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The controversy around the 'glacier marriage project'.
Exploring different perspectives on and imaginaries of ski tourism in the Ötztal &
Pitztal valleys in Tyrol, Austria.

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"Man braucht einander." (Song from the band *Von Seiten der Gemeinde*. I spent a lot of time listening to their music when writing this thesis)

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1 Introduction - blow it up or leave it alone?

“Wilderness gets us into trouble only if we imagine that this experience of wonder and otherness is limited to the remote corners of the planet, or that it somehow depends on pristine landscapes we ourselves do not inhabit. Nothing could be more misleading.” (Cronon, 1996, p. 24)

Wilderness can be a misleading term if we think of it as some remote, disassociated and non-human sphere, as written in the quote above from William Cronon back in 1996. But, almost 30 years later, this remains exactly what some think of when envisioning the Austrian Alps: pristine landscapes, untouched nature and wilderness. While understanding the Alps as wilderness can, as Cronon argues, get us into trouble, another common saying has accompanied the development of the Alps in recent years. “The more, the merrier” has echoed from many voices in Alpine valleys for decades (Gasser, 2019). Recently, a ski tourism project in the Ötztal and Pitztal valleys in Tyrol, Austria, has given a special touch to this. Along with the planned merging of the two ski resorts in Ötztal and Pitztal into one sprawling ski circus, often referred to as the “glacier marriage” project, economic dominance is about to take on a new dimension - at least, this is one of the main arguments being brought forward in the controversy around this glacier marriage. It is not as if there have been no expansions of ski resorts in the Alps before this. Indeed, in 2019 alone 1.2 billion euros were invested in Austria, Switzerland and Germany, according to ropeway associations (Gasser, 2019). However, several voices have said that with this glacier marriage project, the last pieces of wild nature will be given away to one of the most important Austrian economic sectors, ski tourism (Hruby, 2020).

A look from Ötztal and Pitztal to the east, to Kitzbühel, or to the other end of Tyrol, to the Arlberg, shows how this development or trend works. A few large ski resorts expand more and more. Not only more area, but also more railways and gondolas, ski pistes and ski lodges, hotels and other infrastructure which are needed to enable skiing and ski tourism. Because for a new or expanding ski area, new roads and houses must be built, new areas sealed, new workers sought and much more. On their website, the planners of the Ötztal–Pitztal ski resort merger name seven “good” reasons why an investment of 131.6 million euros would be valuable: attractiveness, neighborhood in sight (meaning that the two valleys are geographically quite close to one another), little consumption of resources and great effect, secured livelihood of two valleys, impulse for the most important economic branch, no reasons for exclusion as well as the stop of the negative spiral in Pitztal (Pitztal–Ötztal. 7 gute Gründe, 2021). If one asks the former president of the Austrian ski federation, Peter Schröcksnadel,

then the fusion of the ski areas is "a very large chance for the Pitztal" (Pitztal-Ötztal. Aktuelle Beiträge, 2021).

However, the voices against the glacier marriage are also getting louder and louder (Willim, 2020). A wide range of actors from tourism, environmental protection agencies and citizens of the area, among others, are involved (Huber, 2021). Taking a look at the opponents' perceptions of the project, various arguments have been made about the possible negative impact of the project, including the possible trimming down of the mountain "Mittelbergferner" with the extent of 64 hectares, 750,000 cubic meters of material being moved and 40 meters of altitude being blown off a peak. Furthermore, they argue that the project would also risk the total loss of a near-natural high alpine landscape, a serious devaluation of a landscape where alpine flora and fauna flourish as well as the total loss of a ski touring area and hut base. Moreover, they also criticize the glacier marriage project as speculative plans and questionable economics in the light of climate crisis and glacier retreat (*Petition gegen die geplante Gletscherverbauung Pitztal—Ötztal.*, n.d.).

In the controversy around the glacier marriage project, different actors' values and their imaginations of the future seem to come together in a complex way. Although or rather because of the political, legal, discursive, material and societal uncertainty of the project, now is a moment when perspectives from Science and Technology Studies (STS) can unfold their strengths. STS researchers try to make visible what remains invisible otherwise, enabling an understanding of how things could be otherwise (Law, 2017). Technoscientific controversies, like most controversies in contemporary societies, represent the boiling points where the inner workings and entanglements of science, technology and society rise upwards. Here, I take "technoscience" to refer to the intertwinement of technology and science in "a set of social and material practices" (Law, 2017, p. 31). Because "[w]e live in a technoscientific world," we experience this in our everyday practices and especially when different opinions come into play, for instance in controversies (Davies, 2024, p. 2). Sarah Davies (2024, p. 2) writes further about these entanglements that "[s]cience and technology - captured by the portmanteau word *technoscience* - are, in different ways, central to life in the vast majority of contemporary societies around the world." While this is true for many aspects of human life, from my perspective and how I will argue in this thesis, it is also true for the supposedly remote Alpine valleys Ötztal and Pitztal in Tyrol, Austria. My argument is that it is also and exactly here where science and technology matter, where they unfold their meaning and where their controversiality is illuminated. I think this because "[science and technology] affect us on both individual and collective levels, shaping personal choices and experiences, but also policy, politics, and shared futures. Society, technology, scientific knowledge, everyday experience. All of these things are intertwined and interconnected [...]" (Davies, 2024, p. 2).

A controversy like the glacier marriage is exactly the moment for STS researchers to get on board and closely observe and investigate what is happening. And, more importantly, in which ways it is happening and, further, to whose favor. How is technoscientific and other knowledge at play in this particular controversy? How is power distributed and used? Who is speaking (for whom)? Who is not speaking or even silenced? How are technoscience and society being co-produced (Jasanoff, 2004)? These types of questions are at the heart of STS concerns, and I will therefore come back to them at several points in this thesis. In presenting my arguments, I explicitly make use of STS approaches in order to research and understand the afore-mentioned controversy, gain knowledge on the actors' clashing values and make visible how different futures can be and are imagined.

In doing so, I kick things off with the State-of-the-Art (chapter 2) where I look at phenomena such as overtourism, economic views on ski conglomerates and geophysical considerations. Thereby, I try to open up the complexity of this controversy and its context. Drawing on existing STS research around environmental controversies, expertise and sociotechnical imaginaries, I lay out the landscape of knowledge I built my research upon.

Based on the discussion of existing literature and by concretizing the research gap, in the next chapter (chapter 3), I point to my research questions around the main focal point of how different actors imagine the future of tourism in the Ötztal and Pitztal valleys in light of the glacier marriage controversy. To answer this question, within the thesis I explicitly make use of distinguished STS perspectives (also chapter 3) that enabled me to research the controversy in innovative ways. Namely, I argue how the sensitizing concepts of sociotechnical imaginaries (Jasanoff & Kim, 2009; 2015) and envirotechnical regimes (Pritchard, 2012) served as theoretical lenses to explore the entanglements of technoscience, society and nature in this case. Because they help illuminate historical trajectories, presents and envisioned futures I deliberately chose these concepts which I will next (also chapter 3).

After that, I explain my research design by elaborating on my methods and material (chapter 4). Herein, I track what methodological considerations framed my research and which methods I picked to gather and analyze the data. Controversy mapping (Marres, 2015), short-term ethnography (Delamont, 2007; Pink & Morgan, 2013) and semi-structured interviews (Silverman, 2006; Jensen & Laurie, 2016) served me as empirical methods to gather data. In terms of my data analysis, while in the beginning of the process I made use of grounded theory approaches (Charmaz, 2006), I ended up developing analytical vignettes (Jenkins et al., 2021) in order to litigate my analysis, helping me not only with my thinking but with my writing as well. The chapter concludes with my perspectives on research ethics within this thesis and an elaboration on the specific case of the controversy around the glacier marriage project in the Ötztal and Pitztal valleys in Tyrol, Austria.

The main pillar of this thesis comes when I present the results of my research (chapter 5). For this purpose, I decided to use the form of vignettes. Within them, I describe the data I gathered and engage with it through contextualization and with various aspects and temporalities of the research within this thesis. In what I call empirical-/visual-/interview- vignettes, I explore different actors' positions, values and arguments, elaborate my own arguments and bring my analysis to the ground. While the different characters I developed are not to be understood as ideal types in the sense of the sociologist Max Weber (Weber, 2002 [1922]), they do borrow from a particular thought style (Fleck, 1979 [1935]). I combine the analysis of the data I gathered with considerations in light of STS thinking. In this, I explore how my analysis brings together arguments from the controversy mapping, ethnographic approach and semi-structured interviews. The chapter is accompanied by photos I took while in the Ötztal and Pitztal valleys and concludes with answering my research questions.

These formulated and elaborated results are then brought into discussion in the next chapter (chapter 6) in the light of the arguments I present in the State-of-the-Art and in the chapter on my sensitizing concepts. Here, I engage with issues like sustainability, sociotechnical imaginaries, skiing infrastructure as mundane technologies and diverse and nuanced perspectives of my STS approach. With the different vignettes and facets of the case at hand, I try to illuminate and add to existing knowledge about the controversy around the glacier marriage project in the Ötztal and Pitztal valleys in Tyrol, Austria.

Finally, I refine my analysis and discussion of the results by bringing together my arguments in the conclusion (chapter 7). Here, I point to the main pillars of my research, the most important considerations in my thesis as well as viable and promising pathways for future STS research in this area.

2 State-of-the-Art

“Ice is not just ice.” (Carey et al., 2016, p. 787)

In this chapter, I explore the existing literature that I built on in my endeavor to research the imaginaries around the future of ski tourism in the light of the controversy in the Ötztal and Pitztal valleys in Tyrol, Austria - the glacier marriage project. I kick things off with three sections (2.1 to 2.3) on the relevance of the European Alps and (ski) tourism as phenomena for historical and contemporary social science research. After this, I elaborate on glaciers in the next section (2.4). Here, I explore what they have meant historically and what they stand for today, especially in times of climate crisis. In the next two sections (2.5 and 2.6), I turn to the question of how STS research has generally dealt with issues around the environment, specifically with regard to disasters, infrastructures and controversies. Thereby, I argue that STS has offered fruitful and insightful approaches for researching the environment not only historically but also in our contemporary societies. The following section (2.7) is concerned with the specific issue of expertise in controversies, wherein I argue that technoscientific knowledge is usually contested and that expertise is not static nor assigned easily in controversies.

The heart of this chapter (2.8) comes next and discusses how scholars have dealt with the future or future-making. Here, I argue that the specific case that I research in my thesis can build on existing knowledge around (technoscientific) imaginaries of the future, not only in a broad sense but also more specifically in Austria. Furthermore, I show how this case is embedded in a particular Austrian technopolitical culture, but it is yet to be investigated how this plays out in the specific regional and topical context of ski tourism in these two valleys in Tyrol. Hence, I argue that research in STS has not yet dealt sufficiently with the issue of imagining futures in a rural, high-Alpine Austrian context considering the specific phenomenon of ski tourism.

2.1 The Alps and their importance

What are the Alps and what have they meant for both humans, particularly Austrians, and non-humans alike—mountains, glaciers, animals and so on? Although many might have something in mind when speaking about the Alps, there are very different pictures and conceptualizations of these mountain chains (Bätzing, 2005; 2015). Therefore, in the following, I want to simultaneously differentiate these approaches and achieve a common understanding, emphasizing what the Alps mean for this thesis.

“The story of these Alpine images - from the ‘montes horribiles’ to the romantic aestheticisation all the way to the present, post-modern interpretations - is well known.”
(Bergier and Guzzi 1992 as in Johler, 2002, p. 102)

The *montes horribiles*, as the Alps were once called, have went through some changes in their history—both in terms of their societal and scientific interpretation. As illustrated by the quote above, people also thought of the Alps in a romanticizing way, pointing to their beauty, the associated freedom and the pureness of nature. Nowadays, there exists a variety of interpretations of what these Alpine chains of mountains are: who and what belong to them and who and what not. The anthropologist Gilles Rudaz (2009), for instance, argues that when researching the European Alps, social scientists actually investigate a topic for which it is often not clear what meaning the phenomena, the mountains and the people living next to or on them, have. However, if researchers take two arguments—stewardship and consubstantiality—seriously, they can acknowledge the multiple and complex connections between people living in the mountains and the mountains themselves. But what does this mean? Specifically, Rudaz (2009) underlines that “[...] stewardship and consubstantiality lie at the core of a strategy aimed at maintaining the right of local self-determination” (p. 161). While the rights of local citizens and their natural environment lie at the heart of such scientific endeavors, it is sometimes hard to actually find out what a local community is, and more so in relation to or in comparison to neighboring landscapes or people.

