particular insights, demonstrating how reconversion and requalification strategies, combined with institutional reorientation, can translate the principles of sustainability and resilience into concrete practices.

2.4.1 Dobratsch (Austria)

The case of Dobratsch constitutes a significant example of reconversion in mountain tourism within the broader context of climate change adaptation. The Dobratsch region, near the municipality of Villach, had long been exploited for its mineral resources and saw the construction of a ski resort in the 1980s. However, the resort remains relatively small and insufficiently equipped in terms of ski lift infrastructure to attract tourists and remain competitive within the Alpine ski market (Isonio 2020). As reported by the project manager of the NaturPark Dobratsch, Alex Kleinegger, cited by Clavarino (2020), the accounts of the resort had been in deficit for several years, primarily due to high maintenance costs and the progressive decline of annual lift ridership, which fell from approximately one million passages in 1991-1992 to around 100,000 in the 2000-2001 season. Plans to expand and modernise the ski area, including the installation of artificial snowmaking systems, were considered. However, in front of environmental protection regulations and the presence of numerous water sources, crucial for supplying drinking water to nearby municipalities, ultimately prevented their implementation (Naturpark Dobratsch n.d.). Given this context, local authorities, rather than continuing to invest in a snow-dependent, unsustainable model and to reinforce the ski industry,

opted for a requalification process for the area. The strategy focused on diversifying tourist activities and promoting slow tourism practices, including trekking, mountain biking, and mountaineering, thereby reducing reliance on ski-based infrastructure (Legambiente 2020). The most innovative and symbolically significant aspect of this project, however, was the dismantling of the ski lifts, followed by the institution of the Natural Park of Dobratsch in 2002, the first to be established in Carinthia (Clavarino 2020). This decision was the result of increasing environmental concerns, the need to safeguard ecologically sensitive areas, and a strategic reorientation towards a more sustainable use of the territory. The transition thus marked the abandonment of a tourism paradigm centred on the continuous expansion and modernisation of ski facilities, expressing a will to shift to a less intensive, environmentally compatible model of tourism and mountain development, aligned with ecological limits and climate change-related challenges and privileging natural resources over economic purposes. As highlighted by Ulivieri (2017), Dobratsch represents "an example of resilience and adaptation to climate change, where local residents were the primary beneficiaries in terms of improved quality of life and environmental conditions".

With the dismantling of ski lifts, Dobratsch was redefined as a "mountain for all", fostering a year-round tourism model that enables both local communities and tourists to experience the area freely and in peaceful surroundings (Haddad 2026). Today, visitors can engage in a wide range of slow outdoor activities. The area offers three hiking trails, suitable for both summer and winter, four ski touring routes, a 5km cross-country circuit, a toboggan slope and several thematic itineraries. A multi-day trekking route around Mount Dobratsch further enhances the offer, allowing visitors to explore various natural and cultural landscapes, including historical buildings and heritage sites (Region Villach 2019). At the summit, visitors encounter two churches, the *Windische Kirche* and *the Deutsche Kirche,* as well as the historic Ludwig-Walter-Haus mountain hut. Recently renovated and made fully energy self-sufficient, the hut now provides approximately 40 beds and seminar facilities.

Although the tourism requalification generated important environmental and socio-economic benefits for the region, the increase in visitor numbers also led to new pressures. The growth in tourism flows has been accompanied by increases in waste production and traffic-related emissions (Clavarino 2020). Therefore, while the diversification strategy enhanced economic resilience and reduced dependence on snow activities, the impacts related to mobility and rising visitor numbers cannot be overlooked. This dual dynamic highlights that the only implementation of sustainable practices does not automatically eliminate environmental externalities, but the continuous development of innovative and strategic measures and effective management of the tourism-related impacts are needed.

However, it is undeniable that the decision to requalify the area, for both environmental and economic reasons, proved to be a successful strategy, demonstrating the feasibility of an alternative model of mountain tourism development. Following the dismantling of the ski lifts, Dobratsch not only consolidated its new identity but also increased its attractiveness as a destination. In recent years, visitor numbers have risen from approximately 30,000 to 50,000 (Ulivieri 2017), suggesting that a transition away from snow-dependent tourism can enhance both environmental sustainability and territorial competitiveness. Generally, during the 2024/2025 tourist season, the Carinthian State Office for Statistics recorded approximately 13,007,754 overnight stays and 3,257,372 arrivals across the region. Within this context, Villach Land in 2025 registered 504,833 overnight stays and 1,856,912 arrivals, both of which rank among the highest in Carinthia. However, compared with the 2017/2018 season, Villach Land recorded 758,592 overnight stays and 1,949,197 arrivals, indicating a decline. Despite this, these figures confirm that Villach Land remains a major tourism destination in the region, highlighting the area's importance to Carinthia's tourism economy.

2.4.2 Val d'Isère (France)

Another exemplary case is Val d'Isère, located in the French Alps. France represents one of the leading ski destinations in the Alpine region, attracting about 55 million visitors annually (ClimateChangePost n.d.) and hosting 148 ski resorts, 19 of which are situated in Isère (OECD 2007). Although many French ski areas are located at relatively high altitudes, projections suggest that if natural-snow reliability continues to decline, a significant reduction in the number of operational ski resorts is likely in the coming decades. In particular, the Département of Isère will be among the most affected territories. In 2011, the French Court of Auditors emphasised the urgency of reorienting tourism strategies, criticising the continued allocation of public funds to unsustainable approaches and snow-dependent models, recommending therefore the adoption of more resilient development pathways (Legambiente 2020).

Anticipating the concerns about the long-term viability of snow-dependent tourism, the Département of Isère has already begun to rethink its tourism strategy in light of the growing vulnerability of its ski destination to climate change (CIPRA 2006). As in the early years of the 2000s, most public funds were allocated to boost ski-related activities, often without a coherent strategic direction and objectives, and in some cases to sustain economically obsolete or structurally fragile ski areas (CIPRA 2011). From 2003 onward, however, investment priorities were progressively redefined, focusing on alternative tourism development models and

diversification measures better aligned with sustainability goals. This shift aimed to reduce dependence on the ski industry while enhancing the resilience and adaptive capacity of mountain territories in the face of climate change challenges (CIPRA 2007). The urgency of this transition became evident during the winter season 2006/2007, when Isère's tourist destinations recorded a decline in visitor numbers; ski areas, in particular, were penalised by insufficient snowfall, registering a 5.6% decrease compared to the previous season (INSEE 2008).

Within this evolving context, the General Council of the Département, in cooperation with ski area operators, defined a shared strategic framework and a series of objectives centred on diversification, allocating 55% of the financial funds to the development of non-ski tourism activities (CIPRA 2006). The measures adopted included improving the quality of existing tourism offers and tourist facilities, dismantling unprofitable ski lifts, and supporting ski areas in reducing or abandoning snow-dependent activities (OECD 2007).

Several ski destinations seized the opportunity to redefine their development frameworks, recognising the need to adapt to climate change and to implement a more sustainable tourism model. The Vercors Massif constitutes an emblematic example. Historically, tourist activities have focused mainly on the ski industry and winter tourism, but in recent years, the area has experienced a significant decline in the reliability of natural snow and a reduction in the number of snow days (Sénat 2023). In response, the municipalities involved developed a shared territorial project aimed at identifying and assessing the impacts of climate change across multiple sectors, including tourism, agriculture, natural resources, and local ecosystems (Barolini 2020). The measures implemented include the development of a year-round tourism offer, the dismantling of the five ski lifts, and the promotion of low-impact activities, such as trekking itineraries, cycle paths, hiking and snowshoeing trails, as well as gastronomic and cultural routes. Beyond infrastructural changes, the project also raised awareness among tourist operators and local communities about climate change and its related challenges and impacts, encouraging the emergence of an integrated, innovative territorial vision that is respectful of environmental constraints and local specificities.

Preliminary results suggest that the diversification strategy has not compromised tourism performance, with overnight stays comparable to those in the ski industry model. In 2025, Isère recorded approximately 23 million overnight stays, compared to 21 million in 2018, with increases in both winter and summer tourist flows (Isère Attractivité 2025). Around 60% of total tourist flows occur in mountain territories, which account for around 205,800 beds. These figures thus suggest that diversification strategies, including, where necessary, the dismantling of ski facilities, do not compromise visitor numbers or the overall competitiveness of mountain

destinations. Rather, they show that ski- and winter-based models are not the only viable development pathway, and that economic and environmental sustainability can coexist, ensuring that tourist areas enhance long-term resilience to climate change.

Tourism requalification processes, such as those implemented in Dobratsch and Isère, should increasingly become the norm across the Alpine region, where mass tourism is significantly affecting natural environments and local communities. The impacts of climate change on winter tourism can no longer be underestimated, as the number of snow days and the reliability of natural snow will progressively decrease, jeopardising the viability of ski destinations. Low- and medium-altitude ski areas are expected to be the most affected by these dynamics, whereas high-altitude resorts will remain dependent on artificial snowmaking systems to ensure their future.

As observed by Bonardo (2024, para. 3):

> "In many mountain destinations, natural snow is progressively disappearing, even if it is difficult to fully acknowledge this reality. We are approaching the end of an era, and it is by now essential to rethink tourism through a renewed cultural approach. The transition will be neither immediate nor painless, as it will be challenging to fill the void the ski industry may leave behind. The future will likely no longer be characterised by crowds of visitors in a few privileged areas. While major tourist destinations will have to redefine themselves and confront the heavy legacy of the ski industry, the vast open space that characterised the mountains may, conversely, offer new opportunities for alternative and more sustainable forms of development".

In Italy, as highlighted before, even though strategies and plans have been developed to address climate change and future challenges, tourism approaches still tend to prioritise technological adaptation measures, such as snowmaking systems, and the reinforcement of the ski industry. In 2025, ski facilities subject to the so-called "therapeutic obstinacy" were 218, compared to 103 in 2020, often supported by public funds for the modernisation and expansion projects (Legambiente 2025). Moreover, impacts related to summer tourism cannot be ignored. Although outdoor activities may entail lower environmental impacts than winter sports, increasing overcrowding, traffic congestion, and associated emissions generate additional pressures on already fragile mountain territories.

Against this complex context, the following chapter analyses a project proposed in the Italian Dolomites, in Passo Rolle, which, similarly to the cases of Dobratsch and Isère, envisaged a process of tourist and territorial requalification grounded in diversification and long-term sustainability. Despite its potential to foster a structural transition towards a more resilient development model, the proposal was rejected. Institutional actors failed to capture its innovative value, instead perpetuating a snow-dependent, mass-tourism model.

3. The case study: La Sportiva Outdoor Paradise

3.1 Methodology

The case study focuses on the project proposed by Lorenzo Delladio in 2017 for the territorial and tourist requalification of Passo Rolle, with particular attention to its potential for local development. The La Sportiva Outdoor Paradise project was selected due to its innovative characteristics, as it represents a credible alternative to the traditional ski-based tourism and development model that continues to dominate Alpine regions. Rather than reinforcing dependence on alpine skiing, the project proposed a diversification of the tourism offer through the promotion of year-round, low-impact outdoor activities, demonstrating that alternative models are not only conceivable, but also potentially more sustainable from an environmental, economic and social perspective. Moreover, the case of Passo Rolle also allows for a direct comparison between the two contrasting development trajectories: on the one hand, the persistence of the ski industry, exemplified by the cableway connection; on the other hand, the project proposed by Delladio, which is based on the diversification of activities, ecological restoration and long-term resilience.

The thesis adopts a qualitative research approach, combining a literature review with an empirical analysis in order to provide a comprehensive understanding of the research topic.

