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Climate Change Adaptation Types in Alpine Winter Tourism Destinations:

Klimawandelanpassungsarten in alpinen Wintertourismusdestinationen:

Differentiating Incremental, Transformational, Autonomous and Planned Adaptations in Balderschwang, Germany

Unterscheidung zwischen inkrementellen, transformativen, autonomen und geplanten Anpassungen in Balderschwang, Deutschland

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Abstract: In the context of climate change adaptation, alpine winter tourism destinations are confronted with multiple, sometimes conflicting, types of adaptation measures, aiming first and foremost at reducing vulnerability to climate change. Measures' scopes range from incremental adjustments to transformational turnarounds of existing pathways. Different actors can initiate and manage adaptation, including individual self-organised responses, private sector measures, community-led initiatives, and government-imposed measures. In this study, we apply two conceptual frameworks from climate change adaptation research to the case of Balderschwang, an alpine winter destination in Bavaria, Germany. The aim is to examine both its recent adaptation development and the adaptation visions of the residents. In addition to an in-depth assessment of the case study area, we base our analysis on qualitative interviews conducted with 12 residents, being both community members and tourism stakeholders. Our results show that different adaptation types, both in terms of the depth of intervention as well as the actors introducing and managing the adaptation, may coexist, potentially enabling, constraining, or even evolve into each other. Awareness of these adaptation types can help untangle adaptation barriers and identify potential linkages that could help align adaptation efforts across the different actors, thereby increasing the likelihood of successful

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climate change adaptation. We conclude that the collaborative approach, a mix of autonomous and planned adaptations, offers a promising way to streamline local adaptation needs with governmental support, increasing the possibility of successful adaptation.

Keywords: climate change adaptation, climate change impacts, tourism destinations, year-round tourism, product diversification, qualitative interviews

Zusammenfassung: Im Zusammenhang mit der Anpassung an den Klimawandel sehen sich alpine Wintertourismusdestinationen mit vielfältigen, manchmal widersprüchlichen Anpassungsmaßnahmen konfrontiert, die in erster Linie darauf abzielen, die Klimawandelvulnerabilität zu verringern. Der Maßnahmenrahmen reicht hierbei von schrittweisen Anpassungen bis hin zu transformativen Umgestaltungen bestehender Strukturen. Verschiedene Akteure können Anpassungsmaßnahmen initiieren und bewältigen, darunter selbstorganisierte Reaktionen von Einzelpersonen, Maßnahmen des Privatsektors, gemeindegeleitete Initiativen und staatlich verordnete Maßnahmen. In dieser Studie wenden wir zwei konzeptionelle Rahmenwerke aus der Klimawandelanpassungsforschung auf den Fall Balderschwang an, einer alpinen Winterdestination in Bayern, Deutschland. Ziel ist es, sowohl die jüngsten Anpassungsentwicklungen als auch die Anpassungsvisionen der Einwohner zu untersuchen. Zusätzlich zu einer eingehenden Bewertung des Fallstudiengebiets stützen wir unsere Analyse auf qualitative Interviews mit 12 Einwohnern, die sowohl Gemeindemitglieder als auch Tourismusakteure sind. Unsere Ergebnisse zeigen, dass verschiedene Arten der Anpassung, sowohl hinsichtlich der Interventionstiefe als auch hinsichtlich der Akteure, die die Anpassung einführen und verwalten, koexistieren können, sich gegenseitig ermöglichen, einschränken oder sogar ineinander entwickeln können. Das Bewusstsein für diese Anpassungsarten kann dazu beitragen, Anpassungshindernisse zu beseitigen und potenzielle Verbindungen zu identifizieren, die dazu beitragen könnten, die Anpassungsbemühungen der verschiedenen Akteure aufeinander abzustimmen und damit die Wahrscheinlichkeit einer erfolgreichen Klimawandelanpassung zu erhöhen. Wir folgern, dass der kooperative Ansatz, eine Mischung aus autonomen und geplanten Anpassungen, einen vielversprechenden Weg darstellt, um lokale Anpassungsbedürfnisse mit staatlicher Unterstützung zu optimieren und damit die Chancen für eine erfolgreiche Anpassung zu erhöhen.

Schlüsselwörter: Klimawandelanpassung, Klimawandelauswirkungen, Tourismusdestinationen, Ganzjahrestourismus, Produktdiversifizierung, qualitative Interviews