Zooming into these relations, the research of Eric R. Wolf (1962) focuses not only on cultural, economic and social differences between Alpine communities in what is today called South Tyrol, but also the similarities shared among them. Specifically, he was interested in two villages called Tret and St. Felix and investigated them by means of ethnographic field research. As Wolf shows, the linguistic, social, economic and cultural activities of these two villages differ in a variety of ways although they are only a 20-minute walk apart. Physical and other boundaries between Tret and St. Felix seem to have effects, not only shown by research on spatial boundaries but also by investigations in other research areas and means of boundaries (Lamont & Molnár, 2002). These arguments shed light on the fact that boundaries are one way of engaging with two villages. Or in my case also two valleys. I do not dive into this direction further here, but it is of importance to underline that also between the Ötztal and the Pitztal spatial, social, discursive, symbolic or other boundaries could play a role. In a more extensive treatise, Wolf and his co-author John W. Cole (1974) deal with such boundary issues by exploring not only cultural frontiers but also complexities and discrepancies, mostly on an economic level. The reason for the focus on economics is that in the 1960s and 1970s US anthropological research and discourse, Wolf’s and Cole’s thought collective (Fleck, 1979

[1935]) was methodologically focused on comparisons and interested in political economy. Then, but also still now, questions of tradition and modernity as well as globalization and capitalism were at the heart of social science and specifically anthropological research interests. Not only in terms of the European Alps and other related areas, this specific engagement with economic and spatial boundaries has not only been kept but has also expanded beyond the economic focus with, for instance, the concept of liminality (Horvath, Thomassen & Wydra, 2015).

In a similar vein but with a different geographical focus, Gerald Berthoud (1972) investigated the history of dominant modes of economic thinking in the Swiss Alps. He traced back the history of ownership in this particular area of the European Alps through court cases as methodological devices. Thereby, Berthoud shows “that landed property cannot be disassociated from the economic basis” (1972, p. 192). Further, he argues that this sort of property is not like others because it is strongly connected to a “peasant mode production, and at best secondary in capitalism” (Berthoud, 1972, p. 192).

In the discussion around social science research in the Alps, it should be mentioned that there was work done even earlier. In adjacent lines as the authors mentioned above but with a different emphasis, Lucie Varga (1936/2006), for example, worked primarily as a historian of the Alps. She tried to “understand the connections between society, culture, and the economy” (Varga, 1936/2006, p. 253) in a remote Alpine area. Using the methods of ethnography, Varga studied an Austrian valley in Vorarlberg which is located along the borders of Switzerland, Germany and Austrian Tyrol. Thereby, she traced back the history of this Alpine valley which lies in the middle of mountains and comprises a couple of small villages. Varga (1936/2006) argues that there were distinct changes when she stayed in the area describing what she was observing with the argument that “[...] these villagers have undergone profound transformations in their way of thinking and in the social structure of which they are a part” (p. 254). The reasons for these changes or transformations, in Varga’s eyes, were the following:

“The new tourists, looking for the pleasures of the great outdoors, [which] also brought city ways to the countryside. They urbanized the villages. They told stories; they talked about the pleasures of mountain climbing and soon the young men from the villages took up the sport. Skiing, already tried during the war years, was taken up again by the tourists. The villagers began making their own skis” (Varga, 1936/2006, p. 260).

This fascinating process mentioned by Varga speaks to the relations or entanglements that STS research discusses. It is the basic but at the same time complex sociological process of reciprocity, which was described, for instance, through ethnographic methodologies (e.g. Malinowski, 1922/2001). Bronislaw Malinowski, next to his interest in methodology and

sociological theory, also studied the Alps himself (Tauber & Zinn, 2023) and lived part-time in today's South Tyrol, in Oberbozen.

In contemporary societies, similar processes like Malinowski described (1922/2001) still happen on a daily basis. However, STS scholars argue that they have become more complex and increasingly connected to scientific and technological activities (e.g. Fleck 1935; Jasanoff, 2004). Looking at the Alps in the light of these considerations, I argue that they represent a fascinating area where reciprocity happens in contemporary scientific and technological settings. More specifically, both the historical trajectories that the Alps have undergone and the current states of the Alps form an interesting field of study for those who are interested in societal, scientific and technological changes. More so, the particularity of Alpine regions provides ground for researchers interested in both the exchanges and non-exchanges of centers and peripheries, of the urban and the rural, of coming and going, of leaving and staying. Metaphorically, I try to bring across the point that the phenomenon of tourism which Varga (1936/2006) described is an entry point to fascinating and transformative changes in the world and life of Alpine communities. To underline this, Varga continued her argument with the following:

“In sum, the clear trend is the arrival of tourism in the peasant world. Summer sports, winter sports, which result in the transformation of village society and the rise of a new elite made up of enterprising innkeepers and their like. Now the villages' economic activities are heightened, the villagers have learned to make money, their relationship with the towns is getting closer.” (Varga, 1936/2006, p. 261)

This quote illustrates how tourism fundamentally transformed the villages and their citizens. Thereby, it is specifically not argued that this process is negative or problematic. Rather, from the perspective of a social scientist, this is a statement about phenomena that were observed in the social worlds of humans interacting with each other. Another quote from Varga (1936/2006) illustrates what was observed back then but also points to processes and values that are still important nowadays in a lot of Alpine valleys:

“A powerful new idea, of urban origin, now begins to enter the village, an idea that is partly religious in nature, a dynamic idea with revolutionary potential: the idea of progress. The new hotels spell progress; so does tourism, sport, money.” (p. 263)

This points to the fact that historians, anthropologists and other social scientists need to be attentive to historical, cultural and linguistic issues which contextualize the phenomena - in this case, an Alpine community - that are being studied and the knowledge that is thereby

being produced. For my specific case study, which is interested in two West Tyrolean valleys in Austria, I argue that the idea of progress with and through tourism is one of importance. The idea of progress in both science and technology and beyond, which has been discussed and also criticized by STS scholars (e.g. Hess, 1997; Harding, 2008; Sismondo, 2010; Falkenberg & Fochler, 2024), is often also associated with an understanding of a community, region, culture or nation. Reinhard Johler (2002) argued that there has been and still is a discrepancy between different ideas of Alpine identity and in how far this serves as a background for a national Austrian identity. He explains that “[i]n Austria, this concept of an ‘Alpine’ construction of national identity, which can be set on top of the landscape, is always in - sometimes more, sometimes less great - opposition to an idea of nation which argues with urbanity” (Johler, 2002, p. 102). This interesting facet of cultural belonging and national identity provides a context and background for my own research within this thesis. The Austrian context is further described by Johler (2002) as a rivalry between different conceptualizations of Austrian identities. More specifically, it is worth noting that these processes have existed historically but also prove to be relevant today. Because “[a] ‘ruralisation’ (and with that an ‘Alpinisation’) of national identity was in direct competition with an ‘urbanisation’ (or ‘Viennaisation’) of the country” (Johler, 2002, p. 102).

When it comes to STS perspectives in light of these considerations and the Austrian context, there has not been an extensive amount of literature produced. However, in the last two decades, more research has been carried out in this regard, which hints to how science and technology are discussed, imagined and taken up by Austrian publics nowadays, mainly in the context of public participation in biomedicine (Felt & Fochler, 2008; Felt, Fochler, Mager & Winkler, 2008). This literature has successfully pointed to the emergence and stabilization of certain “technopolitical identities or cultures.” However, there are multiple and diverging ways of coming to such a culture, or not. Ulrike Felt, Maximilian Fochler and Peter Winkler describe this term in the following:

“We use the term “technopolitical cultures” to capture the ways (i.e., the practices, structures, and mechanisms) in which technologies are interwoven into a specific society.” (Felt, Fochler & Winkler, 2009)

This quote illuminates that a specific society, for example, the Austrian, Tyrolean or even Ötztal or Pitztal society, has certain processes through which it engages with technologies. The question remains how this observation may play out when a somewhat Alpine identity comes into being with technologies of ski tourism.

2.2 (Ski) tourism in the Alps

After exploring historical and contemporary approaches of social scientists to research and describe the Alps, their nature, and their inhabitants, I will now turn to the specific issue of tourism. As already mentioned, tourism in the Alps has a long history but is also important nowadays in and around these mountain chains (Bätzing, 2015). For the start of skiing as leisure and part of tourism, Andrew Denning (2014a; 2014b) argues that although Alpine skiing started slowly already in the late 19th century, it only became more popular in the early 20th century with a massive growth in numbers of people. Most of the early tourists came in the summertime to enjoy the thriving and blooming nature as well as the remoteness in contrast to their usual urban environment. However, some came during winter when there was lots of snow to ski on and when nature could possibly be experienced in a different way. While visitors in the 19th century were motivated by “[...] nature in its most extreme form, a combination of soaring peaks and punishing winter climate [...],” visitors before the Second World War experienced skiing as a way “[...] to maintain a close relationship with nature in its preindustrial form” (Denning, 2014a, p. 83). Hence, these skiers did not perceive themselves mainly as tourists but rather as the ones who are sensitive to and aware of nature, mountains and snow:

“In this era before the profusion of ski lifts, when skiers presented themselves as pioneers and adventurers rather than tourists, skiing appeared to some as a beneficent, natural alternative to the crass capitalism of summer Alpine tourism” (Denning, 2014a, p. 83).

I think it is very interesting to remember these early interpretations in terms of the situation we experience nowadays across many places in the Alps. Back in the early 20th century, summer tourism in the Alps was perceived as capitalistic, whereas today in the 21st century, mostly winter tourism is seen as the primary force through which capitalism is enacted and practiced in the Alps. It becomes clear that the relationships between local communities, visitors and nature in the form of mountains and valleys is an ever changing one, especially in the Alps. Sports and activities in the surrounding nature have been of importance throughout early touristic endeavors. After the Second World War though, the dynamic of tourism took another, yet different, spin. As Denning (2014a, p. 95) reflects, “[s]porting practice and the landscape had long been deeply intertwined in the Alps, but beginning in the postwar era, their historical relationship shifted as business interests and sporting bureaucracies defined ideal landscape conditions and engineered the landscape to achieve their goals.” This quote illustrates the changes in the meaning of tourism, Alpine skiing and the landscape of the Alps. Furthermore, another facet of the Alps comes into the foreground in the light of these historical processes:

snow. Because snow is essential to skiing, winter tourism and the Alpine landscapes, it was the primary driver of where to go in the Alps. For many years, tourism would only thrive where snow fell at the right times and with the right amount. Too little snow meant no tourists, infrastructures, and investments, while too much snow was also a problem in the form of safety issues or, more dangerously, natural disasters like avalanches (Denning, 2014a).

A crucial turning point in this history is the time period between the 1960s and 1970s when some technoscientific developments were achieved that helped in manipulating the conditions under which tourism and Alpine skiing were carried out. More specifically, “[t]he technological manipulation and eventually production of snow made the practice of Alpine skiing more reliable for producers and consumers alike while also cushioning skiers and tourism producers from the vagaries of natural conditions” (Denning, 2014a, p. 96). In addition to these innovative ways of dealing with snow and nature more generally, tourism managers and entrepreneurs thought of other ways to ensure that there was enough snow so that tourists would come, incomes would be secured, and investments could be made. In the same period of time, in the era after the Second World War, tourism operators and their experts were heavily interested in snow security and therefore envisioned Alpine skiing to take place in higher elevations. Because mountains in the Alps had enough place further up the summits the managers decided “to invest in stations at ever-higher elevations in order to achieve the highest possible level of snow security” (Denning, 2014a, p. 98).

2.3 Ski conglomerates and their effects

These historical trajectories make visible that the changes that occurred in the Alps led to ideas of progress to use tourism as an economic driver for investment and to secure the future income of local communities. Taking these considerations into current Alpine contexts and to my research interest brings me to the economic aspects and importance of skiing, more specifically the role of big ski conglomerates like the one planned in the glacier marriage project in the Ötztal and Pitztal valleys.

To grasp the economic dimension and various effects of merging projects it is worth taking a look beyond the horizon at similar projects that have been carried out in recent years. An economic case study of winter tourism in the Alps (Aranda-Cuellar, López-Morales & Such-Devesa, 2020) is, among other things, especially interested in the recent evolution of the biggest Austrian ski regions: Wilder Kaiser-Brixental in Tyrol and Saalbach-Hinterglemm-Leogang-Fieberbrunn in Salzburg/Tyrol. The authors present these two conglomerates and their arguments in the light of international comparison. They argue that in order to prevent the negative effects triggered mainly by severe overloading and constant expansion of ski resorts - also known as overtourism - it is necessary for policymakers and stakeholders to

address this issue (Aranda-Cuéllar et al., 2020). As is emphasized by Aranda-Cuéllar and co-authors, it is not mandatory or even worth considering a complete abandonment of ski tourism. Rather, finding a balance between the preservation of regional economic power and the protection of the environment is necessary. Furthermore, the authors argue that research, development, and innovation are important ways of achieving long-term structural changes toward sustainable tourism (Aranda-Cuéllar et al., 2020).