The first part of the thesis is based on an extensive literature review, which provides the conceptual and analytical framework for the study. Academic sources, articles and institutional reports were analysed in order to explore key themes such as Alpine tourism development, climate change, adaptation strategies, and governance dynamics.

The second part focuses on the analysis and discussion of the case study and is based on both qualitative and quantitative data.

Qualitative data were collected through semi-structured interviews. Two interviews were conducted with key actors: Lorenzo Delladio, promoter of the project and CEO of La Sportiva, and Luigi Casanova, president of Mountain Wilderness Italia, as well as a critical observer and expert on tourism development in the region. These interviews provided in-depth insights into the project, including its proposed activities and facilities, its environmental implications, and the role of local communities. They also contributed to a broader understanding of the governance dynamics and development strategies shaping the area. The semi-structured format was chosen to allow in-depth discussion, flexibility and active participation, enabling the

exploration of multiple themes and broadening the discussion also to other topics (Kakilla 2021). The interviews were conducted face-to-face, with a duration ranging from 60 to 90 minutes. Both were recorded and then transcribed to enable a more detailed analysis.

In addition to the interviews, a quantitative and descriptive analysis of tourism infrastructure and trends was carried out. Statistical data on overnight stays, tourist arrivals, accommodation capacity, number of ski lifts, and hourly lift capacity were collected from the Istituto Statistico Provincia Autonoma di Trento (ISPAT) for the years 2000 and 2023. Further information on tourism facilities, ski infrastructure, and ski slopes was gathered from the official website of the tourist promotion agency (APT San Martino di Castrozza) and various online blogs.

Finally, a stakeholder mapping and analysis was carried out to identify, analyse, and visually represent the key actors involved in the project. To assess the level of engagement of various stakeholders, an interest/influence matrix was created. The matrix allowed to display both the degree of influence, which is the ability of the actor to support or hinder the project, and interest, representing the priority to address a particular issue or objective (1000 Landscapes for 1 Billion People 2024). This tool provided insights into governance dynamics and helped to explain the divergence between local community support and political interests.

3.2 Geographical and socio-economic context

Passo Rolle is a mountain pass located in the Autonomous Province of Trentino, in the Eastern Italian Alps, within the municipality of San Martino di Castrozza. The origin of the name dates back to 1204, when the pass was referred to as “mons de arola”, a term that in the language of the time meant “small farmyard”, a denomination that effectively reflected the pastoral character of the locality (Primiero Hiking n.d.).

Situated at approximately 1984 metres above sea level, Passo Rolle represents the watershed of the basin of Cismon (Brenta) and of that of Travignolo (Avisio) (Gorfer 1993) and is surrounded by the Pale di San Martino, one of the groups of the Dolomites. Several of the mountains reach elevations over 3000 metres, including the iconic peaks Cimon della Pala and Cima Vezzana. Passo Rolle lies within the boundaries of the Parco Naturale Paneveggio-Pale di San Martino[8]

[8] The Parco Naturale Paneveggio-Pale di San Martino was established in 1967 with the aim of valorising and safeguarding the environmental, cultural and historical value of the territory, while also promoting scientific research within the area (Provincia Autonoma di Trento n.d.). From an ecological perspective, the park is of particular significance due to the richness of its natural landscapes and its high level of biodiversity.
The park includes the Dolomitic group of Pale di San Martino, which are also part of Dolomites UNESCO World Heritage Site, the mountain chain of Lagorai and the Cima d’Arzon area. These sites are further protected under the European Natura 2000 Network(Provincia Autonoma di Trento n.d.).

and is part of both the Dolomites UNESCO World Heritage Site and Natura 2000 Network, highlighting the high environmental and landscape value of the area.

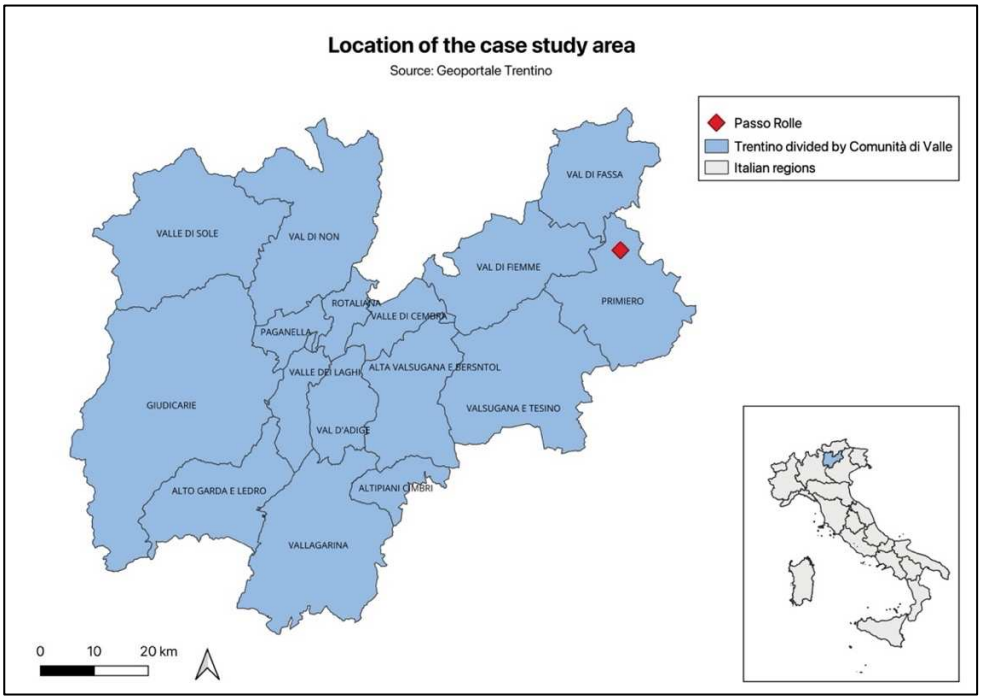

Figure 3: The map shows the position of the case study area in the Autonomous Province of Trentino, indicated by the red diamond.

From a geological perspective, the area is particularly significant due to the convergence of two distinct geological formations that characterise its landscape. On one side lies the Lagorai mountain chain, composed primarily of porphyry rocks of volcanic origin, while on the other side rise the dolomitic peaks of the Pale di San Martino, formed mainly of dolomite rocks (Parco Naturale Paneveggio, n.d.). The contrast between these two geological systems thus contributes to the distinctive character and uniqueness of the pass landscape.

From a historical perspective, Passo Rolle held a strategic role during the Frist World War, serving as a frontline between the Kingdom of Italy and the Austro-Hungarian Empire. In particular, Monte Castellazzo assumed considerable military importance due to its strategic and dominant position, located between the Pale di San Martino, the Lagorai chain and the Bocche-Iuribrutto mountain group (Parco Natural Paneveggio n.d.). Numerous traces of its military past remain visible today, including trenches, military paths, barracks, and ammunition depots.
Passo Rolle is also historically connected to the Alpine School of Guardia di Finanza, which has maintained a detachment in the pass for almost a century. During the 1930s, the Caserma Ferrari was constructed to serve as headquarters for the training activities of the Alpine School of Guardia di Finanza. The facility hosted both winter and summer training courses for the

mountain rescue service, dedicated to officer cadets and members of the corps (La Voce del Nord Est 2017). The barracks remained active until the early 2000s, when the trainees were transferred to the new barracks "Colbricon-Cimon", which are still used today and host specialisation courses of the Alpine school as well as the winter competition of the Corps (Guardia di Finanza n.d.).

Passo Rolle lies between two Alpine valleys, Val di Fiemme and Valle di Primiero, and connects the municipalities San Martino di Castrozza and Predazzo. Due to its geographical position, the pass represents an important link between these two territories, playing a significant role in the mobility and tourism dynamics in the area.

Valle di Primiero, also commonly referred to as Primiero, is located in the eastern part of Trentino, on the border with the Veneto region. The valley lies within several important mountain groups, including the Pale di San Martino, the Lagorai mountain chain and the Vette Feltrine, and covers a total area of around 41,337 hectares (Paesaggio Trentino n.d.). Primiero comprises five municipalities, Canal San Bovo, Imer, Mezzano, Primiero San Martino di Castrozza and Sagron Mis, with a total population of 9,599 inhabitants. Together, these municipalities form the Comunità di Valle di Primiero[9], an administrative body responsible for coordinating several public services across the territory. From a historical and economic perspective, Primiero developed as a silvo-pastoral society. Until the late years of the 20th century, the local economy was based on agriculture, manufacturing, and mining, including ironworking (Gorfer 1993). However, the gradual decline of traditional economic practices in mountainous regions led to the consolidation of the tertiary sector, with tourism emerging as the most significant profitable economic activity in the valley.

Val di Fiemme, located as well as in the eastern part of Trentino, lies within the Lagorai and the Latemar group, covering an area of approximately 41,462 hectares, which corresponds to 7% of the provincial territory (Paesaggio Trentino n.d.). The valley includes nine municipalities: Valfloriana, Capriana, Castello-Molina di Fiemme, Cavalese, Ville di Fiemme, Tesero, Panchià, Ziano di Fiemme, and Predazzo, with a total population of around 20,000 inhabitants. These municipalities are grouped within the Comunità di Territoriale della Val di Fiemme. Part of the valley also falls within the Parco Naturale di Paneveggio-Pale di S.Martino, which includes the Paneveggio forest, also known as the "Foresta dei Violini". Another

[9] The Comunità, established in 2006, are territorial public bodies created with the aim at promoting local autonomies and reducing the centralism of the Provincial administration (Comunità Territoriale della Val di Fiemme n.d.). These entities are entrusted with several responsibilities, including school assistance, social services and public housing. The Comunità thus operate in close cooperation with municipalities in the organisation and management of public services in order to ensure that they adapted to the specific needs and characteristics of each territory.

important institution operating in the area is the Magnifica Comunità di Fiemme[10], a collective organisation that owns around 20 hectares of land, including forests, pastures, and other goods such as mountain huts and trails, and is responsible for managing these common resources (Magnifica Comunità di Fiemme n.d.). Historically, Val di Fiemme developed as a silvo-pastoral and agricultural society (Gorfer 1993). Today, however, the local economy is highly diversified, encompassing economic sectors such as manufacturing (e.g. namely including La Sportiva, Fiemme Tremila, and Pastificio Felicetti), lumber industry, craftsmanship and construction (e.g. Misconel, Edilvanzo, Conci Costruzioni). Alongside these activities, the tourism sector has gained particular importance in recent decades, becoming a key pillar in the local economy.

In the following paragraphs, the emergence and development of Passo Rolle as a tourist destination are investigated. This analysis is complemented by an overview of the evolution of tourism in the Val di Fiemme and Primiero in order to understand how tourist activities, infrastructure, and development strategies have evolved over time.

3.3 The emergence of Passo Rolle as a tourist destination

Thanks to its landscapes and strategic location, San Martino di Castrozza, along with Passo Rolle, quickly became a prominent tourist destination and one of the first in the Trentino region. A first phase of tourist development can be identified between the late 19th century and just before the First World War, during which the area was mainly characterised by elite tourism and initially visited as a pilgrimage site (Comunità di Primiero 2014). The area then began to attract visitors through mountaineering expeditions in the Pale of San Martino, leading to the construction of the first tourist accommodations and hospitality facilities (Gorfer 1993). At the outbreak of the First World War, San Martino was partially destroyed, including several of its tourist infrastructures. However, after the conflict ended, the locality experienced gradual growth in tourism, becoming one of the major tourist destinations in the Alps, especially for winter sports (Gorfer 1993).