1 Introduction

Due to their challenging topography and remoteness, which limit the possibilities for economic diversification, mountain communities often depend on tourism as one of their main socioeconomic sectors. Contributing significantly to the economy in Alpine regions, tourism attractiveness relies heavily on outdoor recreation possibilities, such as mountaineering, hiking, biking, and skiing (Keller, 2018; Lavorel et al., 2019; Romeo et al., 2021). However, these activities depend highly on natural resources and seasonal climate conditions, making mountain and especially winter tourism vulnerable to climate change (Scott et al., 2012). Evidence shows that temperatures in the European Alps are rising at greater rates than the global average (Brugnara, 2020; Palazzi et al., 2019; Pepin et al., 2015), challenging mountain tourism communities through reduced snow reliability and shorter winter seasons (Beniston et al., 2018; Sommer et al., 2020). Additionally, summer droughts, heat waves, flash floods, and landslides threaten tourism infrastructure and human health (Duvillard et al., 2019), underlining the growing necessity for adaptation (Schneiderbauer et al., 2021). Overall, climate change impacts on mountain tourism are perceived to be both negative and positive. In summer, hazards like rockfalls or floods can disrupt hiking and climbing activities (Mourey et al., 2020). Increasing heat in urban areas may enhance the appeal of cooler mountain destinations, particularly in spring and autumn, potentially expanding demand in the low season and contributing to season extensions (Pröbstl-Haider et al., 2015; Rosselló, 2013; Serquet & Rebetez, 2011). In contrast, winter tourism is predominantly negatively affected, particularly in low-altitude ski areas at the north-eastern Alpine foothills (Bausch, 2019; Steiger et al., 2019, 2021; Steiger & Abegg, 2018), whereas high-altitude ski areas may benefit from declining snow conditions in lower-lying destinations due to guests' preference for snow-reliable ski areas (Rutty et al., 2015a, 2015b; Steiger & Scott, 2020).

Alpine winter destinations used to adapt to climate change impacts through two main strategies, aimed primarily at the preservation of the current system, strongly driven by the economic importance of winter sports and especially skiing (Witting & Schmude, 2019; Bausch et al., 2024): (1) improving and expanding skiing infrastructure to increase profitability and remain competitive (Falk & Steiger, 2020); (2) compensating for declining snow reliability through technical snowmaking (Scott et al., 2024). More recently, however, a paradigm shift has become apparent in the industry (Chevrollier et al., 2025). An increasing number of ski areas are now considering a broader, long-term oriented transformation towards diversified, year-round and sustainability-oriented mountain tourism destinations (Bausch et al., 2024; Duglio & Beltramo, 2016). While specific governmental support programmes (including financial subsidies) exist for both system-preservation as well as system-transformation pathways, the actual decision-making, planning, and implementation of

adaptation measures are usually carried out by the respective communities or by private actors such as ski area operators (OECD Publishing, 2007).

In practice, coordinating climate change adaptation can be a complex task, with destinations repeatedly facing conflicts over the prioritisation of long-term versus short-term adaptation measures, alongside questions of competence and responsibility. From a conceptual perspective, research on climate change adaptation within tourism studies remains relatively underdeveloped compared to other sectors (Loehr, 2020; Scott et al., 2024; Scott & Becken, 2010; Scott & Gössling, 2022). Within the broader field of climate change adaptation research, various conceptual frameworks have been developed that offer significant potential for enhancing the understanding of the complexities of climate change adaptation, also within the tourism context. These address, among others, the conceptual categorisation of adaptation based on intention, function, spatial and temporal dimensions, scope, depth, duration of benefits, and degree of spontaneity (Maskell et al., 2025).

The case study presented in this article illustrates some of the recent developments and dynamics in climate change adaptation within the tourism sector: In Balderschwang, a winter tourism-dependent destination in the German Alps and highly exposed to climate change, a bottom-up initiative aimed at connecting the two small ski areas Riedberger Horn and Grasgehren in 2016. Initially, supported by a local referendum and despite conflicting with environmental law, the planned ski area connection gained political momentum and backing by the state government. However, it was subsequently withdrawn when the dispute threatened to jeopardise the simultaneous election campaign. Instead, the Bavarian government promised substantial funding towards the development of nature-based, sustainable tourism in the region (Deutsche Presse-Agentur, 2023; Sebald & Schnell, 2018).

This paper examines both the recent and envisioned climate change adaptation in the destination Balderschwang based on two conceptual frameworks from climate change adaptation literature: incremental versus transformational and autonomous versus planned adaptation. Both concepts are especially relevant in the case of Balderschwang, as the destination's development trajectory shifted during the dispute over the Riedberger Horn concerning both the intended scope of adaptation and the actors implementing the corresponding adaptation measures. Despite the governmental investment proposal in nature-based tourism in the region, there is still uncertainty and disagreement among residents and tourism stakeholders in Balderschwang about the vision for adaptation and implementation of proposed measures. Therefore, this article aims to address both theoretical and empirical gaps: First, the paper addresses the scarce inclusion of concepts from climate change adaptation literature in tourism contexts. Second, it seeks to enhance the understanding of the adaptation types pursued in the destination Balderschwang, how these adaptation measures have been and will be implemented, and which

actors play a central role in realising these measures. Developing a solid conceptual understanding of how different adaptation measures interrelate and take shape is crucial for overcoming the tension between short- and long-term priorities, as well as for clarifying responsibilities and areas of decision-making authority (Goldstein et al., 2019; Magnan et al., 2020; Maskell et al., 2025).

We employ a qualitative approach to analyse the development of the dispute surrounding the Riedberger Horn, drawing on media articles and public documents. In addition, 12 interviews have been conducted with local individuals who are both Balderschwang community members and tourism stakeholders to explore their visions for adaptation and perspectives on how proposed measures should be implemented. The following research questions guide this article:

(RQ1) What types of climate change adaptation related to tourism occur in Balderschwang, how does the adaptation process take place, and which actors are involved in planning and implementing adaptation?

(RQ2) How do the adaptation measures conflict, interrelate and evolve over time?