Such studies show that even large ski conglomerates are heavily dependent on the correct functioning and balance of the ecosystems they are based on. The issue of overtourism as a short- or middle-term problem also has effects in the long run while being problematic for the winter tourism landscape in the Alps as a whole. Particularly interesting and relevant is that these types of economic considerations and research do not always follow the logic of expansion but rather argue for a balancing of various interests and values. As a consequence, in the authors' perception, this should lead to stable economic and ecological situations (Aranda-Cuéllar et al., 2020). The mentioned difficulty is a key issue not only in major ski areas and for big conglomerates but also in the case of the Ötztal and Pitztal valleys, as similar dimensions of tourism are planned to be achieved.

However, following the arguments made by Martin Falk (2009) from a different economic point of view, ski conglomerates are significantly more efficient than independent and, importantly, smaller ski areas. In this paper, the author draws comparisons between Austria and other ski nations such as the US or Switzerland. Based on the economic analysis, it is argued that the economic benefit of ski conglomerates in comparison with smaller independent ski areas is given (Falk, 2009). Yet, it is important to note that this paper offers a one-dimensional and purely economic view of the phenomenon of big ski conglomerates and omits other issues such as environmental protection, the global climate crisis and the social problems of local citizens. Nevertheless, from the economic perspective taken by Falk (2009), the potential merging of the two ski regions Ötztal and Pitztal might be seen as a useful step toward cost reduction and profit maximization.

This brings me to the more complex consequences ski conglomerates can entail (Bender, Borsdorf, Fischer & Stötter, 2011). On the one hand, it is important to mention the geophysical effects caused by globalization processes in the Alps and associated expansions of ski resorts. Glacier retreat is taking place due to mountain degradation, resulting in water scarcity. Meanwhile, there is also water pollution, soil erosion and significant loss of biodiversity. On the other hand, the cultural landscape, the demographic structure in the mountain regions and the land use itself are changing as well. Potentially, migration to urban areas and with this marginalization of peripheral mountain regions occur (Bender et al., 2011). Notably, German geographer Werner Bätzing (2015; 2017) who has discussed the history, current state and possible futures of the Alpine region, argues similarly. The questions of whether the Alps are

the victims of neoliberalism, how the cultural identity of the Alps will change and how sustainable management is possible are central to both his investigation and his argument. While Bätzing (2015) writes about the Alpine region as a whole, I argue that my case—the Ötztal and Pitztal valleys—is also embedded in wider, even global developments of neoliberalism, cultural changes and the striving to live sustainably. Regarding the latter, it must be mentioned that collective ambitions towards achieving this goal of sustainability sometimes face enemies, counter-developments and backlashes of all sorts and from various actors. However, the topic of sustainability is, to me, at least, essential when we discuss projects like the glacier marriage project. Sustainability raises questions of uncertainties, securities and desirable futures while at the same time pointing to environmental, economic and social aspects.

Zooming into the situation in the area I am interested in, a study from the perspective of landscape planning (Schirpke, Altzinger, Leitinger & Tasser, 2019) investigated how cultural ecosystem services and aesthetic values are intertwined. More specifically, the authors trace what attraction the Ötztal area has had for visitors and locals since the beginning of tourism. Interestingly, the historical change from agricultural use to touristic use of land in the Ötztal area is associated with the loss of aesthetic value. Therefore, it has been argued that decision-makers and policies must support the agricultural use of land in mountain areas in order to maintain the area's attractiveness (Schirpke et al., 2019).

The dimensions of big ski conglomerates, their potential economic and environmental effects, the aesthetic values that they are interwoven with as well as the fact that they are embedded in wider, global changes highlight the importance of fine-grained tools for research and analysis. Therefore, I argue that the complexity the mentioned literature points to makes an STS perspective necessary when researching the controversy around the glacier marriage project. The body of literature cited in this section sheds light on the fact that economic considerations are a driving force in tourism and that even the most remote valleys in Tyrol are embedded in wider and even global changes. But what changes are taking place?

2.4 Glaciers in flux

“There is a dripping, cracking, and banging in the Alps. Global warming is melting the glacial ice.” (Hinterramskogler, 2021)

What is happening there in the European Alps? And what does this have to do with global warming? The “dripping, cracking, and banging” that is mentioned in the quote above is from the website of the Austrian Academy of Sciences and metaphorically illustrates what is happening in the Alps, namely the decrease and sometimes complete disappearance of

glaciers. Furthermore, the quote hints to processes that, on the one hand, seem to be taking place globally but that, on the other, have felt effects locally. While these glaciers were long perceived as ‘the eternal ice,’ the situation has changed dramatically. Researchers from the Austrian Academy of Science have now found that glaciers in Austrian Vorarlberg and Tyrol are not only decreasing but that many of them are, in fact, in a state of disbalance (Hartl et al., 2022). Lea Hartl, one of the authors of the study said: “Glacial retreat is an overall large-scale trend, but individual glaciers sometimes clearly differ in terms of how and how fast they are melting” (Hinterramskogler, 2021). Glaciers seem to be evolving differently in consideration of global warming and local circumstances. Yet, the overarching trend of decrease is well described by research. To better grasp and understand glaciers, in the next paragraphs I try to approach how glaciers in Tyrol and elsewhere have been described scientifically in the past and how they are conceptualized nowadays.

Humans in the European Alps have been on and around glaciers for thousands of years (Meixner & Siegl, 2010). In Tyrol, the first known mention of a glacier dates back to the year 1260, when a territory was handed over and the locality was described as “peak mountains which are called ‘Ferner’ [the local term in Tyrol]” (Meixner & Siegl, 2010, p. 14). Until the 17th or 18th century the understanding and depiction of glaciers remained close to the idea of “*montes horribiles*,” the terrifying mountains (Meixner & Siegl, 2010; Johler, 2002). However, in the centuries that have followed glaciers and high Alpine mountains areas have come to be conceptualized in various ways. While early scientific interest in Alpine glaciers in the 19th century, e.g. by Louis Agassiz or James D. Forbes, already described “glacier flow” as a phenomenon (Clarke, 1987), contemporary science is dealing with glaciers in manifold ways, from various disciplines’ perspectives and with different conceptualizations and methods.

A common and not unproblematic understanding of glaciers is one that portrays them as “mere indexes of climate change that are otherwise detached from human society” as Karin Gagné, Matthias Borg Rasmussen and Ben Orlove criticize (2014, p. 793). From this distant perspective, glaciers have served as icons for the global issue of climate change to “create narratives of both loss and possibility” (Gagné et al., 2014, p. 793). Various scholars from the social sciences have elucidated that this narrow thinking about glaciers has its limitations and is not the only way of looking at them. Rather, there exist multiple and heterogeneous perspectives on glaciers. How people and societies attribute value to perceive and experience glaciers is very much context-specific and influenced by local cultures, economies, histories and ways of living. Furthermore, the uncontested scientific consensus that glacial change, especially glacier retreat, all over the world does not lead to the conclusion that individuals and societies deal with this process in a similar or even the same way.

On the contrary, social scientists have found a variety of different strategies amongst communities living close to glaciers and other actors, like regional and national actors or

international governmental and non-governmental institutions, on how to deal with changing glaciers (Gagné et al., 2014). Not only do the perspectives and conceptualizations around glaciers differ worldwide, but so do the epistemologies and the actions around processes of glacial change in specific environments. Whether glaciers are valued for their moral or spiritual meaning, their significance for local and regional economies by, for instance, means of tourism, or their reservoir of water useful for farming or energy production, depends on the situatedness, goals and power of different actors (Gagné et al., 2014). While much of natural science focuses on the history, current state and future of glaciers and their changes, anthropologists Luckman, Wiegandt and Orlove (2008), who were similarly interested in the nature, history, and consequences of glacial retreat, were also importantly interested questions of how decreasing glaciers influence economic, cultural, symbolic and social worlds of both locals and non-locals. Hence, to understand glaciers and their retreat, social scientists need to understand the societies they are embedded in; in other words:

“[...] glaciers are never simple elements of the natural landscape which are detached from human life-worlds. Moreover, beside being the loci of human actions, glaciers are practically always produced in encounters between different groups, which in turn influence how people relate to their immediate landscape.” (Gagné et al., 2014, p. 804)

Another perspective on glaciers is provided by Julie Cruikshank (2005). Following climate histories, colonial records, Aboriginal oral traditions and her personal fascination for glaciers in northwestern North America, Cruikshank tries to explore different histories, depictions and understandings of glaciers. Moreover, her work illustrates how nature and culture, two entities often seen as separate, become intertwined and hard to differentiate. Therefore, STS scholarship has introduced and discussed the term “natureculture,” most prominently elaborated on by Donna Haraway (2003; 2008).

The term natureculture challenges the traditional dichotomy between nature and culture by insisting that they are always already entangled and co-produced. It highlights how living beings, technologies and environments mutually shape one another, making it impossible to draw clear boundaries between the natural and the cultural. Building on this, scholars in STS and anthropology have used the concept of natureculture to study multispecies relations, biotechnologies as well as ecological change, emphasizing the inseparability of human and more-than-human worlds (Kirksey & Helmreich, 2010; Franklin, 2003; Tsing, 2015).

The conceptualizations of glaciers mentioned above exist in contrast to most understandings of public media discourse but also to some of natural science communications concerned with climate change.

In the context of the Ötztal and Pitztal valleys, glaciers can be understood as naturecultural entities because they are shaped not only by climatic and geological processes but also by ski tourism infrastructures, political decisions and local imaginaries of the future. Their melting is simultaneously a biophysical phenomenon and a cultural event, entangled with technologies of measurement, scientific expertise and narratives of either loss or resilience. Approaching glaciers as naturecultures, therefore, makes it possible to analyze them as more-than-human actors within the controversy around the glacier marriage project, where environmental change and social values are inseparably linked (Haraway, 2008; Latimer & Miele, 2013; Tsing, 2015).

Still, glaciers are commonly pictured as icons of climate change with the common slogan ‘ice is just ice’ (e.g., by the Intergovernmental Panel on Climate Change (IPCC) or by Pollack, 2010). Recently though, new perspectives have gained ground in the discussion around conceptualizations of glaciers and their human as well as non-human surroundings. Next to the above-mentioned classical understandings of glaciers as icons of climate change and the mostly anthropological arguments to look at glaciers in a more contextualized, historicized and nuanced way, some researchers called for yet different approaches to glaciers. For instance, Carey and co-authors (2016) argue that while there have been a lot of changes in humans’ perspectives on glaciers, the discussion has not yet touched upon the fact that a “critical but overlooked aspect of the human dimensions of glaciers and global change research is the relationship between gender and glaciers” (Carey et al., 2016, p. 771). To overcome this lack the authors propose a “feminist glaciology framework to analyze human-glacier dynamics, glacier narratives and discourse, and claims to credibility and authority of glaciological knowledge through the lens of feminist studies” (Carey et al., 2016, p. 771). By reviewing, analyzing, and critically engaging with a wide range of literature on the relationships between humans and ice, the authors come to an important conclusion:

“Ice is not just ice.” (Carey et al., 2016, p. 787)

While Western societies and sciences, mostly through the discipline of glaciology, claim to neutrally represent nature, Carey and her co-authors argue that this is not the case. Rather, through the feminist glaciology framework they are able to show how far the discussion around and conceptualizations of glaciers are gendered. Their framework “draws attention to those who dominate and frame the production of glaciological knowledge, the gendered discourses of science and knowledge, and the ways in which colonial, military, and geopolitical domination co-constitute glaciological knowledge” (Carey et al., 2016, p. 787).

This gendered and colonial way of producing knowledge and science around glaciers also leads to the argument that “there is a friction between western representations and local

peoples' views of glaciers" (Gagné et al., 2014, p. 794). While glaciers are commonly researched, used and depicted by Western standards, local knowledge seems to be disregarded or not accounted for. Glaciers are valued by Western societies and local communities for multiple and often different reasons. Their aesthetic dimensions, their income generating possibilities or their uniqueness for scientific endeavors provide the ground for various ideas and practices of valuation (Gagné et al., 2014).