Passo Rolle played a fundamental role in the early development of Alpine tourism, being among the first ski destinations in Trentino (Casanova 2024). In 1952, the first ski lift was built at the pass, marking the beginning of the local ski industry (Primiero Hiking n.d.). In the following years, the presence of cadets from the Alpine school of the Guardia di Finanza. Contributed to the development of several mountaineering and climbing routes in the Pale of San Martino

[10] See footnote 1 in chapter 1

during the 1960s. As a result, Passo Rolle gradually gained importance in the regional tourism systems, offering numerous activities in both summer and winter seasons. The last decades of the 1900s marked the beginning of mass tourism and the consolidation of the ski industry, characterised by the expansion of the ski infrastructure and the extension and improvement of the ski slopes (Skiresort n.d.).

3.3.1 The San Martino di Castrozza-Passo Rolle ski resort

Today, the Passo Rolle ski area is part of the San Martino di Castrozza ski resort, which also includes the ski sectors of Alpe Tognola, Punta Ces and Colverde (Dove Sciare n.d.). These areas are jointly managed by the Consorzio Impianti A Fune San Martino Di Castrozza – Passo Rolle, an organisation that brings together five operating companies responsible for managing and developing the ski area. With specific regard to Passo Rolle, the lifts and facilities are operated by San Martino Passo Rolle SPA and Castelazzo SRL.

Overall, the San Martino di Castrozza-Passo Rolle ski resort offers around 60km of ski slopes, served by 21 ski lifts (Skiresort n.d.). The lift system has a total capacity of 31,079 passengers per hour and includes one aerial tramway, 4 gondola lifts, 12 chairlifts, 4 ski lifts and 2 tapis roulant. The majority of the ski slopes are located in the Alpe Tognola and Punta Ces sectors, which account for approximately 45km of slopes situated between 1404 and 2537 metres above sea level. By contrast, the Passo Rolle ski area is smaller, offering less kilometres of slopes. While the slopes of Punta Ces and Alpe Tognola are directly connected, the sectors of Col Verde and Passo Rolle function as a separate ski area (Skiresort n.d.). The following table provides an overview of the sectors of the San Martino di Castrozza-Passo Rolle ski resort, including the total kilometres of ski slopes and the number of ski lifts for each area.

Table 1

Ski sector	Ski slopes (km) and n. of ski lifts
Alpe Tognola	18.6 km of slopes, 7 ski lifts
Punta Ces	18.7 km of slopes, 5 ski lifts
Pra' delle Nasse	0.7 km of slopes, 2 ski lifts
Colverde-Rosetta	4.2 km of slopes, 2 ski lifts
Passo Rolle Sud	9.8 km of slopes, 3 ski lifts
Passo Role Nord	7.1 km of slopes, 2 ski lifts

Source: Comunità Di Primiero (2012). Relazione Tecnica Generale Opere accessorie alla funicolare "San Martino di Castrozza – Passo Rolle" finalizzate alla messa in rete di tutte le aree sciabili del comparto locale.

Moreover, the resort is part of Dolomiti Superski, one of the largest ski domains in the world, allowing visitors to access 12 interconnected destinations and 1,220km of slopes with a single ski pass (APT San Martino di Castrozza n.d).

In addition to Alpine skiing activities, visitors can also access approximately 30km of cross-country trails located in Passo Rolle and Prà delle Nasse, as well as two snow parks and several routes for trekking, snowshoeing, and ski mountaineering, together with a variety of activities for families (APT San Martino di Castrozza n.d.).

Figure 4: Ski map of the San Martino di Castrozza-Passo Rolle ski resort (Source: Skiresort n.d.)

3.3.2 The Passo Rolle ski area

Within this context, given the aim of the thesis, it is necessary to focus more specifically on the Passo Rolle area, whose characteristics and development are particularly significant for understanding the tourism and territorial dynamics of the pass.

The ski area counts around 15km of slopes located between 1900 and 2200 metres of altitude served by 4 chairlifts, one ski lift and one tapis roulant (Skiresort n.d.).

The following tables provide a detailed overview of the main characteristics of the ski infrastructure and slopes located in the Passo Rolle area. Table 2 presents the technical features of the ski lifts, including their name, year of construction, the hourly capacity and the lower and upper altitudes. Table 3, on the other hand, shows the main attributes of the ski slopes, reporting their names, difficulty, length and difference in height.

Table 2

Name	Year of construction	Number of seats	Hourly capacity	Lower station altitude (metres)	Upper station altitude (metres)
Seggiovia Castellazzo	1990	3	1800	1987	2216
Seggiovia Cimon	1994	4	1960	1985	2050
Seggiovia Ferrari	1985	2	1200	1900	2047
Seggiovia Paradiso	1990	4	1489	1873	2191
Ski lift Rolle	1998	1	900	1904	2004
Tapis roulant Baita Segantini			1500	1970	1999

Source: Lift-world n.d.

Table 3

Name	Difficulty (blue, red, black)	Length (metres)	Difference in height (metres)
Campo Scuola Cimon	Blue	560	70
Castelazzo 1	Red	1250	217
Castellazzo 2	Red	995	217
Castellazzo 3	Red	1080	217
Collegamento Cimon-Ferrari	Blue	207	30
Ferrari	Blue	880	84
Ferrari II	Blue	473	84
Fiamme Gialle	Red	724	171
Paradiso I	Black	1030	320
Paradiso II	Red	2500m	
Raccordo Ferrari	Blue	970	144
Rolle I	Blue	700	100
Rolle II	Blue	750	100
Segantini	Blue	260	31

Source: APT San Martino di Castrozza n.d.

With regard to snow conditions, the high-altitude location of Passo Rolle contributes to the persistence of relatively reliable natural snow cover compared with lower-altitude ski destinations. On average, the pass records approximately 165cm of snow over a ten-day period during the year (Skiinfo n.d.). However, snow conditions have declined over time. For instance, during the 2012-2013 season, the area recorded 12 snow days with a total snow cover of approximately 485cm, whereas in the 2024-2025 season, 17 snow days were recorded, with a

significantly lower snow cover of about 112 cm, highlighting the progressive reduction in snow reliability.

To compensate for the increasing variability of natural snowfall, artificial snowmaking systems have been widely implemented. In Passo Rolle, snowmaking infrastructure covers 95% of the ski slopes (Skiresort n.d.). More broadly, within the San Martino di Castrozza-Passo Rolle ski resort, artificial snow can be guaranteed on around 58km of slopes through a network of 150 snow cannons. In terms of water basins, Passo Rolle relies on a small artificial basin, Lake Buca Ferrari, while two larger basins support the snowmaking systems in other sectors of the resort: one located in the Punta Ces ski area, with a capacity of 60,000 m3 (San Martino Rolle n.d.) and another in Alpe Tognola, with a capacity of 50,000 m3 (Alpe Tognola n.d.).

In the winter season, on the pass is also present a cross-country circuit of 2km, which is prepared and managed by the Alpine School of Guardia di Finanza, and a snow park (Rolle Railz Park) in the area of Castellazzo, whose opening depends on the availability of snow (APT San Martino di Castrozza n.d). Other activities include ski mountaineering, snowshoeing and hiking. During the summer, ski lifts in Passo Rolle are usually closed, but it offers several recreational opportunities, including hiking, trekking, e-biking and mountain biking, trail running, Nordic walking, and climbing. The pass also hosts several restaurants, accommodation facilities and tourist services, which are summarised in the following table.

Table 4

Mountain huts	Rifugio Capanna Cervino, Rifugio alpino Volpi al Mulaz, Rifugio alpino Laghi di Colbricon
Restaurants and Malghe	Baita Segantini (open only in summer), Malga Rolle, Malga Juribello, Chalet La Baita, Cimon Stube, Ristorante Vezzana
Accommodations	Hotel Vezzana, Hotel Venezia, Hotel Alpenrose
Other services	ski school (based in San Martino di Castrozza), ski rent Noleggio Sport Demez

Source: APT San Martino di Castrozza n.d.

3.3.3 The decline of the Passo Rolle ski area

Despite its significant tourist potential and the wide range of activities it offers, Passo Rolle has experienced a gradual decline over the past decades, with its tourist facilities and infrastructure now partially abandoned or left in a state of neglect and decay. As noted by Casanova (2016), the ski infrastructure network of Primiero appears weak and poorly developed, having remained

largely unchanged since its construction in the 1990s, with little or no modernisation. At the same time, the development of other ski destinations in the surrounding areas further undermined Passo Rolle, which was unable to keep up with them, accumulating an increasing and unsustainable level of debt (Casanova 2017). These dynamics were exacerbated by the economic crisis, limited financial resources, and persistent conflicts among the societies managing the ski facilities. Within this context, climate change and the consequent decline in snow reliability represent additional pressures, contributing to aggravating the structural weaknesses in the ski industry in Passo Rolle and more broadly in Primiero (Casanova 2024).
As highlighted by Casanova (2024), most of the accommodations and tourist facilities in San Martino di Castrozza are currently owned by banks or operated by non-local organisations, thereby additionally limiting the capacity to develop alternative strategies for the territory. Primiero has struggled to effectively promote its environmental and cultural resources, while failing to innovate its tourism offerings or implement a coherent requalification strategy for Passo Rolle. The result is:

> "a landscape that has been significantly degraded, deteriorating facilities, and ski infrastructure that keeps accumulating millions of euros of debt every year. Even summer tourism is declining. Passo Rolle has become an increasingly neglected area that no longer encourages visitors to stop, not even for a short break, such is the widespread sense of disorder and abandonment" (Casanova 2016, par.3).

Within this broader context of decline, internal conflicts among local actors further exacerbate existing challenges. The owner of the ski facilities and slopes on Castellazzo (Castellazzo SRL) and his sisters, who manage the mountain hut Capanna Cervino, have been engaged in ongoing disputes over land management and access rights (Casanova 2024). Ivo Mich, the manager of the ski infrastructure, invoking Law 40/2021, which regulates safety norms for winter sports and, in this case, prohibits the use of ski slopes by pedestrians and ski mountaineer, issued an order forbidding transit for those wishing to reach Capanna Cervin and Baita Segantini on foot. Such tensions are particularly critical to the promotion and future development of Passo Rolle, as they further limit opportunities for tourism and territorial requalification, thereby constituting an additional obstacle to any coherent strategy for sustainable development.

Although several attempts have been made over time in order to prevent the complete decline of the area, the conflicts between local actors, the general abandonment of the territory and the obstruction of requalification projects since the 1990s have progressively relegated San Martino

di Castrozza and Passo Rolle to a marginal position in both regional winter and summer tourism (Casanova 2017). On the other hand, the inability of ski lift operators and public actors to effectively manage and promote the area and its facilities is evident, as they continue to rely on the ski industry and invest in projects and strategies incompatible with the ongoing challenges stemming from climate change, reflecting a broader failure to adapt to evolving environmental and socio-economic conditions. The ongoing reduction in snow reliability and the shortening of winter seasons should instead encourage the actors involved to rethink tourism development models, recognising that the future of ski destinations cannot depend on the continuous expansion of the ski industry but rather on the diversification of activities and the adoption of environmentally sustainable practices. This consideration is even more relevant considering that Passo Rolle is part of a natural park, where sustainability and the protection of natural environments should be prioritised.

As Casanova (2012) observes, such a transition does not necessarily imply the complete abandonment of ski activities, but rather entails the simplification of the ski lift and slope infrastructure. In the case of San Martino di Castrozza, this would mean aligning development strategies with the actual scale and characteristics of the destination, which, in order to revitalise tourism, does not require the further exploitation of its territory or the imposition of new large-scale and often unmanageable infrastructural projects (Casanova 2012).