2 Conceptual background

2.1 Incremental versus transformational adaptation: Different types of adaptation in winter tourism

Climate change adaptation can be categorised based on the temporal scope and the depth of intervention. A concept that has gained increasing attention in this context is the distinction between incremental and transformational adaptation (Fedeles et al., 2019; Kates et al., 2012; Magnan et al., 2020; Mapfumo et al., 2017; Pelling, 2011).

Incremental and transformational adaptation are often viewed as two opposing approaches. Incremental adaptation refers to small-scale, familiar adjustments to existing practices that aim to preserve the functioning of a current system (status quo), in response to climate change (Park et al., 2012). Transformational adaptation describes a fundamental change of an existing system that addresses the root causes of climate change vulnerability (Fedeles et al., 2019; Pelling, 2011). While researchers tend to see incremental adaptation as a limited, short-term solution, they regard transformational change as essential to address long-term, intolerable risks. Decision-makers, however, often favour incremental measures as more practical and feasible, despite recognising the necessity of transformational action, frequently seen as politically challenging (Abegg et al., 2017; Kates et al., 2012; Kuhl et al., 2021; Magnan et al., 2020). Hence, the majority of identified and implemented

climate change adaptation measures are short-term oriented and reactive, and therefore classified as incremental (Rasul et al., 2020; Vij et al., 2021), while the literature regarding the actual implementation of transformational adaptation remains limited (Ajulo et al., 2020; Fedele et al., 2019). Especially research on the nexus of winter tourism, climate change, and adaptation remains comparatively underdeveloped (Scott & Gössling, 2022) and lacks empirical research on the conceptualisation and implementation of transformational adaptation.

Most literature on winter tourism focuses on supply-side adaptation, particularly technical snowmaking in ski areas (Scott et al., 2012; Steiger et al., 2019). This measure seeks to mitigate risks from rising temperatures and increased weather variability (Abegg et al., 2021). However, warming trends reduce snowmaking efficiency (Scott et al., 2024) and raise energy use, costs, and dependence on suitable temperatures and water availability (Damm et al., 2014; Scott et al., 2024). Recent studies question technical snowmaking as a suitable long-term adaptation, particularly for ski areas at lower altitudes (Scott et al., 2024; Spandre et al., 2015), since snowmaking is found to be prone to maladaptation, if required conditions, such as low temperatures and water access, are not sufficient or only marginally given (Scott et al., 2024). Furthermore, focusing on snowmaking is seen as merely extending or slightly modifying existing structures (Berard-Chenu et al., 2023), oftentimes without promoting systemic or structural changes needed to address the deep-rooted socioeconomic challenges that contribute to the vulnerability of many mountain destinations and their communities (McDowell et al., 2021). Nevertheless, research on ski tourism shows that operators often prioritise short-term, incremental adaptation measures like snowmaking, focusing on the preservation of the status quo and overlooking the potential of long-term strategies such as year-round tourism or product diversification (Bednar-Fiedl et al., 2023; Cholakova & Dogramadjieva, 2023; Haanpää et al., 2015; Hopkins, 2014). This preference may stem from climate change scepticism, a focus on immediate economic returns, and/or a strong faith in technological solutions, factors that in the worst case hinder long-term adaptation and sustain reliance on existing, oftentimes not sustainable business models (Abegg et al., 2017; Haanpää et al., 2015; Hopkins, 2014; Steiger et al., 2019).

A frequently proposed adaptation strategy in scientific literature is the diversification into less snow- and weather-dependent products, alongside the development of year-round tourism offerings (including the possibility of abandoning ski tourism operations altogether), which can generate value through snow-independent activities and is therefore considered transformational (Adler et al., 2023; Sauri & Llurdés, 2020). The shift towards year-round operations offers significant potential for expanding summer activities within ski areas, a development further accelerated by the COVID-19 pandemic. This strategy is not limited to low-altitude ski resorts that are increasingly affected by climate change and declining snow

reliability. It is also being adopted by high-altitude destinations, which, while less immediately threatened, recognise the potential for additional revenue streams (Chevrollier et al., 2025). While such measures are seen as crucial to achieve the long-term goal of reducing a destination's vulnerability to climate change, comprehensive empirical research on their effectiveness remains limited (Dannevig et al., 2021; Scott & Gössling, 2022).

Several authors have challenged the strict dichotomy between incremental and transformational adaptation and argue that incremental adaptation, when embedded in long-term strategies, can gradually amount to transformational change, an approach referred to as continuous adaptation (Kuhl et al., 2021; Magnan et al., 2020; Termeer et al., 2017). However, tourism literature lacks research on a conceptual viewpoint of incremental and transformational adaptation or how transformational change can be shaped through a series of small, cumulative steps.

Finally, the absence of adaptation refers to the failure to respond to a changing climate, which can potentially lead to substantial losses (Fedele et al., 2019).

2.2 Autonomous versus planned adaptation: Different levels of climate change adaptation in winter tourism

Another way to conceptualise climate change adaptation is to distinguish between autonomous and planned adaptations.