This brings me to three more meanings of glaciers in the world that I have not yet touched upon. Glaciers can be thought of as threat or as natural hazards. While some might appreciate glaciers for their beauty and uniqueness, others perceive them as a threat to their lives or livelihood. Through avalanches, morays or floodings, but also through water scarcity, glaciers prove to be a distinctive power in the life of many people. Speaking of power, glaciers can also be the source of and place for energy production by using their water in dams or power plants. Furthermore, glaciers can be seen as an area of tourism where both local and national interests come into play (Gagné et al., 2014). This, however, from an STS perspective, at the same time means acknowledging that also the glaciers' agency and their meaning for interactions between humans and their environment, including non-humans (Greenhough, 2014). This explicitly non-human-centered perspective highlights the importance of actors, which are not prominently thought of but matter nevertheless and is commonly referred to as Actor-Network-Theory (Callon, 1986; Latour, 1993; Michael, 2017).

Indeed, STS scholarship has argued and illuminated that objects like glaciers can not only be conceptualized as "an effect of stable arrays or networks of relations" (Law, 2002, p. 91) but also be thought of by looking at their fluid boundaries or by acknowledging that they are fluid in themselves (De Laet & Mol, 2000; Law, 2002). In the next sub-chapter, I want to show how STS has dealt with the topic of infrastructures and illustrate what disasters have to do with them.

2.5 Disasters and infrastructures

Many STS researchers are interested in current environmental controversies, yet many also engage with the histories and trajectories of environmental issues or even disasters (Müller, 2019; Pritchard, 2012; Glenna, 2010). While at the first glance a disaster is not in sight when looking at the situation in the Ötztal and Pitztal valleys, it is still worth noting that disasters from an STS perspective are defined as "failures of diverse, nested systems, producing injurious outcomes that cannot be straightforwardly confined in time or space, nor adequately addressed with standard operating procedures and established modes of thought" (Fortun et al., 2016, p. 1004). While public media and policy often emphasize the suddenness, the definite beginning and ending as well as the measurability of a "disastrous event," STS-

inspired research has criticized the temporality and causality inherent to this thinking (Fortun et al. 2016). In the case of the controversy around the glacier marriage project in the Ötztal and Pitztal valleys, it is hard to speak of a *fast* disaster. However, one STS definition helps us to acknowledge a different understanding: “slow disasters” is a conceptualization that attempts to capture “the injury produced by everyday operations of the many entangled systems people live within and depend on today [...]” (Fortun et al., 2016, p. 1010). The outcomes of large infrastructure projects, like the one planned in the Ötztal and Pitztal valleys, are often unsure and unpredictable. Furthermore, it is unclear and there is no scientific or societal consensus whether (the system of) ski tourism is beneficial or harmful for humans, and the environment. An example of how slow disasters can be understood from an STS perspective is the work by Scott Gabriel Knowles (2020) in which he traces a way of thinking about slow disasters in the form of climate change in the Anthropocene, different temporalities and the social production of risk. The Anthropocene, a term not undebated, is characterized by the ongoing accumulation of human traces in the geological texture of the planet (Curtzen and Stoermer, 2000 as in Armiero and De Angelis, 2017). I argue that the controversy in the Ötztal and Pitztal valleys can also be seen in the light of such discussions because “environmental issues are produced by the interaction of societies and the environments they inhabit” (Buckingham & Turner, 2008, p. 1).

This points to the entanglement of science, technology and society, which is also mirrored in the term infrastructure itself. While infrastructure is often pictured as being composed of neutral and material objects, STS perspectives and research have shown that “infrastructure is not a neutral background that enables an infinite set of activities. Infrastructure holds values, permits certain kinds of human and nonhuman relations while blocking others, and shapes the very ways in which we think about the world” (Slota & Bowker, 2017, p. 530). Furthermore, STS research has investigated the ways in which temporalities matter within and beyond infrastructures (Carse & Kneas, 2019). Drawing on a variety of fields, Ashley Carse and David Kneas examine how temporality plays out in different projects from the perspectives of stakeholders like planners, designers, constructors, political actors, potential end-users and opponents. The crucial point of the authors’ argument is their focus on the temporalities of unbuilt or unfinished projects, or better infrastructure. They argue that existing literature has neglected this fact and, therefore, that “[...] many—if not most—of the dams, roads, railroads, ports, airports, and pipelines generally classified as infrastructure exist in states aptly characterized as unbuilt or unfinished. Planned, blocked, delayed, or abandoned, such projects are ubiquitous—the norm, rather than the exception” (Carse & Kneas, 2019, p. 9). The authors show that these types of infrastructures, be they unfinished, unbuilt or only imagined, are interesting entry points for social scientists to investigate the often-unpredictable ways in which temporalities play out. They get “knotted and reworked” in multiple ways and

open up pathways for research and analysis (Carse & Kneas, 2019, p. 10). The authors develop a typology of heuristics where some projects or infrastructures are pictured as shadow histories (paths not taken), whereas others can be seen as present absences (what is left behind). Carse and Kneas distinguish further into suspended presents (varied affective states), nostalgic futures (basically former promises), and zombies (lingering between dissipation and reemergence (Carse & Kneas, 2019).

While I use the term infrastructure to describe the system of gondolas, slopes, restaurants, and so on, which is to be built and is therefore part of the controversy in the Ötztal and Pitztal valleys, I deliberately choose to not dive into the direction of infrastructure studies in STS. Nevertheless, it is interesting that Carse and Kneas (2019) investigate and discuss unfinished and unbuilt projects. This sort of perspective illuminates the multiplicities in which infrastructures appear in humans' lives and activities. Yet, infrastructure studies are often interested in heterogeneous material appearances, also in the form of knowledge infrastructures and science policy with a particular focus on knowledge production in new scientific cyberinfrastructure (Slota & Bowker, 2017). While I acknowledge that infrastructure also matters in the controversy I investigate, I do not think that the perspectives of infrastructure studies bring the particular lenses to my endeavor through which I want to look at the phenomena. As mentioned before, environmental controversies like the one I explore are sites where contradictions and especially opposing values become visible and observable. While decisions need to be taken fast to prevent damage or decide for a good and desirable future, looking at controversies through the lens of STS helps me in exploring broader culturally rooted imaginaries about how the world should look like now and in the future.

2.6 Environmental controversies

STS has a long tradition of engaging not only with scientific controversies but also with societal ones. The interest in decision-making processes, power mechanisms and democratic (and non-democratic) procedures is, to me, one of the pivotal strengths of STS approaches and scholarship. Needless to say, as argued, from an STS perspective, science, technology and society are intertwined. It is therefore not easy to distinguish between what counts as controversy only in a certain realm. Rather, STS scholars have shown that science, technology and society are co-produced (see e.g. Jasanoff, 2004) and, further, that distinction between nature and culture is often misleading and problematic (see e.g. Latour, 1993). Additionally, in the realm of STS, technology and science are usually not seen and conceptualized as two different entities but rather as entangled or intertwined. Hence, STS scholars speak of technoscience or technoscientific controversies when discussing historic and contemporary issues in these spheres (Davies, 2016; Macnaghten, Davies & Kearnes, 2019). Sarah Davies,

for instance, nicely points to some of the key aspects of what it means to live in a world of technoscience:

“We live in a technoscientific world. Across the globe, science and technology are key aspects of public policy and advice, everyday experience, and popular culture. Our days are marked by mundane technologies (from mobile phones to traffic lights) and shaped by expert advice (as we decide what to eat, study, or grow for food). We consume science by watching science channels on YouTube or by researching the medical conditions that affect our lives. Science and technology - captured by the portmanteau word technoscience - are, in different ways, central to life in the vast majority of contemporary societies around the world.” (Davies, 2024, p. 2)

STS researchers have had an interest in controversies, sometimes particularly connected to the environment or natureculture entanglements. Dorothy Nelkin (1995) introduces a typology of disputes to differentiate and classify controversies in which the second type points to “tensions between environmental values and political or economic priorities” (p. 448). A lot of these controversies are connected to local citizens’ concerns about the building of problematic infrastructures (as discussed earlier in section 2.3) in their immediate neighborhood.

This second type of controversy seems to be fitting to the issues discussed in the Ötztal and Pitztal valleys. Because political and economic considerations are positioned on quite the opposite end of the other perspectives about the issues at stake, I argue that this means the existence of a technoscientific controversy within the context of the environment. “[Such controversies] raise questions about equity in the distribution of risks, the role of the citizen in technological decisions, and the access of local communities to expertise” (Nelkin, 1995, p. 448). The questions that lie at the heart of environmental controversies comprise costs and benefits of the outcome of the particular controversy, (often unequally distributed) resources, issues of power and how to engage in a certain controversy, and the question of who is invited to speak and raise their voice and who is not. For the last point, STS has developed the terms invited and uninvited participation or publics (Wynne, 2007). These notions point to the necessity for researchers, particularly when looking at controversies, to be attentive to inclusion and exclusion effects, how they take place and, ultimately, who benefits from these processes. Speaking of different or multiple publics in the plural instead of one public in the singular, as is often portrayed in the media, means acknowledging that the public is not a static entity but has multiple facets and compositions. Adding to this argument, STS scholars have shown that publics are not “simply out there” to be informed, consulted and decided upon but that, on the contrary, they are usually formed and performed in different settings and contexts (Felt & Davies, 2020).

Coming back to the specific type of environmental controversies, STS research has shown an interest in what Maarten A. Hajer called “emblematic events/issues” (1995). Some events or issues seem to have a pivotal role in raising the publics’ awareness of environmental problems and vulnerabilities. In the case of the discussions in the Ötztal and Pitztal valleys, I argue that while there were and are other touristic projects—possibly of even bigger dimensions and potentially more disastrous effects—citizens’ engagement with and the publics’ interest in this particular controversy, importantly, might be a symbolic interaction with the “emblematic issue” of (over)tourism and its environmental outcomes (Hajer, 1995). These issues are often discussed with recourse to experts and especially their knowledge and expertise. In the next section, I will discuss different understandings of expertise and what roles expertise can play in controversies.

2.7 The roles of expertise in controversies

Classical understandings of expertise are characterized by a high degree of scientific knowledge or technical skills that a person or expert possesses. Davies explains this way of assigning expertise or of being an expert in the following:

“When we think about the nature of expertise, the taken-for-granted model we tend to mobilise is that it is something that is possessed or embodied by particular people or groups. One has expertise, or one is an expert. And this is, indeed, a key way that expertise has been conceptualised.” (Davies, 2024, p. 125)

But it is also a matter of morality who counts as someone with expertise (Grundmann, 2017). Usually, disinterestedness and impartiality are part of what is needed when expertise is to be accounted for and believed in. However, STS has challenged this conceptualization of expertise and thereby acquired a certain amount of expertise itself. In a more relational understanding of expertise, it can be seen as two-fold because expertise “relates to clients and it relates to their needs, which often is the need for guidance in decision-making” (Grundmann, 2017, p. 26). How can we look at the expertise involved in the controversy around the building of ski infrastructure in the Ötztal and Pitztal valleys? In the course of developing sociotechnical imaginaries, knowledge and expertise are factors that need to be taken into account. We know from different studies within and beyond STS that expertise in controversies plays out in very different and sometimes complex ways (e.g. Martin & Richards, 1995; Elzinga & Jamison, 1995). The importance of experts was acknowledged by these papers while it is often important who counts as an expert in the first place. Therefore, the role of experts and their expertise offer another perspective through which to look at the

controversy in the Ötztal and Pitztal valleys. Not only does this mean investigating who has been and is acknowledged the status of an expert, including how one becomes an expert and what expertise they hold, but also involves looking into who is not acknowledged with the status of an expert in the first place. Furthermore, it is important how and by whom expertise is deployed and utilized to argue their plans and visions. First and foremost, though, it is difficult to investigate and thereby acknowledge who or what (e.g. institutions) counts as having expertise or being expert. Harry Collins and Robert Evans have discussed these and other issues around expertise (e.g. 2007), highlighting how tacit knowledges play a pivotal role when it comes to expertise. Considering the fact that expertise can be held not only by a single person but also as by collectives such as institutions, citizen groups or activists, their key argument, which they ground in STS research and scholarship can be found in the following:

“The starting point for STS is that expertise is social and performative. Being an expert involves familiarity with the formal aspects of knowledge along with the capacity to act and respond to circumstances. An expert has the tacit, social, and cultural knowledge needed for the performance of the expertise. Expertise belongs to individuals and communities.” (Evans & Collins, 2008, p. 610)

Additionally, social scientists make use of the terms ‘ignorance’ and ‘uncertainty,’ which have, for instance, been discussed by Kleinman and Suryanarayanan (2015) in their paper on science-industry relations in the case of Bayer in the US. Power relations play a role in controversies as much as they do in other discussions. This line of thinking makes me sensitive to the role of cable-railway operators and economists’ views on tourism. Importantly, it is not only corporations that hold power and sometimes behold information but also (local) governments (Kinchy & Schaffer, 2018). This is particularly interesting for the case of merging ski areas as political actions and industries’ goals can be intertwined.