3.3.4 The cableway connection between San Martino and Passo Rolle

Despite these considerations, the approach adopted by local actors remains clear: rather than pursuing alternative and more sustainable development strategies, they have continued to support and finance new infrastructure projects across the whole ski resort of San Martino di Castrozza, including the improvement of cableways and the expansion and modernisation of the artificial snowmaking systems. Within this framework, the proposal of the cableway connection project serves as a prime example of this development trajectory.

The project, officially justified as an alternative mobility measure, establishes the construction of a 4,650-metre cableway linking the ski areas of Passo Rolle and San Martino di Castrozza, specifically connecting the localities of Bellaria, Prà delle Nasse and Malga Fosse di Sopra (Monplan Ingegneria 2019). The system is structured into three segments: the first connecting Bellaria to Prà delle Nasse, the second from Prà delle Nasse to Malga Fosse, and the third extending to Passo Rolle, for a total of five stations along the route. The infrastructure has an hourly capacity of 1,500 passengers, with cabins accommodating up to ten people and an estimated travel time of approximately 17 minutes. In addition to the cableway, the project

includes a new ski slope connecting Malga Fosse di Sopra and Prà delle Nasse to San Martino di Castrozza. Initially, the project envisaged the starting point of the ski slope at Passo Rolle, in the Buca Ferrari area, extending along the Torrente Cismon through a skiweg. However, this option was subsequently rejected due to regulatory restrictions imposed by the Parco Naturale (Monplan Ingegneria 2019). Moreover, a new service hub in Nasse was planned in order to host ski-related services, including a ticket office, an information point and a ski rental service (Monplan Ingegneria 2019).

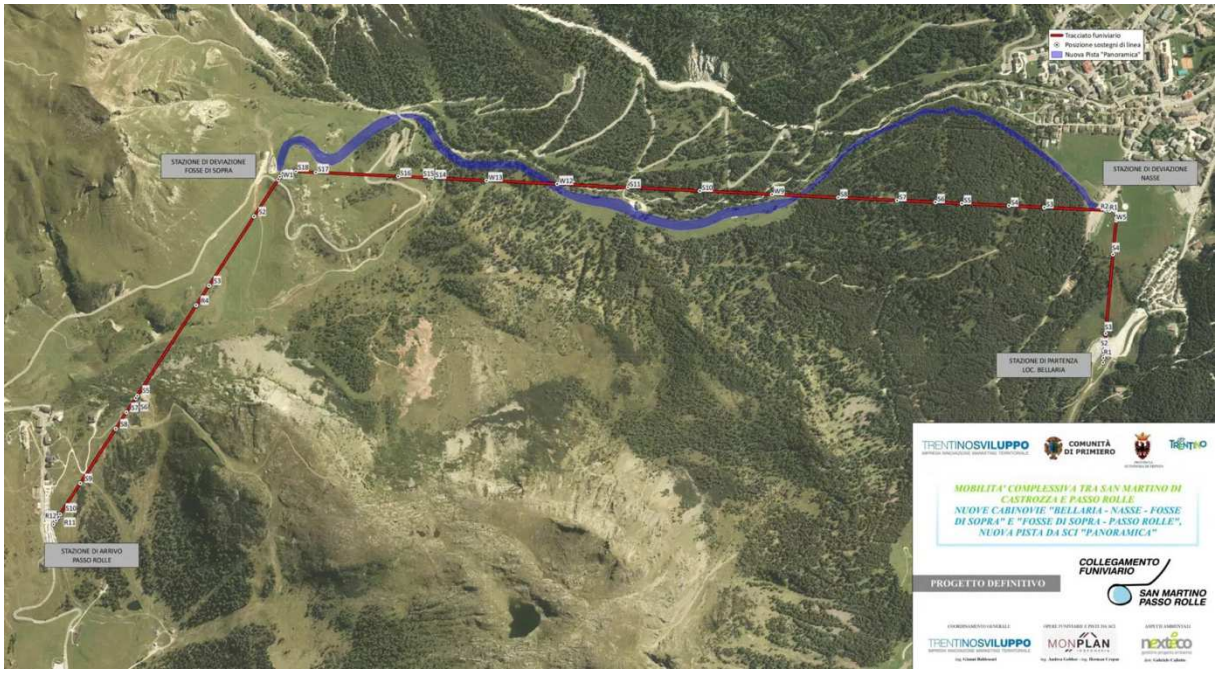

Figure 5: Project of the cableway San Martino di Castrozza-Passo Rolle (Source: SciMarche 2019)

Trentino Sviluppo, the provincial agency that developed the project, initially estimated a total investment of around 30 million euros (Ufficio stampa Provincia Autonoma di Trento 2019). However, several components of the project remain undefined, particularly regarding the costs of auxiliary works, including the upgrading of snowmaking systems, the requalification of Malga Fosse, parking facilities and broader interventions at Passo Rolle. By 2024, the estimated cost had increased to approximately 54 million euros, to be financed through both public and private funds (Ufficio stampa Provincia Autonoma di Trento 2024). The project is part of a broader strategy to revamp the entire ski area of San Martino and Passo Rolle, which also includes further investments in the modernisation and expansion of the ski slopes, ski infrastructure, and snowmaking systems (Ufficio stampa Provincia Autonoma di Trento 2018). As stated by Maurizio Fugatti, President of the Autonomous Province of Trento, the main objective is to restore the competitiveness of the territory (Ufficio stampa Provincia Autonoma di Trento 2019). The interconnection of the ski areas is expected to improve the traffic

circulation of the area, while enhancing the overall quality and attractiveness of the tourist offer in both the winter and summer seasons (Comunità di Primiero 2012). From a mobility perspective, the project aims to provide an alternative means of accessing Passo Rolle, reduce reliance on private vehicles, and promote pedestrian mobility and the use of public transport between accommodation facilities and ski infrastructures (Monplan Ingegneria 2019).

However, while the project is presented as a strategy for improving accessibility and territorial competitiveness, it raises critical issues regarding its environmental implications and its coherence with climate change adaptation objectives. In particular, the emphasis on the expansion of ski-related infrastructure is incompatible with the increasing vulnerability of the sector to climatic variability, thereby raising questions regarding the long-term strategic rationale of the investment. These issues will be further examined in the subsequent sections.

3.4 The evolution of tourism in Trentino

The emergence of tourism in Trentino can be traced back to the early decades of the 20th century, when the valorisation of natural landscapes and the first mountaineering expeditions led to an increase in visitor numbers and the gradual organisation of tourism facilities and services (Leonardi & Pombeni 2006). This initial phase of development was interrupted by the outbreak of the First World War, during which many local destinations were subjected to damage or were razed to the ground, as in the case of San Martino di Castrozza.

The first post-war period, within a transformed political and socio-economic context, efforts were mainly directed towards the reconstruction of the tourist infrastructure and the reorganisation of the tourist sector. This process was further complicated by the loss of the traditional clientele, which mostly came from German-speaking countries before the war. As a result, both the recovery of the local economy and the tourism industry were slow and difficult, revealing the fragility of the emerging organisational structure. It was in this context that winter tourism began to complement and support the traditional tourism model, mainly focused on the summer season (Leonardi & Pombeni 2006). The construction of the first cableways marked a turning point, fostering the consolidation of ski destinations like Madonna di Campiglio and San Martino di Castrozza. Trentino was thus capable of recognising and exploiting the economic potential of winter tourism, adapting its offer to the evolving trends and expanding tourism development to previously less-established areas, such as Val di Fiemme, Val di Fassa, Primiero and Folgaria.

A decisive phase of expansion occurred during the second post-war period, when Trentino experienced a significant tourist growth, accompanied by the development of both

accommodation capacity and ski infrastructure, especially in the mountain areas (Leonardi & Pombeni 2006). In this phase, destinations that had previously remained marginal, such as Val di Fiemme and Val di Fassa, were able to effectively adapt their tourist offer to the new tourism demand, expanding both their infrastructure and hospitality sector. Conversely, other destinations, including San Martino di Castrozza, began to experience a relative stagnation in their tourism offer and infrastructural development.

The consolidation of mountain destinations was associated with the expansion of the ski industry and the emergence of a model of intensive and industrialised tourism development, characterised by the proliferation of the first large-scale infrastructure, the multiplication of ski lifts and the construction of second homes across the region (Leonardi & Pombeni 2006). By the early 1990s, tourism in Trentino had reached a mature stage of development, both for winter and summer tourism, with around 87,830 beds in the hotel establishments and 179,754 beds in the non-hotel facilities. In particular, Val di Fiemme recorded a total of 6,096 beds, compared with 4,494 in San Martino di Castrozza and Primiero (Leonardi & Pombeni 2006).

In the same period, winter tourism assumed an increasingly dominant role within the regional economy, leading to a notable expansion of the ski infrastructure. By 1985, Trentino counted 17 cable cars, 129 chairlifts and 190 ski lifts, for a total length of 273km and an hourly capacity of approximately 263 people, alongside 600km of Alpine ski slopes and 480km dedicated to cross-country skiing. However, already as early as the 1970s and 1980s, the first winters characterised by insufficient natural snowfall were recorded. These conditions led to the introduction and progressive expansion of artificial snowmaking systems, with approximately 3,000 snow cannons installed across the region (Leonardi & Pombeni 2006).

Within this framework, tourism progressively became the leading economic sector in Trentino. In 2000, the province recorded approximately 2,564,804 tourist arrivals and 13,115,575 overnight stays with a total tourist expenditure amounting to 3,078 billion lire (ISPAT 2001). In the following decades, tourism flows continued to grow significantly, reaching 4,859,462 arrivals and 19,141,944 overnight stays in 2023, thereby confirming the centrality of the sector within the regional economy (ISPAT 2024).

3.4.1 Diverging tourism trajectories: the case of Primiero and Val di Fiemme

Building on the general overview of tourism evolution in Trentino, the following section focuses on the evolution of tourism in Val di Fiemme and San Martino di Castrozza, highlighting the distinct development trajectories and the structural differences that characterise the two territories in the last decades.

As previously highlighted, the two valleys have followed different development paths. While San Martino di Castrozza emerged from the beginning as a major tourist destination within the region, it is currently experiencing a phase of decline in its tourism sector. By contrast, Val di Fiemme, which developed primarily in the second half of the 20th century, continues to demonstrate a trajectory of growth and consolidation today. In 2000, the two valleys recorded similar levels of tourist activity, with 949,937 overnight stays and 165,225 arrivals in Val di Fiemme, and 702,353 overnight stays and 131,199 arrivals in Primiero (ISPAT 2001). However, even at that stage, the first signs of divergence were already emerging. This gap has widened over time: by 2023, Val di Fiemme recorded 297,119 arrivals and 1,284,424 overnight stays, while Primiero recorded 217,532 arrivals and 818,650 overnight stays, confirming a clear imbalance in tourism growth and performance (ISPAT 2024).

A similar pattern can be observed in the evolution of tourism infrastructure. The following tables present the tourist facilities in both valleys between 2000 and 2023, showing the accommodation capacity and the ski-related infrastructure. While both valleys experienced a reduction in the number of ski lifts alongside an increase in their hourly capacity, indicating technological modernisation, the accommodation sector shows a more pronounced divergence. While Val di Fiemme preserved and slightly increased its hospitality capacity, Primiero saw a reduction in bed capacity, indicating a weakening of its tourism infrastructure.

Table 5

Comunità di Valle	Year	Hospitality sector (number of beds)	Number of ski lifts	Hourly capacity of the ski lifts
Val di Fiemme	2000	10,231	23	32,691
Val di Fiemme	2023	10,924	19	34,773
Primiero	2000	8461	21	27,861
Primiero	2023	7,900	20	28,283

Source: ISPAT

Overall, it can be stated that, while Val di Fiemme experienced gradual growth in tourism over the years, Primiero and San Martino di Castrozza show clear signs of stagnation, revealing a limited capacity to adapt to emerging trends and to innovate their tourism offer.