Autonomous adaptation refers to local, self-organised climate change responses that occur without external support, formal planning, or explicit recognition of climate-related causes. These actions are typically undertaken by individuals or communities, drawing on lived experiences and existing knowledge, and often unfold automatically or spontaneously. While sometimes perceived as passive or unconscious, they can nonetheless reflect flexible and context-sensitive adjustments to changes, independent of government or institutional involvement (Field et al., 2014; IPCC, 2023; Parry et al., 2007).

Planned adaptation refers to deliberate, strategic responses to climate change that are typically initiated through formal processes and policy decisions (IPCC, 2023). They are often larger in scope and scale, supported by high levels of organisation and institutional backing (Biagini et al., 2014), and are commonly implemented by governments or public bodies through programmes, projects, or strategies (Rahman et al., 2023). Examples include the development of climate-resilient infrastructure and the deployment of adaptation-oriented finance mechanisms. While frequently conceived as top-down approaches, recent research highlights that planned adaptation can also be community-led, with government agencies acting as facilitators of bottom-up initiatives (Maskell et al., 2025).

The dichotomous framing has led to a typical portrayal of autonomous adaptation as reactive, short-term, and ineffective, an assumption that neglects the prevalence and value of locally driven actions at the individual or community level. Measures located within this adaptation type, while lacking formal institutional support, can, however, be highly relevant, impactful, and represent important expressions of local agency. Rather than occurring in isolation, planned and autonomous adaptations are often based on interdependencies, trade-offs, and opportunities for collaboration (Maskell et al., 2025). Therefore, the authors propose a conceptualisation in which adaptation is described as a continuum between autonomous and planned adaptations, including a mixed type which captures the interaction between the two extremes. In a further nuanced segmentation, four types of mixed adaptation are proposed: First, actors may simultaneously implement a bundle of measures located in both types of adaptations. Second, planned adaptation can shape autonomous responses by enabling, constraining, or sustaining them. Third, autonomous adaptation can influence planned efforts by informing, driving, or even limiting formal responses. Lastly, collaborative adaptation involves the deliberate integration of both types, creating joint strategies between institutional and grassroots actors (Maskell et al., 2025).

To date, the concepts of autonomous and planned adaptations have received limited attention in tourism studies. Research on climate change adaptation in winter tourism has predominantly focused on the supply side (Steiger et al., 2019; Witting et al., 2021), with an emphasis on private sector responses, while an examination of the roles and interaction of different actors (e. g. the government, local population or the destination management) in initiating adaptation has not been a focus in the literature (OECD Publishing, 2007; Rasul et al., 2020). Within the winter tourism private sector, adaptation is seen as predominantly autonomous, driven by market dynamics rather than coordinated (joint) government action (OECD Publishing, 2007).

Nonetheless, government involvement in winter tourism becomes particularly relevant when natural hazards arise or when adaptation strategies generate social and environmental externalities, including those related to snowmaking regulations, energy and water use, as well as public subsidies for ropeways or snowmaking infrastructure (OECD Publishing, 2007). In some cases, ski areas have not only received subsidies, but public authorities have also directly invested in their development. This situation further underscores the critical need for governmental bodies to carefully consider the sustainable use of public funds (Abegg & Steiger, 2017; Steiger & Scott, 2020). Additionally, demand-side adaptation behaviour has been addressed in tourism research. Due to tourists' high flexibility and spatial mobility (Rutty et al., 2015a; Scott et al., 2012), their responses to climate change are largely autonomous in nature. Climate change adaptation has been subject to

conceptual approaches within tourism literature (e. g. Witting et al. (2021) for the demand side). However, tourism research has yet to explicitly frame climate change adaptation within the autonomous versus planned adaptation paradigm.

3 Case Study, Materials and Methods

3.1 The destination of Balderschwang

The case study focuses on the municipality of Balderschwang, located in the district of Oberallgäu (Bavaria, Germany), which has a population of 383 residents and is situated at an altitude of 1044 m above sea level. The 52 112 arrivals and 191 928 overnight stays in 2023 were evenly distributed between the winter (November 2022–April 2023) and summer season (May–October 2023), with 49 % of the overnight stays in winter (Bavarian State Office for Statistics, 2025). Next to the high economic importance of tourism for Balderschwang, the destination was chosen as a case study due to the unique developments surrounding the “Riedberger Horn dispute”, which provides an illustrative example of key concepts in climate change adaptation research. Furthermore, Balderschwang is a pilot area of a research project funded by the EU Interreg Alpine Space programme that aims to strengthen the socio-ecological climate resilience of participating destinations.

3.2 Data and methods

Twelve semi-structured qualitative interviews were conducted in person with Balderschwang residents in December 2023. As most of Balderschwang’s residents, including the interview participants, are directly or indirectly connected to the tourism sector due to its importance for the municipality’s economy and small number of inhabitants, the participants were considered both community residents and tourism stakeholders. Table 1 provides a list of the interviewees, interview length, gender and professional affinity. The interviewees gave their consent for the recording of the interviews for transcription and data analysis purposes. All personal information was removed to maintain the anonymity of the interviewees.

Additionally, due to its profound influence on the recent development of the destination, interview results were complemented by collecting information on the Riedberger Horn dispute in regional and national online media archives since its advent in 2016, as well as in policy and planning documents.