Furthermore, it is important to note that expertise is often associated with science or scientific activities, also in controversies. Alissa Corder (2015) investigated the case of controversial chemicals used as flame retardant in chemical products in the US. Methodologically, she builds on participant observation and interviews with various stakeholders. Within her research, Corder develops the concept of strategic science translation (SST), which, she argues, could prove useful for other contexts, including a variety of environmental controversies. Because Corder was researching “the full range of interested actors engaged in a single environmental controversy, [she has] shown that all stakeholders engage in SST to pursue their divergent goals, though SST takes different forms” (2015, p. 930). This means that various actors in the controversy make claims about science and scientific facts in a strategic way but with different purposes, in multiple ways and with varying outcomes.

Emphasizing the crucial role of power in science–policy relationships, Cordner argues that her concept of strategic science translation could be useful in other contexts and controversies because it “offers a step back from normative attempts to identify legitimate or preferred uses of science. It allows for a more holistic understanding of how stakeholders select, interpret, and sometimes misuse research findings for policy goals” (Cordner, 2015, p. 931).

A concrete example of the complexity of science and expertise in the controversy I investigate in this thesis is the discussion around wider or global effects that also play out regionally in the Ötztal and Pitztal valleys. There are very different scientific positions on glacier change in the European Alps with respect to ski tourism. On the one hand, a geophysical study (Fischer, Olefs & Abermann, 2011) showed that the operation of ski resorts has no direct influence on the retreat and volume reduction of glaciers. For this purpose, affected areas were observed during the last decades and the data was analyzed with statistical methodologies. On the other hand, a different geophysical study (Lambrecht & Kuhn, 2007) showed that glacier retreat and volume reduction were clearly evident in the period from 1968 to 1998 and can be seen as a partial cause of the impact of ski resorts. Especially in the Ötztal and Pitztal valleys, a reduction of 20% of glacier volume was observed. In the light of these two studies, it is a question of perspective, expertise and power whether ski resorts have a negative impact on the volume of glaciers and, therefore, the environment or not. Hence, it is of importance to investigate how expertise, science and knowledge play a role in the controversy around the glacier marriage project in the Ötztal and Pitztal valleys.

2.8 Future in the making

Science and expertise are also often associated with knowledge about past, present or future situations and contexts. While I have showed above what we can learn from studies in STS and beyond about the past and the present in terms of the controversy in the Ötztal and Pitztal valleys, I have not yet covered scholarly discussions with regard to the future.

Bätzing (2017), for instance, developed five *zeitgeist* perspectives for the Alpine region: realistic, neoliberal, hedonistic, downstream, and radical environmental protective. In this thesis, I do not want to argue for one or the other possibility but rather take those different perspectives as starting points for thinking about what futures are imagined for (ski) tourism in the Ötztal and Pitztal valleys. While the perspectives might not perfectly fit the controversy I investigate, they can serve as a hook to help embed different possible futures in the wider context of the European Alps.

Also, a strand of STS research has looked into different perceptions, visions and imaginaries of the future. Influential work in STS has acknowledged that the future matters more frequently and more importantly in contemporary societies (Adam & Groves, 2007). Barbara Adam and

Chris Groves argue that “[g]iven that social uncertainties and insecurities increase proportional to the efforts in economic and technological innovation, greater social transience needs to be counterbalanced by a parallel increase in concern with the future” (Adam & Groves, 2007, p. 2). Huge infrastructural projects, like the building of gondolas, slopes, restaurants and so on usually exist in the form of plans, visions or representations. Hence, they are, essentially, ‘future in the making.’ When we think about the potential futures that the Ötztal and Pitztal valleys might envision, there are of course several possibilities. STS scholars have engaged with visions of the future in many different contexts. One crucial example here is the concept of sociotechnical imaginaries (Jasanoff & Kim, 2009; 2015). This term has been built upon the recognition that “to imagine futures is a crucial constitutive element in social and political life” (Jasanoff & Kim, 2009, p. 122).

Building on this work, yet focusing on a regional context, Chen (2015) investigated how the technology of genetically modified rice is introduced to China with the use of sociotechnical imaginaries. “Rice in China, historically as well as now, is a sociotechnical assemblage that reflects coproduced formations of nature, state policy, and national identity” (Chen, 2015, p. 220). While rice in China might be far away from ski tourism in Tyrolean valleys in Austria, I argue that the sociotechnical imaginary that Chen illustrates for China can serve as an example of how ski tourism in Austria is a co-produced formation. Nature in the form of mountains, snow and glaciers is assembled with state policy and national identity of skiing as a cultural heritage. While “the process of nation building in twenty-first-century China is evolving to address not just material capabilities but also the cultivation of its citizens” (Chen, 2015, p. 230), it has not yet been investigated how and if this phenomenon occurs in Austria with regard to skiing and ski tourism.

Other STS scholars have traced regional differences in sociotechnical imaginaries in the US when it comes to energy innovations (Levenda et al., 2019). They argue that “[w]hile regional sociotechnical imaginaries articulate and resonate with national energy imaginaries of security and modernization, divergences occur due to distinct differences in histories, geographies, political identities, and cultural beliefs” (Levenda et al., 2019, p. 182). This hints at the specificity of regional trajectories and their cultural uniqueness even though regions are embedded in larger contexts such as national policies and laws. While a strive for innovation and technological development, particularly with regard to specific technologies, might be objected to and rejected in Austria (Felt 2015), it is yet to be researched how this plays out in a specific regional context. Felt argues that in Austria there is an “[...] ‘imaginary of the absent’” (2015, p. 104). This imaginary exists within the framework of “a national identity, a specific kind of ‘Austrianness,’ [that] became tied to an imaginary of technological choice, namely, keeping a set of technologies out of the national territory and becoming distinctive as a nation precisely by refusing to embrace them” (Felt, 2015, p. 104). While Felt’s argument builds on

the case of nanotechnologies (with a recurse on nuclear and agrobiotechnologies) and contends that this specific Austrian technopolitical culture is a “preexisting sociotechnical imaginary of the absent, which had been gradually shaped through the nuclear and the agrobiotech experiences” (2015, p. 119), she also shows how this process took place historically and in contrast to other nations’ contexts. She argues further that “a national technopolitical identity was created, a new self-understanding of Austria as a small nation that can choose a different sociotechnical trajectory from its more powerful neighbors” (Felt, 2015, p. 119).

Taking this Austrian self-understanding into consideration when researching the context of Alpine valleys brings many complexities but also offers to contextualize the controversy in the Ötztal and Pitztal valleys around the glacier marriage project. I argue that although the Ötztal and Pitztal valleys and their citizens are situated within the national technopolitical culture of Austria, it is yet to be investigated how this plays out in a very specific, rural and remote place and with the topical focus of ski tourism. Different ideas and imaginations than expected around technoscientific futures in this Austrianness might occur in the two valleys and the surrounding mountains and glaciers. However, it is worthwhile to keep in mind what Felt (2015) argues and how the described processes and mechanisms might be similar or different to the overarching technopolitical culture in Austria. The complexity and fluidity of this culture in Austria are emphasized by Felt in the following quote: “‘Free’ thus emerges as a hybrid term, embracing both the material absence of contested technologies and the imagination of political freedom: Austria is thus “free of” and “free to” at the same time” (Felt, 2015, p. 120). This hints at both political and material components of Austria’s technopolitical culture, which is, like as any culture, contested, negotiated and reinforced in multiple ways.

2.9 Conclusion

The knowledge derived from existing literature and the arguments made in this State-of-the-Art chapter suggest that an STS-inspired case study on the imaginaries of the future in the light of the controversy around the glacier marriage project in the Ötztal and Pitztal valleys is needed. I argue that this thesis can extend existing knowledge in various fields in the social sciences, link different bodies of knowledge from within STS and contribute to ongoing STS engagements with the role of expertise in controversies. Furthermore, the specific context of the case provides ground for a thorough and fine-grained analysis of the imaginaries of the future of ski tourism in the specific context of Austria. The uniqueness of the case which is embedded in a wider Austrian technopolitical culture can make visible what different approaches exist towards the future of ski tourism. Moreover, the rural, high Alpine and remote

location of the controversy seems to be a fitting context for re-conceptualizing and further adjusting of existing theoretical and methodological tools in the realm of STS.

To conclude I want to make two further remarks of importance in regard to the discussion around approaching and investigating the European Alps, in the form of the valleys and mountains in the Ötztal and Pitztal, as well as the communities that live with and in these regions. First, the European Alps were and are full of diversity, sometimes areas and communities being more similar to each other, sometimes more different. Hence, I argue that they can be seen as a mosaic of social activities that is both interesting and worthwhile to be explored and in which the Ötztal and Pitztal only are one stone within this puzzle. And second, the European Alps are a region, or better many regions, of fascinating contacts, frontiers and zones where social scientists like STS scholars can learn more about frictions, convergences and multiplicities. This hints to the point that there is not only one culture or nature to be investigated within social science research in and around the Alps; rather, there are multiple communities and landscapes in Alpine regions out of which, however, researchers can only select only one or a small handful for their endeavors.

Nevertheless, as a researcher I have to choose my topic of interest and I did so by arguing for the case of the imaginaries around the future of ski tourism in light of the controversy around the glacier marriage project in the Ötztal and Pitztal valleys in Tyrol, Austria. Although it would have been possible to investigate other places, controversies or people, in this chapter I have argued that existing knowledge in STS and beyond lacks such a unique case to foster and expand the understanding we have of imaginaries of the future. In the next chapter, I will discuss what my main research question is and what supplementary sub-questions I deal with in this research.

3 Research questions and sensitizing concepts

This chapter is composed of two major parts, one being the formulation of my research questions, the other being the introduction of my sensitizing concepts and the zoom in on what they can make visible and what not. While my research questions are centered around the imaginaries different actors have of the future of ski tourism. More explicitly, for my research I take as starting points such questions that deal with the actors' different arguments and narratives, but I also consider the role of expertise in this particular controversy as well as the multiple ways in which temporalities are part. The sensitizing concepts are sort of a mixture of different frameworks, or vehicles, that help me in thinking, researching and writing about my case. They in any case allow only a partial perspective and, hence, I do not claim to fully research every aspect of the controversy around the glacier marriage project. Nor do I think that this is possible or desirable because, as STS scholarship has shown, every research endeavor is partial and depends both on the researchers' positionality and on contextual circumstances of the case.

3.1 Research questions

In light of these arguments and in consideration of the research gap, I now turn to my research questions. There are three main pillars of what we can learn from the discussion in the State-of-the-Art. First, research that takes into account various perspectives, actors and values is needed for the case of the glacier marriage project controversy in the Ötztal and Pitztal valleys. The complexity which the mentioned literature points to makes visible that an STS perspective gives additional value and insight to existing studies and knowledge. Second, expertise plays a pivotal role within controversies and therefore also in this case. Therefore, this thesis takes into account expertise as the main ground for investigation. And third, this controversy, like many others, is a place where technoscientific issues and sociotechnical imaginaries of desired futures are at play. In light of these considerations, I ask the following as my main research question (RQ):

(RQ): How do different actors imagine the future of ski tourism in the Ötztal and Pitztal valleys in light of the “glacier marriage project” controversy?

This question aims to explore the ways and modes in which the future of ski tourism is imagined in a specific area in Tyrol, namely the two Alpine valleys Ötztal and Pitztal. Actors like humans, companies and institutions play a role in this research question as well as clashing values about what a good and desirable future should look like in this area. I want to

know how the future of ski tourism is imagined. What do different actors argue and communicate to me with regard to the glacier marriage project controversy? This does not mean that I find out about every aspect and every different vision, but rather that I try to engage with and carve out different ways of imagining the future and, importantly, only by a limited number of actors. As answer to this question, I do not expect one single distinct and coherent vision, but rather various and different imaginations of what the future of ski tourism can and should look like in the Ötztal and Pitztal valleys. As ski tourism is part of the area's economy and identity, this also leads to imaginations of how the future of the valleys should look like more generally and in what contexts the citizens want to live in. To specify and support the main research question it is accompanied by three sub-questions (SQ):

SQ1: What arguments and narratives do the actors use?