In terms of tourist products, the two valleys appear similar, both offering a wide range of winter and summer activities.

Val di Fiemme, thanks to the long tradition in winter sports, is characterised by an important infrastructure for both Alpine skiing and cross-country skiing, hosting the Fiemme/Obereggen ski resort composed of five different ski areas and around 150km of cross-country slopes in Lago di Tesero and Passo di Lavazé (APT Val di Fiemme n.d.). The valley is also known for

hosting several international sports events, such as the Marcialonga, the FIS Nordic Ski World Championships and the Milano Cortina 2026 Winter Games. Besides ski activities, visitors can also engage in alternative activities during winter, such as hiking, snowshoeing, and ski mountaineering (APT Val di Fiemme n.d.). Its offer is strengthened by a diversified summer tourism system, including several outdoor activities, such as trekking, hiking, mountain biking, canyoning, horse riding and climbing.
Similarly, Primiero, particularly the San Martino di Castrozza area as previously described, is home to the San Martino di Castrozza-Passo Rolle ski resort and numerous cross-country circuits, along with a variety of outdoor activities (APT San Martino di Castrozza n.d.). During the summer period, the area offers a wide range of outdoor recreational opportunities, including hiking and trekking trails, e-bike and mountain biking routes, trail running, Nordic walking, and climbing.

Despite their apparent similarities, the two territories have adopted different approaches for valorisation and development. Val di Fiemme has progressively built a diversified economic structure, in which tourism is integrated with other well-established sectors, such as the industrial and primary ones, and is increasingly aligning with more sustainable and resilient tourism development models. In contrast, San Martino di Castrozza is characterised by a tourist monoculture, where local economic activities such as craftsmanship, construction, and commerce are heavily dependent on tourism dynamics (Trentino Sviluppo 2012).

In this context, it is particularly important to examine the evolution of tourism in San Martino. Although it still represents one of the main tourist destinations in Trentino, the area is currently experiencing, as already highlighted, a phase of stagnation and, in some respects, even regression, especially when compared with other localities in the province, including neighbouring valleys. Several critical trends emerge, including a decline in the average length of stay, increasingly pronounced seasonality, limited development of summer tourism, and a progressive loss of competitiveness linked to the lack of infrastructural modernisation (Trentino Sviluppo 2012). These factors contribute to a decline in attractiveness, further exacerbated by the marginal role assigned to sustainable tourism in local development strategies. Moreover, tourism in San Martino di Castrozza remains predominantly centred on the ski industry, even in the face of declining snow reliability and the progressive weakening of the ski-based tourism model. This reflects a structural vulnerability in local tourist approaches, which continues to prioritise the traditional winter tourism model rather than fostering innovation. Instead of investing in diversification strategies and promoting summer tourism, which could revitalise

the territory and enhance resilience, local actors continue to support the ski industry, as in the case of the proposed connection between San Martino di Castrozza and Passo Rolle. This approach not only fails to address the emerging challenges that derive from climate change and tourism dynamics but also risks perpetuating an increasingly unsustainable development model.

3.5 La Sportiva Outdoor Paradise

Within this framework of stagnation, local stakeholders have repeatedly attempted to revamp the area. However, these efforts have been characterised by the promotion of invasive infrastructure projects and inadequate strategies, often misaligned with the environmental and socio-economic context. By 2017, the companies managing the ski infrastructure at Passo Rolle were still operating at a deficit, leaving limited room for action.

It is within this context that a local entrepreneur, Lorenzo Delladio, CEO of La Sportiva, a company specialised in the production of footwear and apparel for outdoor activities, proposed an innovative project for the territorial and tourist requalification of Passo Rolle, which remained in the same condition as when the ski infrastructure was realised and is now in a state of decline. The idea emerged during a ski mountaineering excursion with a group of friends, all mountain lovers united by a strong sense of belonging to the territory (Gabrielli & Partner n.d.). That year, the ski lifts were forced to close due to the insufficient snow cover, and the managing company lacked the financial resources to invest in artificial snowmaking systems. Facing the increasingly abandoned and decaying infrastructure, Lorenzo Delladio began to reflect on alternative strategies to revitalise Passo Rolle. At the core of the proposal was a radical rethinking of the dominant mountain tourism model, traditionally centred on the ski industry, fostering a more sustainable and climate-resilient form of tourism and capable of responding to the evolving dynamics of winter tourism (La Sportiva 2017). The main objective was to restore the area to its natural state and transform it into a paradise for outdoor activities, in line with the principles of sustainability, well-being and simplicity. At the same time, the project sought to reduce the seasonality of the local tourist model by fostering the diversification of activities and promoting year-round use of the territory. In this sense, the initiative aimed to enhance long-term resilience and support a more balanced economic model, moving away from the dynamics associated with overtourism (Delladio 205).

The project was based on the acquisition of shares in the local ski and tourist infrastructure, placed in liquidation in 2016, the dismantling of all the ski lifts on the pass, except for the beginner ski area, and the broader requalification of the tourism-related infrastructure. The

initiative would have been entirely financed through private investments, primarily from La Sportiva, together with two additional private investors. The project was part of the marketing strategy of the company, which, in exchange for its financial contribution, would have branded the entire project, including the name, La Sportiva Outdoor Paradise (Delladio 2025).

The initiative targeted a relatively broad audience, including outdoor lovers, families, and the local communities, as well as athletes interested in high-altitude training and companies seeking locations for product testing, events and meetings (Delladio 2025). All activities and facilities were developed around three main keywords: well-being, sustainability, and innovation, with the aim of creating a diversified, year-round tourist offer characterised by low or zero environmental impact.

A wide range of activities was planned, conceived as both alternatives and complements to alpine skiing, including ski mountaineering, snowshoeing, hiking and trekking, cross-country skiing, sledging, winter Nordic walking, sledge dog, snow kiting, and ice climbing. During the summer period, visitors could engage in activities such as e-biking, mountain biking, Nordic walking, trail running, orienteering, climbing and horse riding. Access to these activities would have remained free, allowing visitors to explore the area without additional fees (Delladio 2025). Particular attention was dedicated to families through the creation of a dedicated area for recreational and educational purposes, supported by qualified instructors. This space would have functioned as childcare, organising activities such as skill pathways, interactive games and workshops. These initiatives were not only intended for tourists but also for local communities. The facilities and activities would have been made available to schools and individual users to introduce children to the mountain environment and outdoor sports.

Moreover, the project sought to structure and integrate the tourism offer. Although many of the activities were already available in the area, the objective was to organise them into a structured package, involving local alpine and hiking guides (Delladio 2025). These would have been managed by an ad hoc company, in collaboration with local hospitality and tourism operators. Visitors staying in accommodation facilities in San Martino di Castrozza or Bellamonte would have been offered a holiday package, with the possibility to take part in a range of organised activities led by professional guides. Participation would have remained optional, as visitors could also participate in these activities independently. The package was conceived as an all-inclusive programme, allowing visitors to engage in different activities with all aspects, such as equipment, organisation and professional guidance, already arranged. In this way, the project aimed to enhance the existing tourism offer by providing added value, enabling visitors to

experience several activities and to develop a deeper understanding of the territory and its cultural and natural heritage.
Finally, in order to support the implementation of the proposed activities, a series of interventions on the trail network and accessibility were planned. These were accompanied by a trial mapping process, designed to provide not only standard information, but also detailed data on distances, estimated walking times based on user level, calories burned, accessibility conditions and available services, all integrated within a unified system (Delladio 2025).

Concerning the structural requalification, the former upper and lower stations of the Ferrari and Paradiso ski lifts were to be repurposed as bases for four experience rooms, plus a treehouse, all situated in a high-mountain environment characterised by significant landscape value (Delladio 2025). These structures, as highlighted by Delladio, were conceived as small-scale constructions, fully integrated into the surrounding environments and designed to minimise the visual impact. They would have been partially camouflaged and constructed from natural materials such as wood and glass to blend harmoniously with the alpine landscape. The rooms were intended to integrate the existing tourist hospitality offer as a supplementary experience. They would have been available free of charge to local hotel operators in San Martino di Castrozza and Bellamonte (Predazzo), who could offer them to their guests as an exclusive overnight experience at a price ranging from 400 to 500 euros (Delladio 2025).
In parallel, the project envisaged the removal of other obsolete and abandoned structures, such as the Albergo Rolle, which had been neglected for several years. The associated building volume was planned to be relocated to the area of "Busa Ferrari"[11], where a new multifunctional centre would have been developed (Delladio 2025). This facility was designed to function as a hotel with meeting rooms and event spaces. The structure was intended to be largely underground, occupying the snowcat garage area in order to minimise its visual impact and ensure a low level of landscape alteration. The only structures that would have remained visible were the stations of the dismantled ski lift and the restaurant La Baita. In addition, the artificial lake Buca Ferrari, today used for artificial snowmaking, would have been repurposed as a recreational area for the summer period.

Regarding the catering, the project aimed at, as in the case of the accommodations, complementing the existing offering constituted by the traditional restaurant, malghe and

[11] This mechanism, known as the transfer of development right (TDR), is a spatial planning instrument which "allow a property owner to transfer development rights to another property or to another landowner", thereby enabling development to take place in a more suitable location (Practical Law, n.d.)

mountain huts already present on the pass, with a more refined alternative, proposing more particular, elaborated and personalised dishes tailored to the caloric needs of the visitors and calculated according to the physical activity (Delladio 2025).

The project also envisaged the organisation of social and cultural events, such as open-air cinema, concerts, and musical events, particularly in the area of the Busa Ferrari, which is well-suited to host such initiatives due to its acoustic qualities. Moreover, sunrise and sunset experiences were also included, anticipating trends that have become more widespread only in recent years (Delladio 2025).

The project was ultimately rejected, as it failed to gain the expected support from the public authorities, political actors and other local stakeholders, who were unable, or unwilling, to recognise its potential contribution to the requalification of Passo Rolle and to the broader transformation of the local tourism model.

A key point of disagreement concerned the dismantling of the ski lifts. This reaction reflects a limited understanding of the main objectives of the project, which were the rethinking of the traditional ski-based model, addressing the issue of the obsolete and abandoned infrastructures. Opposition to the project originated from a relatively small group of actors, primarily those with direct interests in keeping the ski lifts open. Unfortunately, this group included stakeholders holding significant political and decision-making power (Manzoni 2021). As a result, the rejection of the project can be interpreted not merely as a matter of economic interests, but rather as the expression of a limited mentality and not capable of capturing the environmental and socio-economic potential of that kind of project. As highlighted by Lorenzo Delladio during the interview, economic interests in maintaining the status quo played only a partial role. Instead, greater relevance should be attributed to political interests. The entrepreneur also talked about the envy that the funding came from a private actor. Moreover, identity-related issues appear to have contributed to the rejection of the project. Although both areas belong to the same regional context, Passo Rolle falls under the administrative jurisdiction of Primiero, while the project was proposed by an entrepreneur from Val di Fiemme, a move that was probably perceived as external interference in local matters (Manzoni 2012).

The result was the preservation of the traditional ski-based tourism model. The company managing the ski lifts in the southern area of Passo Rolle (Società Impianti Turistici Rolle Srl) sold its infrastructure and shares to another society, San Martino Rolle Spa, which continues to manage the ski facilities today (La Voce del Nordest 2018). Substantial financial resources, coming from both public and private sources, were subsequently invested to cover accumulated

debts and support new infrastructure projects, including the ski connection between San Martino and Passo Rolle, as well as other large-scale infrastructure interventions.