Table 1: Interview participants

ID	Interview length	Gender	Professional affinities
I1	00:34:38 h	Female	Hospitality owner
I2	00:55:48 h	Female	Hospitality owner / Municipality
I3	00:25:35 h	Male	Gastronomy owner
I4	00:27:30 h	Male	Snow-dependent activities
I5	00:44:49 h	Male	Craftsman / Hospitality owner / Safety and security
I6	00:50:28 h	Male	Hospitality and gastronomy owner / Municipality
I7	00:37:20 h	Male	Hospitality owner
I8	00:31:19 h	Female	Municipality employee / Tourism information
I9	00:50:40 h	Male	Craftsman / Snow-dependent activities / Safety and security
I10	00:30:13 h	Female	Culture
I11	00:35:34 h	Male	Hospitality employee
I12	01:02:02 h	Male	Snow-dependent activities

Source: own representation based on interview data

The interview lengths ranged between 30 and 60 minutes, were recorded, and were subsequently transcribed. All interviews were conducted in German and based on a semi-structured interview guideline. The most relevant questions guiding the analysis concerned the future development of the destination, the participants’ individual visions for Balderschwang, their level of satisfaction with the existing decision-making structures and suggestions for improvement, the extent to which a shared vision for Balderschwang exists among residents as well as what strengths the destination possesses beyond its snow-based offerings.

After the finalisation of the interview transcriptions and their initial evaluation, the data analysis was performed with the software MAXQDA (VERBI Software, 2021), following six steps (Rädiker & Kuckartz, 2020): (1) Preparation, organisation, and exploration of data; (2) Preliminary category development based on the research questions and the two applied conceptual frameworks; (3) Basic coding of interviews; (4) Further category development through fine coding; (5) In-depth analysis and themes development; (6) Final documentation of analysis. To ensure an unbiased perspective regarding the data, the coders were not directly involved in the interview process (Cofie et al., 2022). Regular exchanges between the two coders ensured the coding process’s consistency and allowed the development of

an initial deductive coding framework, partially based on the interview guideline, which was inductively enriched by subcodes and themes during the interview analyses (Döring, 2023). Additionally, double-coding by two coders enhanced the reliability of the analysis by comparing their independent results (Strauss, 1981), especially given that some of the interview statements were implicit and therefore required interpretation of the respondents' direct statements (Wæraas, 2022).

The analysis of the interviews and the desk research on media and policy documents was guided by the conceptual frameworks and definitions outlined in the section Conceptual background. These frameworks served as analytical lenses for categorising the observed data within the Results section, without positioning the findings within the broader literature, which was undertaken in the subsequent Discussion and Conclusion section.

4 Results

4.1 Past climate change adaptation in Balderschwang: The case of Riedberger Horn

Since the late 1960s, Balderschwang and the municipality of Obermaiselstein have been pursuing plans to connect the Grasgehren and Balderschwang ski areas, comprising five T-bar lifts and two chairlifts. The project gained momentum in 2016 when it received strong local support from the municipalities' mayors and the local lift operator, acting as key advocates. The project envisaged a 1.6-kilometre gondola route from Balderschwang to the summit of Riedberger Horn, and a 3.3-kilometre slope to link the two areas. Supporters, including residents and tourism stakeholders, argued that this modest intervention would significantly boost the competitiveness of the ski areas and secure the tourism-dependent local population's economic prospects (deutschlandfunk.de, 2017; Sebald & Mayr, 2016). Before gaining momentum and becoming politically instrumentalised, the initiative was locally driven by the affected parties, including the two involved communities and their tourism stakeholders, without external influence. According to the definition (e. g. Maskell et al., 2025), the attempt to obtain permission to construct the connecting lift and link the two ski areas can therefore be considered an initial autonomous response. While the planned connection of the two ski areas was undoubtedly also driven by economic interests and not solely by climate considerations, previous research has shown that larger ski areas are associated with a reduced risk of business failure (Falk, 2013). Consequently, the planned connection can be interpreted as a potential adaptation measure for ski areas under climate change pressure. However, investments

in skiing infrastructure reinforce existing “beaten path” infrastructure, replicating and trying to secure the status quo rather than fostering transformational change. In the long term, destinations remain vulnerable to the same threats as climate change progresses. Additionally, there is evidence that the positive effects of connected ski areas decline over time (Falk, 2017). Drawing on the definitions of Kates et al. (2012) and Fedele et al. (2019), the connection of the two ski areas can therefore be considered an incremental approach rather than a transformational adaptation, the latter of which would necessitate a departure from the existing structure.

Despite the high expectations for the project, the planned connection between the ski areas conflicted with the Bavarian Alpine Plan, which designates the Riedberger Horn summit area as Category C, the strictest level of protection, thereby prohibiting any infrastructural projects that could ecologically impact the area (State Development Programme of Bavaria, 2023). Nevertheless, political pressure from the municipalities induced the Bavarian state government in 2016 to enable a local referendum, with the assurance that a positive outcome in both municipalities would lead to an amendment of the Alpine Plan. While the municipalities prepared the legal framework to advance the project, regional, national and international environmental organisations voiced strong opposition. Critics warned that modifying environmental legislation for economic purposes could undermine the credibility of the Alpine Plan and endanger the ecologically sensitive area (Sebald & Mayr, 2016). Yet, in 2017, after the referendum successfully passed, the Bavarian parliament agreed to an amendment to the State Development Program and the Alpine Plan. Public opinion was divided, with critics becoming increasingly vocal. Expert assessments and legal actions initiated by environmental organisations highlighted potential violations of international law. Anticipating a potential legal defeat, the newly formed Bavarian government finally reversed the amendment in 2018, marking a complete departure from the previously pursued agenda (Sebald & Schnell, 2018).