With this question, I specifically target different actors' lines of arguments, how they make sense of the controversy and how they embed their thinking in broader narratives. On the one hand, I want to know what actors are involved in the controversy in the first place and how they relate to one another. On the other hand, I aim to dive into specific actors' positions and arguments further by engaging with them more thoroughly. This emphasis and focus on only some of the actors is due to the restriction of resources and access, but it also gives me the possibility to explore deeply what arguments and narratives single actors make use of. How are different arguments connected? How are different claims tried to be made and legitimized? And in what sense are arguments and narratives connected and entangled? This brings me to the next focal point of my research, namely expertise. As seen above, expertise plays a pivotal role in any sort of controversy, but I argue it matters even more when technoscientific and natureculture issues come together in a controversy like the one around the glacier marriage project. Therefore, SQ2 deals with the role of expertise and legitimation:

SQ2: How do the actors utilize expertise for legitimation?

In the State-of-the-Art chapter, I also tried to argue that time and different understandings of time come into play when a project like the glacier marriage is planned. The multiple and various temporalities that people, institutions, decision-making, policy-making and other aspects are part of come to matter in controversies such as the one I am interested in. Because different actors experience time differently and they frame their arguments in light of clashing understandings of temporality. Therefore, I take this aspect of the controversy as a pivotal part of my research endeavor and try to explore how exactly it plays out. I want to know in what time frames and logics the different actors argue. And I aim to carve out how such

different understandings come together in entanglements of histories, presents and futures. Hence, the third accompanying sub-question of my research is:

SQ3: How do different understandings of temporalities matter?

The target of all of these questions is to enlighten some aspects of the controversy around the glacier marriage project and the imaginaries involved in this. Although I can only make some things visible, while others remain invisible, I think that these questions build a solid ground on which I build my research and investigations.

3.2 Theoretical lenses

To sensitize these research questions, I use the concepts discussed below. These theoretical tools help me in deploying a lens through which to look at my case, the different actors' imaginaries of the future of ski tourism in the Ötztal and Pitztal valleys in light of the controversy around the glacier marriage project:

- First, I examine the usefulness of the concept of sociotechnical imaginaries (Jasanoff & Kim, 2009; 2015) for my case. This conceptual tool, I argue, makes visible the different ideas, visions and plans that the future holds, also in the case of ski tourism in the two Tyrolean valleys Ötztal and Pitztal.
- Second, I open up the discussion by looking at my case with the concept of envirotechnical regimes (Pritchard, 2012). Thereby, I explore the possibility of investigating historical trajectories of decision-making in the realm of environmental and technological governance within my specific case study.
- And third, I examine what the concept of technopolitical cultures (Felt et al., 2008; Felt & Müller, 2011) offers me when looking at the wider relevance of my case. Beyond being a fitting tool for making broader cultural beliefs and practices visible, technopolitical cultures offer me to situate my case study both within Austria and within the STS research landscape.

3.2.1 Sociotechnical imaginaries

While sociotechnical imaginaries are not to be equated with master narratives, they are “instrumental and futuristic: they project visions of what is good, desirable, and worth attaining for a political community; they articulate feasible futures” (Jasanoff & Kim, 2009, p. 123). Yet, these imaginaries are not always framed in a positive way but also formulated in a prohibiting or protecting manner to prevent damage to humans or nature. The concept of sociotechnical

imaginaries is connected to the idea and idiom of co-production which, in a nutshell, is “shorthand for the proposition that the ways in which we know and represent the world (both nature and society) are inseparable from the ways in which we choose to live in it” (Jasanoff, 2004, p. 2).

The concept has been used to look at and understand nation-building and the co-production of science, technologies and societies, but it can also be applied to more narrow frameworks or units of analysis. In my case, different actors’ imaginations of the future of ski tourism seem to clash within the controversy around the glacier marriage project. These different visions of futures can be enlightened by looking at them through the lens of sociotechnical imaginaries, I argue. When examining and understanding the different plans, representations and ideas of the glacier marriage project, but also its objections, it becomes visible how the future of the area is desired to be like and should look like. This is particularly important for my main research question but also for the first sub-question (SQ1) around the imaginations of different actors in the controversy.

At the first glance, it might seem odd to turn toward the concept of sociotechnical imaginaries as it tries to capture “collectively imagined forms of social life and social order reflected in the design and fulfillment of nation-specific scientific and/or technological projects” (Jasanoff & Kim, 2009, p. 120). The focus on nation-states and their policymaking stands in strong contrast to my empirical case which is just two valleys inside the nation-state of Austria. Yet, my argument to use this concept is that the micro-politics and possibly regionalized sociotechnical imaginaries of the Ötztal and Pitztal valleys can serve as exemplary empirical ground for discussing broader sociotechnical imaginaries in Austria. They could be supporting existing knowledge and studies in this realm, but they could also provide ground for counterarguments or more complexity. How are national policies and local actions intertwined? And how are technoscientific and political orders co-produced both nationwide and in a local context (Jasanoff & Kim, 2009, p. 124)?

“STS scholarship acknowledges that science and technology do not unidirectionally shape our values and norms. Rather, and symmetrically, our sense of how we ought to organize and govern ourselves profoundly influences what we make of nature, society, and the “real world”” (Jasanoff & Kim, 2015, p. 3).

In terms of the present controversy, we can ask by borrowing from Sheila Jasanoff: “How do the practices of collective imagination resolve conflict and produce consensus?” (Jasanoff & Kim, 2015, p. 27). In a critical discussion on Austria’s relation to a specific technology, nuclear energy, Felt (2015) argues that Austria’s technological resistance to this particular technology can be read in different ways: “While public questioning of technoscientific innovation is often

interpreted as a sign of technophobia and as putting in danger the innovation-friendly climate that is so sought by governments, it could also be seen as opening up alternative understandings of the public good” (p. 121). With this in mind, we can look differently at Austria as a whole and the Ötztal and Pitztal valleys in specific. The question that arises is whether Austrian sociotechnical imaginaries are enacted and performed at a local level. Is the building of new ski infrastructure a step towards a desirable future or is it, on the contrary, a step in the wrong direction? Felt argues further that “public choices are not for or against technology but for or against particularly imagined forms of life - and these sociotechnical imaginaries are not given in advance but are constructed through the collective work of designing futures that seem to a nation’s citizens worth attaining” (Felt, 2015, p. 121). The use of the concept of sociotechnical imaginaries, ideally, provides me with a lens through which to look at the intersections, differences and incommensurabilities of various visions at play. They might work and act on multiple levels, however this is yet to be investigated. I want to take a closer look at the mechanisms in play when futures are envisioned, constructed and enacted on a local level. The case of the glacier marriage controversy in the Ötztal and Pitztal valleys offers the possibility to examine and observe the co-production of science, technology and society not on a national level, but in a local form with entanglements to regional and national societal spheres.

3.2.2 Envirotechnical regimes

To build upon and accompany the concept of sociotechnical imaginaries with another critical instrument, I use the notion of envirotechnical regimes (Pritchard, 2011; 2012). This concept has been developed by Sarah Pritchard within a case study of water systems in France as well as through researching the nuclear and non-nuclear events in Fukushima in 2011. In her work, she applies envirotechnical analysis which is an approach that highlights the material and rhetorical links between ecological and technological systems. Envirotechnical regimes, therefore, are defined as “the institutions, people, ideologies, technologies, and landscapes that together define, justify, build, and maintain a particular envirotechnical system as normative” (Pritchard, 2011, p. 23).

With the help of the term, I can capture the entanglements of environment and technology and emphasize their mutual shaping. When we look at the controversy in the Ötztal and Pitztal valleys, this perspective makes visible that the technologies and the nature surrounding it are not two separate entities. Rather, they are intertwined systems that interact and mutually shape each other. The notion of envirotechnical regimes points to the “historical and political production of envirotechnical systems” (Pritchard, 2012, p. 224). This “specific, often strategic reblending of natural and technological systems to serve particular ends, although [...] these

configurations do not always develop exactly as the people and institutions promoting them intended” (Pritchard, 2012, p. 224) brings to the foreground what remains invisible otherwise. Namely, the history and politics of certain envirotechnical systems. I deploy this concept to be able to better contextualize the case of the glacier marriage controversy and the imaginaries of the future of ski tourism surrounding it. My argument is that the use of the notion of the envirotechnical, regime or system, helps me to emphasize historical developments and political power structures at the same time. But it also illuminates the entanglements of technology and nature or environment. While there has not happened a disaster like Fukushima in the Ötztal and Pitztal valleys (and it is also not likely to occur), I argue that the notion of envirotechnical regimes helps me in better grasping and understanding the natural and technological shaping of the area. This perspective emphasizes questions of historical trajectories and political decision-making and thereby connects nature, technology and society to understand the building and maintenance of envirotechnical systems. Hence, the glacier marriage project which in its plan involves ski infrastructure like the building of slopes, gondolas, restaurants, streets, lakes and much more can be linked to its natural surroundings as one envirotechnical system. And this has been brought into being by an envirotechnical regime of ski touristic use of nature.

Together with the concept of sociotechnical imaginaries, the concept of the envirotechnical allows me to see certain things, while leaving out others. Sociotechnical imaginaries help me to grasp different ways of future-making in a local area, situated in a nation-state. The notion of envirotechnical regimes and systems as well as envirotechnical as the term itself fosters my ability to grasp the entanglements of nature or environment and technology. Furthermore, the embeddedness in historical and political contexts is something that both concepts hint to, but in the light of discussions in the State-of-the-art chapter and beyond, I argue that a third lens is beneficial for my research.

3.2.3 Technopolitical cultures

When looking at broader levels of how societies deal with issues around science and technology, the concept of technopolitical cultures (Felt & Müller, 2011; Felt et al., 2008) comes to mind. This adjacent lens illuminates yet other aspects of my case, the controversy around the glacier marriage project. More specifically, this concept supports me in elucidating how one or more technopolitical culture(s) come to matter in the context of different imagined futures in the Ötztal and Pitztal valleys. Moreover, it helps me in keeping in mind the national setting that my case is embedded in, Austria, and the wider context it relates to, the European Union as a regulatory power and economic market. Further, with technopolitical cultures I am made aware of the fact that despite the remoteness and rurality of the Ötztal and Pitztal valleys

compared to other areas, like cities, the controversy still evolves in the Western hemisphere, a capitalistic system. On the one hand, I need to acknowledge that my case is situated in contemporary Austria, embedded in a globalized world with global supply chains, supported by technologies like the internet or AI, the technological part of the concept. On the other hand, the actors in the Ötztal and Pitztal valleys belong to a rural area, however, they are part of a democracy and deeply connected to regional and national actors.

While technopolitical cultures are by no means homogeneous, they are also not arbitrary and come into play when scientific and technological, technoscientific, issues are debated, contested and discussed (Felt & Müller, 2011; Felt et al. 2008). Different societies, of course, develop, maintain and also discard a multitude of technopolitical cultures. This is due to the fact that with every technoscientific debate there comes along a certain engagement with values, imaginaries and (political) actions towards (a) scientific development or technological innovation. For instance, Felt et al. (2008) researched the Austrian context in how biomedical technology was negotiated, envisioned and dealt with. The authors find that “the type of technology discussed was crucial for the positions expressed in the groups, rather than whether or not participants were affected by the technology” (Felt et al., 2008, p. 252). This means that the involvement in or affectedness by a certain technoscientific issue is not as important as which exact type of technology is being discussed. In their study working with focus groups, the authors investigated how three central notions, government, governance and participation, are negotiated and conceptualized by Austrian citizens in the case of biomedicine.

“Felt et al. (2010) have shown that by offering shared discursive resources and broader sociotechnical imaginaries (Jasanoff and Kim, 2009) different national technopolitical cultures matter deeply. Yet these technopolitical cultures are far from being homogeneous (Felt et al., 2008) but offer specific sets of discursive references for different technologies, depending on how they are imagined to link up with societal interests, actors and histories.” (Felt & Müller, 2011, p. 347)

The concept of technopolitical cultures is closely linked to the idea of sociotechnical imaginaries (Jasanoff, 2005; Jasanoff & Kim, 2009) which itself is grounded in the idiom of co-production. Sociotechnical imaginaries are collectively held visions of desirable futures, shaped by science and technology, which guide policy, regulation, and societal engagement. Within the Austrian context, such imaginaries are often intertwined with historical experiences of governance and technological deployment (Hecht, 2001). In the controversy around the glacier marriage project, imagining futures of ski tourism, climate adaptation or cultural heritage involves both technological expectations and value-laden assumptions about society

at large. Technopolitical cultures as a concept offer me a lens to see how these imaginaries are interpreted, debated but also operationalized by local, regional and national actors (Felt et al., 2010). Furthermore, they also illuminate how governance is enacted at multiple levels, from rural communities to national authorities (Felt et al., 2008). In the Ötztal and Pitztal valleys, this manifests in the negotiation between local stakeholders and national or EU-level regulatory frameworks. Even in remote or rural areas, actors are embedded in larger technopolitical structures and cultures that influence which technological, scientific or environmental, technoscientific or envirotechnical, interventions are acceptable. This echoes Wynne's (1995) argument that public understanding and engagement with science is always shaped by local knowledges, histories and social contexts, rather than purely by abstract technical rationality or value-free actions.