The rejection of the project thus represents, as it will be explored in more detail in the following section, a missed opportunity. On one hand, it hindered the potential requalification of Passo Rolle and the revitalisation of a tourism sector which showed clear signs of decline. On the other hand, it prevented the valley of Primiero and, more generally, the region of Trentino, from promoting an alternative and more sustainable vision of mountain tourism and local development models. Moreover, this case reveals the inability of local and regional actors to respond effectively to ongoing challenges and to support more resilient models.

3.6 Discussion

The following section provides a comparative discussion of the La Sportiva Outdoor Paradise project and the proposed cableway connection. The aim is to analyse the two initiatives across multiple dimensions, including the economic, environmental and social sustainability, as well as their potential to contribute to the requalification and development of the area. Particular attention will be given to the role of political interests in shaping development choices and sustaining the traditional ski-based model.

3.6.1 Economic sustainability

From an economic perspective, the two projects differ significantly in financial structure and economic sustainability.

As previously highlighted, the La Sportiva Outdoor Paradise project was intended to be entirely financed through private investments from La Sportiva, as the primary shareholder, and two other investors (Delladio 2025). Although Lorenzo Delladio, during the interview, did not disclose the exact amount of the investment, the overall cost was described as relatively limited. A significant share of the investment would have been allocated to the acquisition of shares in the ski lift company and to the subsequent dismantling of the infrastructure. The dismantled components would have been sold to other companies, one in Israel and the other in Poland. The money derived from the sales would have been reinvested in the removal of the ski lifts foundations and in restoring the area to its natural state, while the remaining resources would have been allocated to the realisation of the other expected facilities, including the experience rooms and the multifunctional centre. The planned activities did not require additional infrastructural intervention, as they were already available in the area, except for their

organisation. This latter would then have been covered partly by the visitors, participating in the structured activities. Finally, part of the investment would have been allocated to obtaining the necessary land use permits, allowing access to and use of areas under public administration.

On the other hand, the proposed cableway connection between San Martino di Castrozza and Passo Rolle, together with its auxiliary interventions, is entirely funded through public investments. The project is promoted by the Provincia Autonoma di Trento and Trentino Sviluppo, which allocated a total budget of 54,735,475 euros, of which 52,944,767 are dedicated to the construction works, including the auxiliary works such as the return ski slope from Passo Rolle, and 1,790,707 euros to the planning of the activities (Ufficio Stampa Provincia Autonoma di Trento 2024).

In addition to the cableway project, further public investments were directed towards other infrastructural projects in the area. Among these is the Busabella road deviation along SS 50, which connects Primiero with Val di Fiemme and passes by Passo Rolle. The primary objective of this intervention was to secure the area from avalanche risks, diverting the traffic away from hazardous zones. The project involved the construction of a bridge, several underpasses, and designated public transport stops (Ufficio Stampa Provincia Autonoma di Trento). Completed in 2025, the intervention required a total investment of approximately 6.3 million euros. As stated by province administration, these interventions are part of a broader strategy, also including the cableway connection, aimed at requalifying the area and fostering economic and tourist development. Overall, approximately 60 million euros of public funds were invested under the rationale of promoting alternative mobility, particularly in relation to winter tourism. In this context, however, one may naturally question both the necessity and coherence of such investments. Indeed, both the cableway connection and the road bypass largely pursue the same objectives, namely, as emphasised in the *Piano Territoriale di Comunità* (2012), the improvement of accessibility towards the valley of Primiero and the promotion of alternative mobility within the area. The allocation of substantial public resources on multiple projects aimed at the same goal raises serious concerns about the efficiency and strategic justification of public expenditure. Instead of reflecting a coordinated and diverse development approach, this pattern indicates an inefficient distribution of public funds. Moreover, if one of the stated objectives was the tourist requalification of Passo Rolle, it is legitimate to question why priority was given to a connection project without a parallel improvement of the local tourism offer. As emphasised by Delladio (2025), no significant investments were directed towards the modernisation of the ski lifts or tourist facilities, which remain in a state of obsolescence and deterioration. The only notable intervention consisted of the demolition of the Albergo Rolle,

which was transformed into a parking area, and the renovation of the former Caserma Ferrari of the Alpine School of Guardia di Finanza. These actions further reinforce the perception of a fragmented and uncoordinated development strategy.

Another key aspect of economic sustainability concerns the financing and long-term maintenance of infrastructure, and the overall tourism offer at Passo Rolle. While the proposed La Sportiva Outdoor Paradise project would have relied primarily on private investments, the current configuration remains largely dependent on public resources. This aspect becomes particularly relevant in light of ongoing climatic changes and the progressive decline in snow reliability, which increasingly undermines the viability of the ski-based tourism model.
As highlighted by Delladio (2025), his project would have been sustained with private capital, thereby transferring the economic risk, especially under conditions of insufficient snow or adverse weather, to private investors. In contrast, the existing model places the sustenance of the infrastructure and, more generally, of the area, predominantly on public actors and on the companies that manage the ski lifts. However, the private component, in this case, is quite limited. The main operating company, San Martino Rolle Spa, is largely controlled by public ownership, with Trentino Sviluppo acting as the primary shareholder. This latter holds shares amounting to 7,500,000 euros, making it the dominant stakeholder in the company (San Martino Rolle SPA). Consequently, the current model consolidates a structural dependence on public investments. This dynamic not only raises concerns about the long-term economic sustainability of the area but also could limit its capacity for innovation and adaptation, prioritising short-term development over strategic transformation and hindering both the modernisation of the area and the transition towards more resilient pathways. As emphasised by Casanova (2025), enhancing the resilience of mountain regions requires a fundamental reorientation of investment strategies. Rather than continuing to allocate resources to the construction of new ski lifts, priority should be given to the upgrading and modernisation of existing infrastructure, as well as to the dismantling of obsolete and abandoned facilities, restoring the territories to their natural state.

Regarding economic returns, the contribution that the La Sportiva Outdoor Paradise project would have generated to the local economy appears considerable, both in the short term during the planning and construction phases and in the long term (Delladio 2025). Local businesses and actors would have been directly involved in terms of workforce and resources, both for the dismantling of the obsolete infrastructure and the development of the new facilities, thereby ensuring that investments remained largely within the province of Trento. In the long term, the

economic return would have derived from the increase in the attractiveness of Passo Rolle, driven by the innovative nature of the project (Delladio 2025). The impact would have been even greater, given the altitude of the pass of 2400 metres above sea level. Moreover, the project was part of a broader marketing strategy, carried out by La Sportiva and reinforced by its international visibility, in order to attract a broader and more diversified audience. However, it is important to underline that the potential visibility and innovative impact of such a project would not be the same today as it would have been in 2017. At that time, Passo Rolle would have represented one of the first ski destinations globally to voluntarily dismantle still-operating ski lifts in order to promote sustainability and climate-resilient activities, thereby positioning itself as a pioneering case in the redefinition of mountain tourism models (Delladio 2025).

The governance model planned for the project would have ensured the redistribution of economic benefits at the local level. Once completed, the management of the activities would have been delegated to local stakeholders, such as hotel managers, restaurant owners, the shops and mountain guides, particularly in the municipalities of San Martino di Castrozza, Predazzo and Bellamonte (Delladio 2025). As a result, the economic return would not have remained concentrated within a single actor but would have been distributed across the whole territories of Val di Fiemme and Primiero, strengthening its role as a valuable tourist destination.

Moreover, a central objective of the project was to reduce the seasonality of the existing tourist offering, which is currently focused on the winter and summer seasons. The proposed activities would be accessible throughout the year, encouraging tourism even in the off-season. As highlighted by Delladio (2025), the focus was on quality rather than quantity, prioritising more sustainable forms of tourism.

In contrast, the cableway connection project, while still generating some economic return at the local level, particularly through the involvement of local construction and planning companies (Ufficio Stampa Provincia Autonoma di Trento 2024), appears more limited in the long-term impacts. One of its primary objectives is to improve connectivity among the various ski areas in San Martino di Castrozza, mainly benefiting the winter season and perpetuating an unsustainable economic tourism model largely dependent on the ski industry. Therefore, its economic benefits are inherently seasonal and closely tied to snow conditions, which are becoming increasingly uncertain. Moreover, this consideration becomes even more significant in light of the absence of interventions and investments to improve the infrastructure and tourism offering at Passo Rolle. This issue is further emphasised by Casanova (2025), who highlights the inappropriateness of a project such as the cableway connection in the absence of a renewed tourism offer and in an area largely characterised by obsolete infrastructure.

In this sense, one may legitimately ask whether, in its current state, Passo Rolle is capable of generating a comparable level of attractiveness and economic return to that of the La Sportiva Outdoor Paradise project.

3.6.2 Environmental sustainability

Another important aspect to analyse is the environmental sustainability of both projects, which reflect fundamentally different approaches to development.

This becomes even more significant considering that Passo Rolle is part of the Parco Natural Paneveggio-Pale di San Martino and of the Dolomites UNESCO World Heritage. Therefore, the area is subject to specific levels of protection aimed at safeguarding the natural, environmental, historical, cultural, anthropological, and traditional values of the entire territory under the park administration (Parco Naturale Paneveggio-Pale di San Martino n.d.). One of the main purposes of the Parco is to ensure balanced management and valorisation of these elements, while maintaining high environmental standards and promoting sustainable use of the territory, reducing soil consumption and the use of natural resources (Parco Naturale Paneveggio Pale di San Martino 2016). To achieve these goals, the territory of the Parco Naturale is divided into a system of zoning that regulates land use, defines permissible activities, and establishes different levels of protection. Three zones are identified. Strict nature reserves (Zone A) are designated for the rigorous conservation of the ecosystems and the environment; in this area, excessive fragmentation should be avoided, and the human presence should be limited to a minimum. Managed reserves (Zone B) aim to balance the conservation of the natural environments with the traditional human presence and its influence. Finally, controlled reserves (Zone C) allow for the development of tourist and recreational facilities and uses, ensuring that such activities remain compatible with the preservation of ecosystems (Parco Naturale Paneveggio-Pale di San Martino 2016). In addition to these zones, the Parco also includes the special reserves, "aimed at ensuring the strict protection and scientific enhancement of specific geomorphological, limnological, floristic, faunal, biological, architectural-landscape, and historical-anthropological elements" (p. 64). Therefore, depending on the zoning level, different conservation and protection measures[12] are applied. Regarding the infrastructural, tourist, and recreational activities, the Parco underlines the need to limit interventions primarily to the maintenance and modernisation of existing facilities, while ensuring that any modifications to the ski areas and related infrastructure remain fully

[12] The Parco Naturale defines the conservation measures as "a set of measures necessary to maintain or restore natural habitat and population of wild fauna and flora species to a favourable condition" (Parco Naturale Paneveggio-Pale di San Martino 2016, p.102).

compatible with the conservation of the habitat and species. As shown in Figure 5, the area of Passo Rolle falls within Zone C (controlled reserve) and is therefore subject to regulated development processes, where tourism-related activities are permitted, but they have to be balanced with environmental protection objectives.