From a theoretical perspective, the type of adaptation shifted during this back-and-forth process. Initially characterised as autonomous, it transitioned towards a mixed scenario where autonomous adaptation drove planned adaptation. Maskell et al. (2025) describe such scenarios as those where “existing autonomous adaptations are supported, enhanced, expanded, or scaled up by planned measures, i. e., [...] institutional, policy, or informational support.” In the case of the Riedberger Horn dispute, this occurred when the government began to support the initiative by defending the project against criticism and considering amendments to the Alpine plan. To end the conflict, the state government imposed its own agenda on Balderschwang and Obermaiselstein. This included establishing a transformational nature-based tourism initiative, the Alpinium, a centre for sustainable tourism that employs rangers, monitors rare species, and offers guided tours led by conserva-

tion experts, as well as further potential investments of a total of €20 million in rather incremental adaptation: snow groomers, modernisation of a T-bar lift, and energy-efficient snowmaking systems. Further funds were foreseen to be directed towards grooming infrastructure and cross-country ski trail equipment (Bavarian State Ministry for Economic Affairs, Regional Development and Energy, 2019).

4.2 Future climate change adaptation in Balderschwang: Residents' perspectives and implementation

Despite Balderschwang having a relatively even distribution of overnights during both winter and summer, the interview results demonstrate that Balderschwang's self-perception was prevalently oriented towards being a winter-dependent destination. Like within other peripheral mountain villages (Mayer & Kraus, 2019), most economic value creation occurs during the winter season (I02, I03, I04, I05, I06, I07, I12). Therefore, a shift from focusing on winter tourism towards nature-based, year-round tourism can be classified as a transformational change from its previous trajectory.

The interview results indicate that the majority of community and tourism stakeholders agree on the necessity of enhancing the destination's summer appeal (all interviewees), to strengthen the low seasons such as November (I03, I06), to provide alternatives during winter periods with insufficient snow (I05, I09) and developing a year-round offering (I01, I05, I06, I07, I08, I09, I10, I11, I12) in response to climate change. However, this shared perspective can be categorised into two main envisioned adaptation pathways, which partially overlap but also reveal areas of conflict.

First, interview participants advocate for developing additional offerings through infrastructure expansion and creating new activities for guests. This development stream is driven by the concern that, without continuous innovation and improvement, guests may increasingly turn to alternative destinations in both summer and winter, and a lack of development could undermine the destination's competitiveness (I07). Suggested measures aim at enhancing the quality of winter offerings, including improvements to skiing infrastructure and cross-country skiing trails (I04, I06, I09), as well as the introduction of weather-independent offers to create a more robust overall experience, also during snow-scarce winters. This includes enhanced family-oriented facilities – such as toboggan runs, playgrounds, and curling opportunities – and a range of guided activities, including hiking, snow-shoeing, and cross-country skiing tours (I01, I03, I05, I06, I07, I08, I09). Year-round infrastructure and activity improvements must be accompanied by the year-round operation of mountain huts, providing hikers with services for resting and catering (I03, I06, I07, I08, I09). Further suggestions include extending the operation of lifts

during summer to accommodate guests who are unable or unwilling to hike uphill, as well as supporting bicycle transport (I06, I07, I08, I09, I12). Participants also emphasised the need to develop hiking and cycling trails, potentially complemented by themed walks for families (I03, I05, I07, I08). Another emerging concept was expanding the range of guided tours during the summer, including activities such as rock climbing and mountain biking. These could be integrated into a so-called “Mountain School”, which would serve as a non-winter extension of the ski school. Through this approach, the ski school would transform during the summer into a hub for various mountain activities, offering guests the opportunity to explore a wide range of alpine sports under the guidance of experienced instructors (I02, I05, I09). This measure could also be linked to the Alpinium (I05). Other ideas include creating facilities that enable guests to visit Balderschwang during a workation (I01, I05, I06, I08), to provide bathing waters (I06, I08) and to improve the quality of outdoor stays through improved playgrounds, public spaces, or barbecue areas (I01, I06, I07, I08, I09).