Finally, understanding technopolitical cultures requires acknowledging the distribution of power across technologies, institutions and actors (Star, 1991). Technologies are not neutral instruments but are embedded within social orders that produce, constrain and enable certain actions. When looking at the controversy around the glacier marriage project, I need to be attentive to how power relations, material infrastructures and local practices intersect. Reflexive awareness of these dynamics is essential because it allows researchers to trace how seemingly technical debates about glaciers, tourism infrastructure or climate change mitigation are inseparable from values, imaginaries and political discourses (Felt & Müller, 2011; Felt et al., 2008; Hecht, 2001). Underneath in figure 1, I visually explored how the different terms and sensitizing concepts, my theoretical lenses, are related and how they shape each other.

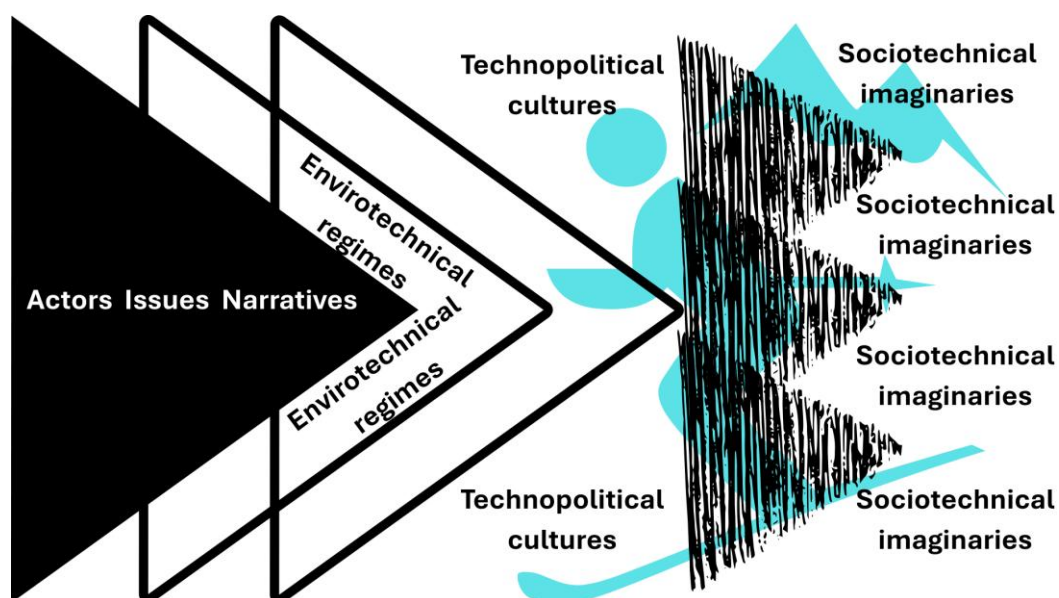


Figure 1: Relation of concepts - visualization by author

4 Methods and material

In the following, I describe the methods I used for data gathering and analysis as well as share insights into the material I deployed as empirical data. I start by explaining some general methodological considerations of my STS inspired approach to engage with the case of different imaginaries of the future of ski tourism in the light of the controversy around the glacier marriage project. This is followed by a description of the research methods I used. To gather data, I combined controversy mapping (Marres, 2015) with ethnographic approaches including semi-structured interviews (Delamont, 2007; Pink & Morgan, 2013). To analyze this data, I chose a grounded theory approach to be a suitable fit for engaging with the data and for answering my research questions. The chapter is concluded by a discussion of ethical issues within the research project and a deeper look into and presentation of my case.

4.1 Methodological considerations

In order to answer my research questions and in consideration of the discussion above as well as the sensitizing concepts, I combined two methodological approaches:

- controversy mapping (Beck & Kropp 2011; Marres 2015; Venturini 2010) and
- ethnographic field work with semi-structured interviews (Delamont, 2007; Pink & Morgan, 2013).

However, the emerging thesis and the overall research were an influx process where different aspects of research were mingled together and sometimes overlapped. This is due to the reason that “[...] the STS focus on practice means that theory, method, and the empirical get rolled together with social institutions (and sometimes objects). They are all part of the same weave and cannot be teased apart.” (Law, 2017, p. 32)

At first glimpse, it may seem as if controversy mapping and ethnography were independent and consecutive steps, but my research design and plan were different. First, I did research on available online material to grasp the different actors, issues and narratives which are prevalent in the controversy around the glacier marriage project. While controversy mapping in STS is usually connected to inspirations from Actor-network theory (e.g. Callon, 1986; Latour 1993; Michael, 2017), I did not directly draw on this strand of STS but rather used its methodological tools to inform my analysis of imagining the future of tourism in the controversy in the Ötztal and Pitztal valleys. Hence, I deployed a version of mapping which is both a “conceptual tool kit for talking about heterogeneous relationality, a method for mapping how every object or actor is shaped in its relations” (Law, 2017, p. 41) and a way of exploring the controversy with respect to the range of different actors which are involved, be they human or

non-human. Taking this approach and its implications seriously, humans, parties and institutions as well as non-humans, objects and materiality need to be accounted for in a symmetrical way (Law, 2017). The baseline here is that not only humans matter in this controversy. Therefore, I was attentive to “[...] how webs assemble themselves to stage effects such as actors and objects, and binaries such as nature and culture, human and nonhuman, or indeed macro and micro” (Law, 2017, p. 42). However, this first step of controversy mapping had limitations. My data gathering and analysis therein relied on available online material which might be partial, but the whole process was also very much subjective and situated from within my own perspective. While I do not see this as a major pitfall of the research project, I needed and need to be aware, clear and self-reflexive about that fact.

This first process of data gathering and analysis informed and guided decisions about the second part, the ethnographic approach including semi-structured interviews. While controversy mapping helped me in grasping the different actors, issues and narratives, the mentioned limitations suggested accompanying it with a second approach. Here, I argue that an ethnographic approach provides the possibility to engage with certain actors in a more focused way. Particularly, researching ethnographically in this case offers to investigate and observe different actors’ practices of imagining the future and using expertise in the controversy around the glacier marriage project in the Ötztal and Pitztal valleys. Together, these two aspects built the foundation for answering my research questions. However, the limitations of an ethnographic approach are that it is both resource intensive as well as that I can investigate some things closely whereas other things remain untouched. Considering this argument, the ethnography was carried out as a limited yet important step in my research process.

4.2 Controversy mapping

Controversy Mapping offered me the opportunity to apply techniques of exploring the controversy around the glacier marriage in the Ötztal and Pitztal valleys, predominantly with digital tools. Within this method, I started by working with and extending an actor map (crosswise after this sub-chapter). To gather an understanding of the issues at stake and the inter-relations between different actors, issues and narratives (in the graphic underneath), I designed consecutive maps by regrouping the actors and attaching statements and positions in the controversy. Therefore, it was also worth thinking of narratives, frames and framing processes which the actors took on to argue their positions.

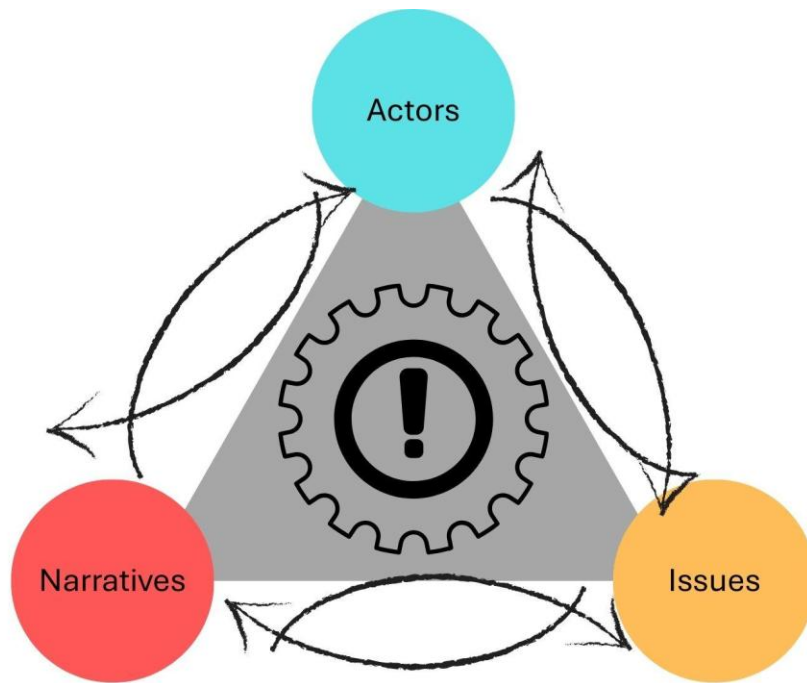


Figure 2: Actors, issues and narratives - visualization by author

From a practical point of view, I started with the maps by using the free software sketchboard.me which is a hands-on software for digital mapping. The main goal for mapping the controversy around the glacier marriage project in the Ötztal and Pitztal valleys was to investigate the different actors' positions towards imaginations of the future of ski tourism in the respective area (and beyond) and regarding the controversy. Thereby, I tried to get one step further in answering my research questions and preparing for in-depth engagement with some of the actors. All in all, the mapping approach provided me with additional insights, ideas and pathways for the ethnographic approach and my overarching research questions. In figure 3 on the following page, one of the initial actor maps with some preliminary issues is shown.

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4.3 Ethnographic approach

To deepen my understanding and strengthen my analytical capabilities of the controversy around the glacier marriage project, I also deployed an ethnographic approach (Delamont, 2007). However, as I did not have the resources to spend a lot of time in the Ötztal and Pitztal valleys, I only carried out a “short-term ethnography” (Pink & Morgan, 2013). In doing so, I traveled to the area and conducted data collection in the form of observation, interviewing and auto-ethnography. The whole process was accompanied by the writing of memos which also serve as material. Initially, my observation was planned to happen when there were discussions in public spaces around the controversy (restaurants, town hall, etc.). However, exactly a couple of days before my visit to the Ötztal and Pitztal, a referendum was held in St. Leonhard in Pitztal with a small majority voting against the implementation of the glacier marriage project. Hence, the project had come to a halt or possibly even an end. This is to say that I had restrictions in time and financial resources so that I could only visit the area in a timeframe when no town hall meetings were held. Nevertheless, I spent five days in the two valleys alongside hiking through the mountains and visiting the area where the planned infrastructure of the glacier marriage project would be placed. A fascinating experience was the overnight stay at the Braunschweiger Hütte with a wide view around the high mountain chains and the glaciers. Here, I was able to see the glacier area that would serve as a ground for the planned new ski pistes. Photographs I took of my ethnographic stay follow throughout the analysis (chapter 5). My plan was to also carry out four to six face-to-face interviews with some of the actors in the controversy while being in the Ötztal and Pitztal area.

But, although I tried to schedule appointments with my interviewees beforehand, this proved to be a major challenge. Since I could not do so, I tried persuading people to talk to me while I was in the area. However, also this endeavor was unsuccessful so that I was frustrated not only with myself but also with the possible interviewees, some of them actors in the controversy around the glacier marriage. While the frustration kept arising, I decided that I would just make use of the time to experience the area in a different way and let myself drift in different activities. This led to the fact that I had and still have mixed feelings about my ethnographic approach. On the one hand, it was very useful and insightful to visit the places where the controversy is embedded. I took pictures, experienced the landscape and infrastructure of the Ötztal and Pitztal and took notes of what I saw. On the other hand, I did not achieve my aforementioned formulated goals, namely, to talk to interesting and interested people for and in my research. Several times I tried to get in touch with local politicians, citizens, tourism managers and so forth, but I could not get hold of them and bring them to talk to me. This is why I decided that I would still enjoy the research trip and make the best out of it through investigating on my own and with my agenda of getting to know different places in

the area. Not only did I make use of the public transport system to get around, I also hiked a lot and felt exhausted after every day. It turned out to be an exciting but also challenging field work trip. At the end of which I counted the interviews I carried out: 0.