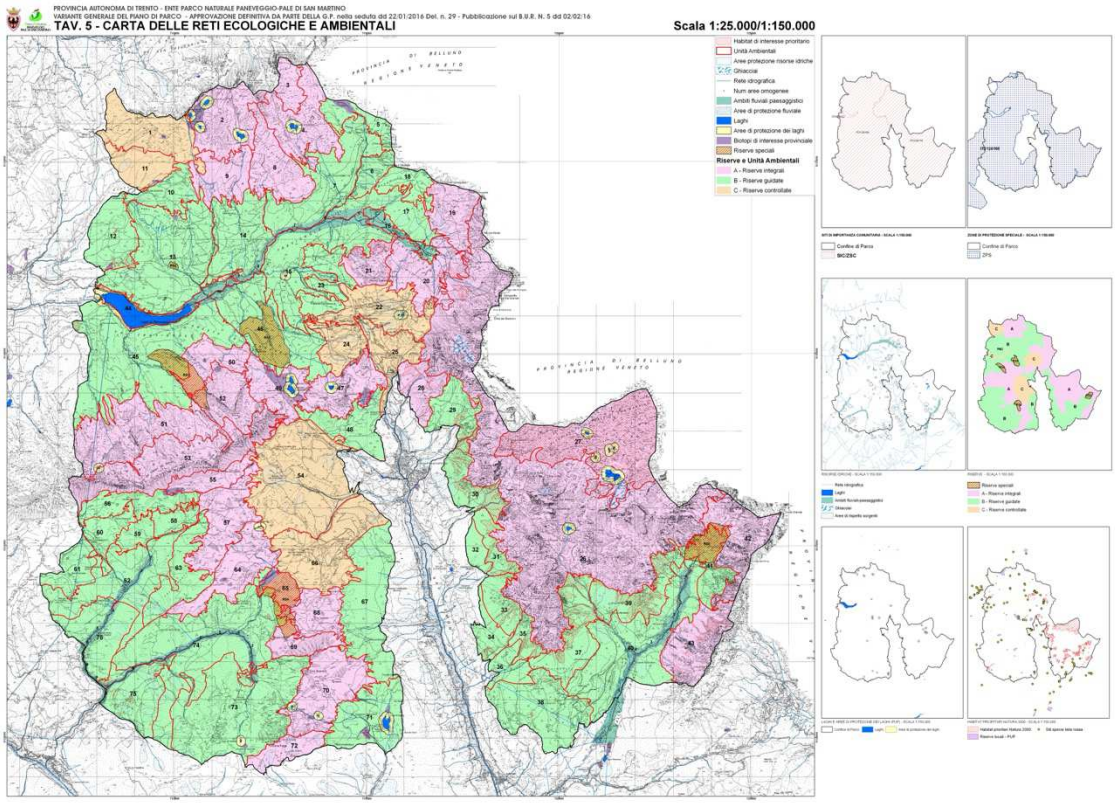

Figure 6: Map of the ecological and environmental networks (Source: Parco Naturale Paneveggio-Pale di San Martino 2016)

Within this context, the La Sportiva Outdoor Paradise project was fully aligned with the objectives of the Parco Naturale and with broader ecological requirements. As stated by Delladio (2025) and confirmed consequently by Casanova (2025), the environmental impact of the project would have been minimal, if not potentially positive. The dismantling of the ski lifts and the foundation bases would have contributed to the restoration of the landscape, allowing the area to return to its natural state and reducing the environmental footprint associated with the existing ski infrastructure. At the same time, the initiative was designed to minimise new land consumption by relying on the reuse and adaptation of the existing structures on the pass. No large-scale or purpose-built infrastructures would have been built, thereby significantly limiting additional environmental pressures. Although the ski slopes could have been reforested, the proposal instead suggested maintaining them in their current condition for activities, such as trail running and sky running. Moreover, the artificial snowmaking system

would have been dismantled, leaving only the artificial lake, which would have been repurposed as a recreational area.

Therefore, the La Sportiva Outdoor Paradise was well integrated into both the surrounding environment and the regulatory framework, particularly in relation to the requirements of Zone C. The project effectively limited infrastructure development and promoted environmentally compatible tourism activities, reducing the impact to a minimum.

In contrast, the cableway connection presents several critical issues from an environmental perspective. While the project proposed by Delladio was based on the removal and reduction of existing infrastructure, the cableway connection introduces new large-scale infrastructural elements into an already fragile area.

The Environmental Impact Assessment (2020) did not identify any major criticalities, concluding that the project would not generate any significant impacts and would remain in line with the regulatory framework of the park. Moreover, the project has been framed as an initiative aimed at promoting alternative mobility and improving connectivity within the ski area, with an emphasis on its potential in reducing CO2 emissions by favouring the use of low-emission transportation and pedestrian mobility. However, this interpretation appears limited when other elements of analysis are considered. According to the SAT (2008), the overall evaluation of the project in terms of environmental, landscape and economic impacts does not fully justify its implementation. In particular, the project does not effectively function as an alternative mobility solution, nor does it significantly influence traffic flows in either the winter or summer seasons. Instead, existing solutions, such as ski buses and summer shuttle services, already provide lower-impact alternatives, raising questions about the necessity of the intervention.

From an ecological perspective, the criticisms become even more significant. A major point concerns the location of the infrastructure, which is situated across approximately two-thirds of areas protected by the Parco Naturale, encompassing zones of high landscape value and naturalistic and archaeological importance (Mayr 2009). In this regard, SAT (2008) highlights that the assessment of impacts on flora and fauna is often superficial and, in some cases, inaccurate, failing to adequately investigate the real implications of the project on local ecosystems. Several key aspects appear to have been overlooked or insufficiently addressed, and many of the conclusions regarding environmental impacts are based on subjective considerations, without any technical or scientific data to support the claims. This leads to a significant underestimation of the actual impacts of the project on the landscape and the ecosystems (SAT 2008).

In light of these considerations, the project appears particularly problematic when considered within the framework of the Parco Naturale, whose regulations emphasise the need to limit the development of large-scale infrastructure, especially in the absence of a comprehensive evaluation of both the direct and indirect impacts on the habitats and the ecosystems (Parco Naturale Paneveggio-Pale di San Martino 2016). However, it is also important to underline that the Parco Naturale ultimately approved the project and its associated works. This apparent inconsistency highlights, as stated by Casanova (2025), the inability of the Parco to effectively implement its own regulations, largely influenced by the interests of ski operators.

Environmental sustainability should also be analysed in the context of climate change. Although Passo Rolle is located at a relatively high altitude (around 2000m), it is not immune to climate change impacts, as rising temperatures are expected to increasingly affect both snow reliability and snow cover in the area. Given its elevation, Passo Rolle is expected to be one of the last Alpine destinations able to guarantee sufficient snow cover for ski operations; however, this does not exclude growing variability and long-term decline. Indeed, recent trends already highlight this direction. While temperature data do not show significant variations in January between 1998 and 2023, with maximum temperatures of 2 °C and 1 °C, respectively, and a minimum of −7 °C in both cases (Meteotrentino, n.d.), snow cover has decreased significantly over the same period. Total snow cover declined from 451 cm in the 1997/1998 winter season to 260 cm in 2022/2023 (ISPAT, n.d.), indicating a clear reduction in snow availability despite relatively stable average temperatures.

In this context, the need to adapt to climate change becomes increasingly important in order to enhance the resilience of mountain destinations in facing the ongoing challenges. While the La Sportiva Outdoor Paradise project directly engaged with these dynamics, promoting alternative practices to the ski industry and sustainable forms of tourism development, the current model on Passo Rolle largely overlooks the changing climatic conditions. Although the pass is relatively more favourable to other Alpine destinations in terms of altitude and snow precipitation, the decision to improve and expand the lift infrastructure network appears incoherent and lacks a long-term perspective (SAT 2008). In particular, the cableway connection, together with ongoing investments in the ski industry in San Martino di Castrozza, risks increasing structural dependence on it. As noted by SAT (2008), “failing to address the critical issues of temperature and precipitation, which are one of the most important elements upon which the project is based, undermines the credibility of the proposed plan, which, although technically valid, relies on conditions that are unlikely to be met” (p. 8).

This limitation becomes even more significant considering the tourist trajectory of San Martino di Castrozza. Despite the winter tourism decline experienced by the destination in recent years, investments continue to prioritise the ski industry as the primary development model, raising questions about their strategic coherence. Rather than reinforcing a snow-dependent model, it would be more appropriate to allocate resources to diversification strategies that enhance resilience and reduce vulnerability to climate variability. Although the project promoters emphasise its potential to promote both winter and summer tourism, the intervention seems to serve only as a ski-area connection, thus perpetuating an unsustainable tourism model.

3.6.3 Social sustainability and political interests

Beyond economic and environmental considerations, it is essential to examine the social sustainability of the two projects and the political dynamics that shaped their development. This analysis plays a crucial role in determining whose interests are prioritised and how local communities are affected.

The involvement of local communities, both during the presentation and subsequent management phases, constituted a crucial component in the development of the La Sportiva Outdoor Paradise project. Besides the involvement of local communities in terms of economic return, as already analysed, the project also fostered from the beginning a participatory approach that included actors from the two valleys and actively engaged local stakeholders from both San Martino di Castrozza and Predazzo (Delladio 2025). The project was presented through a series of public meetings and events, during which its objectives, vision and the activities proposed were explained. The initiative received a generally positive response among local communities. Evidence of this is reflected in the results of a survey conducted through the La Sportiva website, where approximately 90 % of the respondents expressed a favourable opinion of the project (Delladio 2025).

Moreover, although the project was primarily aimed at requalifying the tourist offer, its potential benefits went beyond the economic returns. In this sense, the initiative can be also defined as a community-based project, as it sought to create value not only for visitors but also for residents. As emphasised by Delladio (2025), the project was conceived to benefit both tourists and local residents, enabling the latter to actively engage in the proposed activities. This reflects a broader perspective in which development is not exclusively oriented towards tourist demand, but also towards improving the quality of life for those who live in the territory.

Within this framework, the project would have fostered greater inclusion of residents in the local tourism systems, offering them not only economic benefits but also access to services and opportunities.

Another key dimension of social sustainability concerns the potential of the project not only to enhance the attractiveness of the areas from a tourism perspective, but also to contribute to the revitalisation of a mountain territory already experiencing processes of decline. As highlighted by Delladio (2025), depopulation in mountain areas is often linked to economic stagnation and the lack of opportunities. In this context, a project like La Sportiva Outdoor Paradise, by fostering new forms of economic activity and tourist development, could have contributed to invert these trends. By creating new opportunities and increasing the overall appeal of the area, it had the potential to attract new residents and support the long-term socio-economic vitality of the territory.

However, despite the general consensus at the local level, the project was ultimately rejected by those actors holding decision-making and political power, highlighting a discrepancy between the opinion of local communities and institutional decisions. In order to better understand these dynamics, an interest-influence matrix was developed. From the matrix, a clear imbalance in the levels of interest and influence of stakeholders can be observed. On one hand, most of the actors with decision-making power, including the municipality of San Martino, the Comunità di Valle of Primiero, the Consorzio managing the ski lift on Passo Rolle, and the Autonomous Province of Trento, showed limited support to the project proposed by Delladio, mainly due to their interests in preserving the ski infrastructures and the current tourism model. On the other hand, stakeholders with comparatively lower influence, such as the local communities, actors from the neighbouring Val di Fiemme and environmental associations, expressed a more favourable attitude towards the project.