These proposed adaptation measures can be classified as autonomous adaptation, as they predominantly focus on the private sector or community-level adaptation, occurring without external support or structured governance (Maskell et al., 2025). Considered individually, most of these proposed measures serve as an extension of existing structures and thus have an incremental character (Kates et al., 2012). However, if strategically aligned, such as within a comprehensive strategy to establish a year-round tourism destination, these individual improvements could collectively accumulate into broader, transformational adaptation, termed in literature as continuous adaptation (Kuhl et al., 2021; Termeer et al., 2017; Magnan et al., 2020; Kates et al., 2012). One respondent articulates the transformational nature of shifting towards summer and year-round tourism in Balderschwang as follows:

“From a tourism perspective, the focus should now be placed much more strongly on the summer. What has been different over the past 35 or 40 years should now be completely reversed.” (I03)

However, other statements criticised the development of additional infrastructure, fearing overdevelopment. Several interview participants emphasised the importance of preserving Balderschwang’s distinctive character, highlighting its tranquility, remoteness, and limited infrastructure as key assets rather than weaknesses (I02, I04, I05, I06, I07, I09, I10). For many, the municipality’s appeal lies precisely in what cannot be easily defined or constructed: its atmosphere, natural beauty, and sense of retreat (I02, I06, I10). Consequently, several interviewees advocate also for no or only moderate development and are sceptical towards large-scale infrastructure expansion (I02, I04, I06, I07, I10). The lack of extensive infrastructure was even

described as a USP (I02), distinguishing Balderschwang from more commercialised destinations (I07). While some recognised the value in selective modernisation, better coordinated management, or re-activation of existing facilities (e. g. improvement of signposting and quality of trails, extension of the activation of the lifts in summer), others cautioned that mass tourism, particularly through expanded lift systems, would conflict with the expectations of guests seeking peace and nature (I02). Hereby developing “nothing” is considered a key strategy for Balderschwang to keep its uniqueness as a remote mountain village. Rather than pursuing growth, participants advocated for limited infrastructural adaptation measures or careful improvements and modernisation of existing facilities.

4.3 Calls for closer cooperation and a shared vision

The most frequently expressed concerns regarding adaptation were the lack of a shared vision, the desire for closer collaboration, and a form of jealousy-induced competition among community members and tourism stakeholders (I01, I02, I03, I04, I05, I06, I08, I09, I10). Interview participants reported the presence of several “lone fighters”, alongside a strong sense of rivalry and a perceived lack of mutual support. In this environment, success is oftentimes envied rather than celebrated (I02, I08). A key challenge lies in the diverging interests between small accommodation providers and larger hotels. The latter often have their own on-site infrastructure, meaning guests can spend their entire holiday on hotel grounds, using hotel facilities and services, without interacting with the destination or using its offerings (I01, I09, I10). As a result, services such as snowshoeing tours are offered exclusively to hotel guests. External visitors and inhabitants have limited access to these activities because no other local actor provides such tours. This fragmented approach reduces the potential added value for the destination, which could be significantly increased if ski schools and other providers offered these tours to all Balderschwang guests and its inhabitants (I05, I12). Furthermore, five separate ski schools operate in Balderschwang with only minimal cooperation between them (I01, I03), as emphasised by interviewee I01:

“There is a lack of cohesion in Balderschwang; everyone competes with each other. It starts with the ski schools and ends with us, the hotel industry and holiday flats.”

Almost all participants emphasised that a shared vision is essential to ensure future success. This vision should identify shared values among stakeholders as a basis for collaboration. One interviewee highlighted that:

“It’s now five to twelve, but it’s not yet five past twelve. So, we still have an opportunity to react and steer somewhere together.” (I02)

Most respondents expressed satisfaction with the recent establishment of the Competence Team Tourism, a coordinated semi-institutional body consisting of representatives from Balderschwang. It aims to consolidate diverse perspectives within the village and foster a more streamlined approach to tourism development. According to the typology introduced by Maskell et al. (2025), the establishment of this initiative can be classified as mixed adaptation, in which autonomous adaptation evolves into planned adaptation over time, “into more organised community-led institutions”. In this context, respondent I05 suggested that a greater integration of the Alpinium with the visions of stakeholders from Balderschwang could bring tangible benefits to the local community, constituting a collaborative adaptation approach, in which “both autonomous and planned actors/groups come together to develop adaptations which allow for autonomy of individuals but also put into place a structure and organization.” (Maskell et al., 2025).

4.4 Preserving the autonomy of Balderschwang

Another concern raised by the interviewees is the need to ensure the autonomy of Balderschwang in its future development. Several stakeholders perceive the private ownership of the ski lift in Balderschwang as a barrier to more inclusive community-oriented decision-making. This becomes particularly evident during periods of limited snowfall, when the ski lift owner, for example, prioritises allocating snow grooming, technical snow production, and slope access to racing teams instead of family runs. Meanwhile, other community members, such as accommodation providers, would prefer to focus on opening slopes for children and families, to maintain the attractiveness of the destination for a broader range of guests (I05). Additionally, the opening hours of the mountain huts are tied to the operating times of the ski lifts. Consequently, several stakeholders depend on the decisions of a single private operator whose concentration of power is perceived as problematic because it limits the autonomy and planning security of other businesses within the destination (I03). Participants therefore expressed the wish for the municipality to purchase the ski lift and manage it to benefit all stakeholders in Balderschwang. This would generate added value and increase decision-making power and autonomy of the community (I02, I03), enabling the individual actors to adapt more freely. In the words of one interviewee:

“That the lift is in private hands is actually insane. That one person can make decisions for an entire village. And if they decide not to open tomorrow, I’m finished as a ski hut operator. It absolutely needs to be a project where you say: this all has to be transferred into public ownership, where everyone can have a say. Yes, that would be something – and then, if it finally belonged to us, we could fully expand it for summer use.” (I03)

According to the typology of mixed adaptation, this potential scenario would be classified as planned adaptation, enabling autonomous adaptation, where planned measures (the purchase of the ski lift by the municipality) “encourage autonomous adaptation through technical, financial, institutional, policy, or informational support” (Maskell et al., 2025).

4.5 Lessons learned from the Riedberger Horn case

Respondents referred to the case of the Riedberger Horn as an example where planned adaptation constrained autonomous adaptation. For several years, efforts were focused on the proposed connection of the ski areas, leading many local actors to invest time and resources. Consequently, other ideas for development were neglected or abandoned, as attention and investment were concentrated on the mountain and the ski project (I11). Following the cancellation of the plan by external authorities, and the fact that, despite promises, only limited public funds have been allocated so far, local tourism stakeholders became more cautious about initiating new large-scale infrastructure initiatives. There is a prevailing fear that future efforts may once again be rendered futile if higher-level decisions override local plans at a late stage (I09).

5 Discussion and Conclusion

Based on the case study of Balderschwang, the article empirically investigated the types of climate change adaptation, their implementation, and the actors playing a central role in employing adaptation measures within an Alpine winter tourism destination. By applying two established frameworks, both the development of the Riedberger Horn case and the climate change adaptation measures envisioned by the local population and tourism stakeholders were examined. As outlined conceptually in the existing climate change adaptation literature, the presence and interplay of incremental, transformational, autonomous and planned adaptations in the chosen case study can be confirmed: The analysis of the development of the Riedberger Horn case illustrates how an initially autonomous adaptation can evolve

into planned adaptation, through adoption, upscaling, and a subsequent policy reversal by governmental bodies. By broadening the time horizon, the measure can be qualified as transformational rather than incremental. Consistent with existing literature, the article's findings regarding the residents' envisioned adaptation measures reveal that most documented responses are implemented at the local level, primarily by individuals or the community (Berrang-Ford et al., 2021; Sietsma et al., 2021). The interviewees predominantly described their envisioned adaptation measures occurring within the community, initiated by individuals, private companies, or the community itself. Examples include enhancements of both winter and summer activities, such as the maintenance of biking and hiking trails and the provision of additional activities for families. Furthermore, the results align with previous research, indicating that most implemented adaptation measures are autonomous and short-term oriented rather than preventive; they tend to be incremental rather than transformational (Rasul et al., 2020). However, if integrated into a common strategy, these measures have the potential to become transformational, a process described as continuous adaptation in similar contexts (Kuhl et al., 2021; Termeer et al., 2017; Magnan et al., 2020). Indeed, interviewees expressed a desire for a unified long-term strategy as one of their key aspirations for the destination, highlighting that Balderschwang's current socioeconomic system is only marginally characterised by cooperation and lacks a coherent vision. The extent to which this can be linked to the tumultuous development around the Riedberger Horn remains ambiguous. It is also unclear whether the shift in local stakeholders' perception – from supporting an infrastructural connection of the two ski areas in 2016 (Sebald & Mayr, 2016) to now largely avoiding infrastructural measures – has been influenced by the government's planned adaptation focusing on environmental protection and nature conservation (Sebald & Schnell, 2018).

From a conceptual perspective (Maskell et al., 2025), the objective of establishing a unified vision could be achieved through two approaches. Firstly, the already established Tourism Competence Team, comprising local tourism stakeholders, enjoys high trust among interview participants. The team is recognised for its competence in making tourism-related decisions on behalf of the local community. External support for such local groups could potentially professionalise and increase the success of these initiatives in guiding the community towards a unified vision for climate change adaptation, capitalising on the existing community acceptance and developing autonomous adaptation into a more organised, planned adaptation over time. Secondly, the Alpinium, the government-led nature conservation centre, can offer opportunities for establishing a collaboration platform between autonomous and planned adaptation stakeholders, where both the local community and external organisations/institutions come together to develop and work closely on a shared vision for climate change adaptation. Thus, this article

supports the assertion by Scott et al. (2024) that there is a need for “improved adaptation collaboration [...], so that coherent adaptation pathways for the ski industry are informed by and incorporated into community and state climate change plans”.

The prevailing theoretical approach in the literature is that the absence of adaptation constitutes a failure to respond to a changing climate and leads to increased vulnerability (Fedele et al. 2019; Schipper, 2020). Findings from our interviews led us to the assumption, that this generalisation falls short in a tourism context and warrants further investigation in future research: A group of local residents argues for a climate change adaptation strategy that, in contrast to the advocates of additional investments and developments into winter and summer attractions, emphasises the value of nothing as a USP, attracting a partially already established customer base, which chooses Balderschwang precisely for its remoteness and unspoiled nature. However, the gathered data currently does not allow evaluating whether this approach would succeed or, as suggested in the literature, lead to increased vulnerability, requiring further research.

The article's limitations encompass the categorisation of adaptation measures guided by definitions from the literature. While some of these definitions are well established, others are less clear-cut and leave room for interpretation. As a result, the presented classifications should be viewed with some caution. Further research is needed to test and refine these findings. Additionally, given the unique nature of the case study, we recognise that combining the two conceptual frameworks must be applied in various contexts and locations to advance the understanding of adaptation in winter tourism destinations.

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