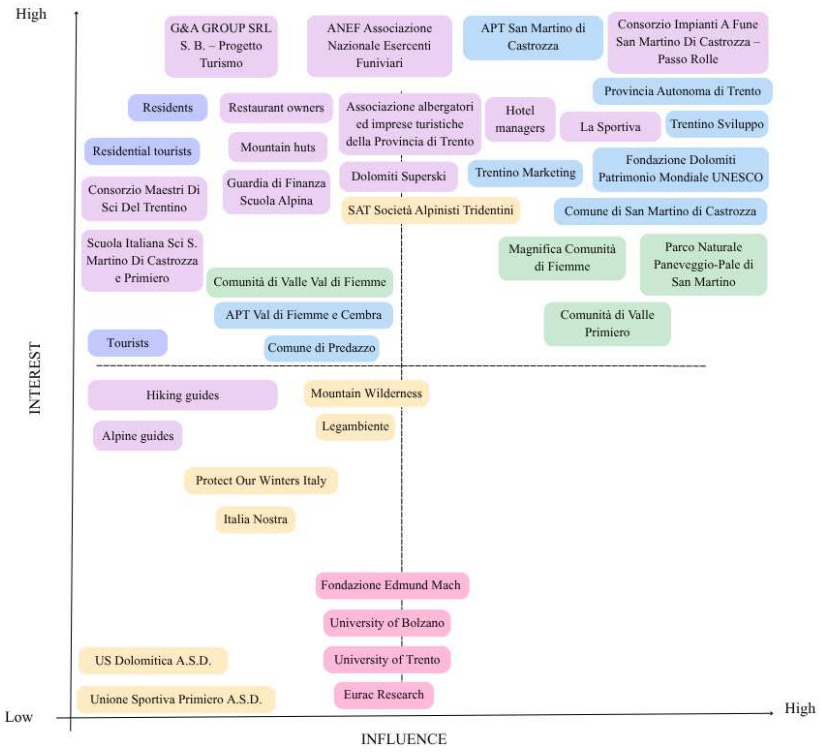

Figure 7: Stakeholders mapping and engagement through the Interest/influence matrix

The result is the perpetuation of a tourism model that appears increasingly unsustainable from both environmental and economic perspectives, as exemplified by the implementation of the cableway connection between San Martino di Castrozza and Passo Rolle. This decision reflects the broader development strategies adopted by the Autonomous Province of Trento and other public institutions, revealing an inclination to preserve traditional approaches to mountain tourism centred on the maintenance and expansion of ski-based infrastructure. This orientation is further evidenced by the financial strategy outlined in the reports of Trentino Sviluppo, which indicates that a significant share of investments has been allocated to the construction of ski lifts, snowmaking systems, and water basins (Trentino Sviluppo 2024). While these interventions are justified as measures to sustain and enhance local economies, they also reinforce a development pathway that remains strongly dependent on a sector increasingly vulnerable to climatic conditions.

Therefore, as stated by Casanova (2025), Delladio collided with an unsuitable political landscape and a cultural context "unprepared to adapt to change, […], lacking a long-term perspective and unable to recognise the value of such a highly valuable territory". Within this framework, the long-term sustainability of Passo Rolle appears increasingly uncertain. According to Casanova (2025), even with the implementation of the cableway connection, the

area is destined to a progressive decline, as the structural vulnerabilities of the current development model remain unaddressed.

Conclusions

In light of the considerations discussed throughout the thesis, the La Sportiva Outdoor Paradise project represents a missed opportunity for both the territorial and tourist requalification of Passo Rolle, as well as for the promotion of a more sustainable tourism development model in mountain areas. As already discussed, the persistence of a ski-based tourism model, increasingly incompatible with the climatic and environmental conditions, combined with continued investment in technological adaptation measures rather than in the diversification of activities, risks reinforcing dependence on unsustainable development pathways and public financial support. The project proposed by Delladio is fully aligned with the guidelines promoted by institutions such as CIPRA and the Alpine Convention, as well as with the emerging tourism trends analysed in the previous chapters, which showed a gradual decline in the number of alpine skiing practitioners in favour of alternative tourist activities (Legambiente 2025). Moreover, as highlighted by Eurac Research (2024), the dismantling of the ski-related infrastructure combined with a diversification strategy and the promotion of year-round tourism can significantly enhance long-term resilience and reduce dependence on the ski industry and climatic conditions. The project is a demonstration of what Casanova (2020) described as valuable development initiatives, able to promote zero-impact tourism and limit infrastructural development, finding a balance between human activities and nature.

On the other hand, the cableway connection, together with the current tourist offering in San Martino di Castrozza and Passo Rolle, risks perpetuating unsustainable tourism from both economic and environmental perspectives. From the standpoint of tourism offer and visitor flows, the cableway connection may contribute to an increase in overnight stays and ski lift rides, potentially enhancing the attractiveness of the destination during the winter season. However, this potential growth must be critically assessed against the environmental impacts outlined above, raising the question of whether they can be justified in the name of tourism and economic development, particularly in the light of the short-term sustainability of the project and the structural vulnerabilities of the current tourism model in Primiero.

These observations are consistent with the broader analysis of Alpine tourism development presented in the first chapter, which highlights the significant impacts of mass tourism on mountain territories, both in terms of natural and cultural resources. As noted by Casanova (2025), the ski industry is among the most intensive forms of tourism, which, combined with rising summer tourist flows, leads to landscape transformation, environmental degradation, and overexploitation of natural resources. Moreover, tourism also affects social and cultural

dynamics, contributing to the commodification of the mountain culture and landscape and, in some cases, gentrification. From an economic perspective, mass tourism can result in the emergence of a tourist monoculture, which, alongside ongoing investments in ski infrastructure, further reinforces reliance on external capital and the ski industry.
Within this context, the need to recognise the structural limitations and contradictions of the current tourism model becomes evident. Climate change further reinforces this urgency. Rising temperatures and the progressive decrease in snow cover and snow reliability, as investigated in the thesis, challenge the long-term viability of ski-based tourism and call for a strategic reorientation.

In this sense, the La Sportiva Outdoor Paradise can be interpreted as an attempt to move towards what has been defined in the first chapter as the third way, promoting a development model capable of balancing human activities with the natural environment while moving beyond patterns of unlimited consumption. This aspect was also emphasised by Casanova (2025), arguing that such initiatives represent credible alternatives to the dominant tourism model.

The case of Passo Rolle also demonstrates the complexity of rethinking tourism development model in mountain areas, highlighting the inability of the institutional and political actors to acknowledge the challenges posed by climate change and the progressive decline of the ski industry. Despite growing evidence and observable trends, decision-making processes remain strongly influenced by economic and personal interests, leading to interventions that are often misaligned with long-term sustainability objectives, prioritising short-term economic returns and the preservation of existing infrastructure over more transformative and adaptive approaches. Moreover, this dynamic highlights the inability to integrate environmental considerations into strategic planning, resulting in fragmented and inefficient policies. Instead of fostering innovation and facilitating a transition towards more sustainable forms of tourism, current strategies perpetuate an unsustainable development model, contributing to exacerbating the vulnerabilities of mountain territories in the face of ongoing environmental and socio-economic changes.

Therefore, it can be argued that the case of Passo Rolle ultimately reflects a failure of the institutional and political sphere to recognise the potential of alternative development models.
Despite the innovative character of the La Sportiva Outdoor Paradise project and the support expressed by local communities, the provincial and municipal administrations, as well as some local entrepreneurs, remained anchored in a traditional, ski-based development paradigm,

promoting the cableway connection project and the reinforcement of existing infrastructure. These dynamics resulted in a missed opportunity to implement more sustainable and resilient projects, and more importantly, to undertake a requalification of the area. Rather than fostering innovation and diversification, current strategies have effectively maintained the status quo, further reinforcing structural dependencies on a sector increasingly vulnerable to climatic and market changes.

In this sense, the failure to embrace a strategic shift towards alternative tourism models risks further exacerbating the ongoing processes of stagnation and progressive decline affecting the area. As highlighted by Casanova (2017), the "combination of opportunism, clientelism, cultural fragility, and resistance to innovation has ultimately condemned Primiero and Passo Rolle to a marginal role in tourism development in the Alps" (par.1).

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Annexes

Annex n.1

Semi-structured interview – "La Sportiva Outdoor Paradise" – Lorenzo Delladio (2025)

1. With rising prices and the increasing demand for exclusive experiences, mountain environments risk becoming perceived as elitist spaces, not only for tourists but also for local communities. Some have described your project as "a mountain for wealthy people." Do you consider it appropriate to define your proposal as a form of luxury tourism?

2. In what ways would the project have contributed to local development, particularly from an economic perspective? Which benefits would have been brought during the implementation phase (e.g., in terms of employment and the use of local resources) and in the long term?

3. How would the local community have been involved in the planning and management of tourism-related activities?

4. Beyond accommodation and dining facilities, would trails and activities have been freely accessible, or subject to fees?

5. (If subject to fees) Were any concessions or discounted access schemes planned for residents of the Primiero and Val di Fiemme areas?

6. Could your project be defined as a community-based project, going beyond mere tourism redevelopment of Passo Rolle? In other words, was it intended to create a space that local residents could actively inhabit and experience without feeling excluded?

7. One of the central elements of the project was environmental and territorial regeneration, with the aim of restoring the area's natural character and developing a sustainable tourism model. Given that Passo Rolle lies within the Parco Naturale Paneveggio-Pale di San Martino, how does the project fit within this context? What would its environmental impact have been?

8. Did the project foresee the renovation of existing structures or the construction of new buildings?

9. The project was based on dismantling ski infrastructure in order to promote alternative, less environmentally impactful activities. In this context, was the maintenance or construction of artificial snowmaking systems envisaged?

10. What funding mechanisms were envisaged? Was direct investment from La Sportiva considered, or would there also have been personal financial involvement?

12. One of the commonly cited limitations of alternative models is their relatively lower economic output compared to the alpine skiing industry. Do you believe this factor contributed to the rejection of the project, or were other elements, such as cultural or identity-related aspects, also influential?

13. In recent years, the number of decommissioned ski lifts and artificial snow reservoirs has significantly increased. Do you believe your project could represent a viable alternative to the traditional model of mountain tourism development?

14. Do you think the project could be reintroduced in the future, perhaps in a revised form?

15. What is your opinion on the possibility of relaunching the project through a community cooperative funding model, aimed at creating a shared space managed directly by the local population?

Annex n. 2

Semi-structured interview – Luigi Casanova (2025)

1. Do you consider the proposal would have been appropriate and coherent with the specific context of Passo Rolle?

2. With regard to the planned infrastructure and proposed activities, do you believe they were genuinely sustainable?

3. One of the core elements of the project was environmental and territorial regeneration, with the primary aim of restoring the area to a more natural state and developing a tourism model capable of respecting the natural landscape. Mr Delladio stated that the project would have

integrated into the natural park in a fully sustainable way, with a null or even positive environmental impact. Do you agree with these claims?

4. According to Mr Delladio, the rejection of the project was mainly due to political reasons and a narrow mindset, particularly in San Martino di Castrozza, which remains tied to a traditional model of alpine tourism. Today, in light of growing awareness of climate change, do you think this mindset has evolved, or does resistance to change still persist?

5. The case of Passo Rolle highlights the tension between the will of local communities and political interests. In this instance, political interests appear to have prevailed, maintaining a development model linked to the ski industry. In your opinion, who should hold responsibility for deciding the future of mountain areas and determining how they should be managed?

6. How should local communities be involved in decision-making processes and in the management of mountain areas, particularly in tourism and territorial redevelopment projects such as this?

7. With reference to the concept of carrying capacity, how can it be translated into practice in fragile environments such as alpine contexts, especially in protected areas like Passo Rolle? How can it become a valuable element in the governance of alpine regions?

8. How can the concept of limits be balanced with the right of all individuals to access and experience mountain environments? Do you think measures such as access restrictions or reservation systems could represent appropriate solutions?

9. Do you believe that projects such as “La Sportiva Outdoor Paradise” could offer a viable alternative to the ski industry, capable of respecting environmental limits while fostering sustainable local development?

10. Mr Delladio has stated that, following the approval and construction of the new ski lift connection, the project in its original form would no longer be meaningful. Do you agree with this statement? Do you think a revised version of the project could still be feasible?

11. Looking at the current situation, what future do you envision for Passo Rolle and for mountain regions more broadly?