Nevertheless, I took hundreds of pictures and filled my memory with experiences that also guided my further approach to the research. After all, I decided to carry out online interviews with some of the actors in the controversy because I reckoned that I could schedule them easier. And finally talk to people that want to say something about the controversy around the glacier marriage project. Therefore, I got in touch with a variety of different people who in some ways were connected to the controversy, live(d) in the area or otherwise were interesting people to talk to. Not only did I contact mayors, local politicians, business owners, railway operators, other stakeholders, researchers, journalists and local citizens, but I did so by failing with a bang. Most people I wanted to talk to either did not respond to my emails and calls or they refused to get interviewed by me. Although I tried to be very restrained and cautious about my research and told them I was genuinely interested in their perspectives, many people declined my request for an interview.

So, what was I going to do? I had to decide on a way forward and broaden my scope a bit. Initially, I wanted to interview people with very different perspectives and thereby get a sense of contradicting and opposing actors, arguments and imaginaries of the future in the Ötztal and Pitztal. However, most of the actors who initiated the glacier marriage project or would carry it out (or were out of other reasons obviously in favor of it), were hard or impossible to reach. Whereas some of the actors who were either against the project or had a yet different perspective on it were apparently more likely to let me interview them. Hence, I decided to live with that. At some point, you must make decisions in any case and go with the flow, I said to myself. In the end, I interviewed eight individuals. Most of them had (rather) nuanced perspectives or were (rather) against the glacier marriage project. Starting with an exploratory interview, I decided to recruit interviewees through (my own or the interviewees') personal contacts and suggestions by the interviewees. By means of a snowballing technique I was finally able to recruit eight interview partners.

With regards to the online interviews, I decided to go for a semi-structured approach in which I would be viewing the process of interviewing as social interaction (Silverman, 2006; Jensen & Laurie, 2016; Warren, 2012). Although I did not physically meet with the interviewees in a room, I still view these research interviews as social interaction. This is due to the fact that ever since the COVID-19 pandemic, but also before, methods of digital interviewing were carried out in a broad range of research (Lupton, 2014; 2023; Trier-Bieniek, 2012; Oliffe et al., 2021). Of course, these interviews remain bound to general considerations when it comes to qualitative social science research interviews (Holstein & Gubrium, 1995; Plesner, 2011; Law & Urry, 2004), but they are also specific in their nature, due to the digital setting (Hanna, 2012;

Holt, 2010; Tomás & Bidet, 2023). While Stotten (2020) who investigated the interconnectedness of agriculture and tourism in the Ötztal region ethnographically reports quite easy access to participants and interviewees in this area, I did not have that experience.

4.4 Data analysis

For analyzing the controversy in the form of mapping, I, sort of, carried out an empiricist version of controversy analysis (Marres, 2015) which means that “[...] we recognize that controversy analysis is always partial, and that it is our task to formulate a methodological strategy that is partial to the intellectual and normative aims of the study of STS” (Marres, 2015, p. 676). It involves reconstructing the controversy through digital analysis and moving to the investigation of issues rather than topics. Hence, I analyzed the controversy alongside issues. This analysis ideally should already have provided a rich landscape of (different) preliminary sociotechnical imaginaries of the glacier marriage controversy in the Ötztal and Pitztal valleys and ways of utilizing (different) expertise and knowledge in it. Although I spent a decent amount of time with online research and carving out the different actors, arguments and narratives, I did not succeed in exploring an emergence of (different) sociotechnical imaginaries. For this purpose, so my argument goes, a more in-depth online data gathering and analysis would have been needed.

This is why I complemented the controversy mapping with an ethnographic approach including semi-structured interviews. Nevertheless, the approaches around controversy mapping shaped my thinking about and my knowledge of the glacier marriage project alongside being preparation for further engagement with the topic. I also see the first step of my analysis as a means of probing the landscape of the controversy and finding out about relevant actors, issues and arguments. Of course, this part of my research lacks not only thoroughness, but it also misses a readjustment after the ethnographic approach and in light of the interview analysis. Initially, I planned to do so and thereby develop elaborated actor and issue maps which would have served me in carving out (different) sociotechnical imaginaries prevalent in the controversy. Although this is a major downside of my research design and process, I argue that, for the purpose of this thesis, restrictions played a role in various facets. And so, they did in this regard. While I had in mind a lot of different approaches for analysis, I also had to learn to bring my research and results to the ground. Meaning that at some point I had to make decisions about phasing and, ultimately, stopping my analysis.

Having these considerations in the back of my head, I approached my analysis of the short-term ethnography, the semi-structured interviews and all the gathered material. I transcribed the interviews from the ethnographic approach verbatim (Paulus, Lester & Dempster, 2014) and carried out thematic, inductive and open coding (Rivas, 2018). Therein, I drew on the rich

history of STS engagements with grounded theory approaches (Charmaz, 2006) and also tried to deploy such an approach to the material I gathered. I had in mind to focus and make use of notions such as “narratives” and “tropes” (Law, 2017, p. 37) to closely examine how they are prevalent in the controversy around the glacier marriage. Thus, I wanted to carve out what work they do as well as how they are interwoven with particular practices. I did not only plan to analyze the interviews in such a way but also the memos and field notes which I wrote during the short-term ethnography. The goal of the data analysis, ultimately, was to develop ideal type-like constructs (Weber, 2002 [1922]) which, I argue, can be linked to the concept of sociotechnical imaginaries and thereby serve as answers to my research questions. In the end, my results should lead to a better understanding of a contemporary environmental controversy and potentially (regional) sociotechnical imaginaries around the future of ski tourism in the Ötztal and Pitztal valleys. I expected that these imaginaries could serve as background for other research in this area of inquiry and moreover for opening up different possible and maybe better futures because “[t]hings never have to be the way they are. Such is the point of this STS of method.” (Law, 2017, p. 49)

However, and as it is prevalent throughout the previous paragraphs, I did not succeed very much in what I had in mind before and when carrying out the data analysis. Rather, I adopted a flexible, creative but empirically based approach through which I could analyze the gathered data and get answers to my research questions. This means that I meandered around in the coding process and thereby went back and forth within and between interviews, memos, photographs and other material like websites and documents I found. Others called this way of going through data „zig-zag-approach“ (Rivas, 2018) and I heavily relied on such a process. Furthermore, I made use of basic principles in qualitative social science methodology like circular procedures and entanglements between theory and the empirical material (Knoblauch, 2021). Thus, what I learned throughout my studies in both sociology and STS proved to be useful sources to engage with the data I gathered. In the end, my approach to data analysis was different to what I knew from sociology, similar to what I explored within STS and yet a mixture of various data analysis methods. This does not mean that „anything goes“ (Feyerabend, 1999), but through this thesis’ research I developed my own way of data gathering and analysis, alongside innovative ways of writing about my research and its results which is to be read further below in the research results section (chapter 5).

These results are illustrated through a series of vignettes, closely connected to data from the interviews I carried out, but also containing contextualizing photos I took during my ethnographic fieldwork. Furthermore, the vignettes are accompanied by theoretical considerations which are interwoven with the empirical. This approach refrains from a clear distinction between theory and the empirical, rather they get enrolled together throughout the elaboration on my results. The dynamics of the controversy around the glacier marriage

project in the Ötztal and Pitztal is mirrored in the dynamics of my results section, sometimes focusing on different actors' arguments, issues and narratives, at other times zooming into themes that arose from the data. Building on the initial and preliminary series of inductive and open coding of the interviews, memos, field notes, relevant documents and online material, I developed the different vignettes. Through the variety of accounts, I want to make visible not only the different actors' positions but also the multitude of modes on which they get performed and enacted, for instance, through establishing legitimacy, utilizing expertise and pointing to possible pathways for action. The performativity of knowledge as well as these vignettes, as they also lend from the knowledge I gathered throughout this research, resonates with accounts in STS that highlight the inseparability of facts and values in contemporary societies and especially in sociotechnical controversies (Latour, 2007; Jasanoff, 2015).

Similar to the meandering coding in form of the zig-zag-approach, also the development and genesis of the vignettes was an iterative process. Because of the movement which went back and forth between different data, theory and my arguments, I argue that this non-linear process can be associated with approaches described more as ethnographies of controversies (Marres & Lezaun, 2011). Such endeavors rely on tracing back arguments and their circulation as well as inscriptions and actor-networks in one or more sites. Juxtaposing and relying on multiple sources enabled me to capture not only explicit claims, for example made by my interviewees, but also the implicit and latent assumptions that underpinned the different actors' positions. In this sense, my analysis moved beyond a content-based reading and toward a relational understanding of expertise and, more generally, the controversy around the glacier marriage project in the Ötztal and Pitztal (Grundmann, 2017).

In the data analysis and development of the different vignettes, I took recourse on and reconfigured emerging themes and tropes which makes use of the argument that themes and tropes do not exist simply as semantic devices but as instruments that actively configure relations between people, institutions and their material environments (Law, 2017). Therefore, my coding was not only a matter of classification, but a way of tracing how arguments are performed, circulated, stabilized or rejected. This aligns grounded theory principles, while also extending them within an STS sensibility that treats empirical phenomena as inseparable from their sociotechnical contexts (Charmaz, 2006). Throughout the analysis in this thesis, I tried to remain attentive to my own positionality, which was sometimes not so easy. That is to say that although I somewhat believed that I could keep a certain distance towards my research and the participants involved in it, I found myself in the midst of a complex controversy where heavy boundaries are drawn between actors and different values clash. Nevertheless, I attempted to remind myself of inspirations by feminist STS approaches and thereby reflect on my positionality, assumptions, choices and overall research process (Haraway, 1988; Harding, 1991). This reflexive stance was particularly relevant and important because of the

sensitive and localized character of the controversy around the glacier marriage project in the Ötztal and Pitztal valleys. Through being some sort of reflexive, I tried to reinforce an iterative and circular logic of research in which theory and empirics constantly inform and reconfigure one another (Knoblauch, 2021).

In sum, my analysis of the controversy around the glacier marriage project combined approaches of controversy mapping, grounded theory and vignettes into a fluid or in flux methodological approach. While this departs from classical understandings of methodology and especially forms of coding and analysis, it enabled me to be flexible and at the same time empirically grounded. My meandering engagement with the prevalent controversy mirrors the complexity and emergence of the controversy itself. The resulting vignettes form the ground for understanding not only individual actors' positions, but also broader sociotechnical imaginaries at stake in envisioning the future of ski tourism in the Ötztal and Pitztal valleys.

4.5 Research ethics

I was not only involved in online research of newspaper articles and other sources but talked to people and engaged with them while doing ethnographic fieldwork. Hence, I oriented myself according to basic ethical principles for researchers like being respectful and maintaining integrity (Jensen & Laurie, 2016, p. 49). Furthermore, I designed an informed consent with all relevant information about my research as well as ensuring confidentiality for all participants involved in my research, as far as possible and with restrictions. This is to say that in a case like the glacier marriage controversy there are only so many people, institutions and actors involved and, hence, to be researched, talked to and interviewed. The different actors' geographical, personal and contextual situatedness lead to the fact that some actors pointed to further resources (meaning personal contacts) I could approach. Ultimately, in such small valleys like the Ötztal and Pitztal it is even harder to ensure anonymity than in other areas or topical foci of research. Nevertheless, I tried to be ethical in my research by checking in with and listening to interviewees and other involved actors on how they perceived confidentiality issues within my research. Flexibility in research and also in research ethics might be perceived as weakness, but I argue that in such highly contested controversies as the one I investigated it can be more complicated. In contrast to quantitative or standardized research, this means research of such nature as I carried out is usually a more complex encounter including various and sometimes difficult relationships with the researched humans and non-humans. However, I always tried to make my interviewees and research participants feel safe, acknowledged and listened to with their concerns and issues.

To me, to be an ethical researcher also means to acknowledge my own situatedness and partial perspective on the controversy and the involved (and not involved) actors, be they

humans or non-humans (Haraway, 1988). Therefore, I was not only open about my research goals with the participants but also reflected on my own positioning with memos before, during and after the fieldwork and interviews. STS scholar John Law has critically engaged with the relationship between theory, method and materiality, but he has also reflected on multiple topics like politics, democracy, public participation and research ethics. Therein he argues for STS researchers' thrive for a better, more just and more sustainable world and way of living. I connect a lot with what he wrote about the possibilities to enhance and enact societal, technoscientific and envirotechnical changes through research. Law describes the difficulty of doing so, but he also acknowledges the urgent need to still try in the following:

“Though we need to remind ourselves that the world is not open and that not everything is possible, this does not mean that we cannot try, just a little, to open up and enact alternative and better possibilities.”

(Law, 2017, p. 49)

Although not anything is possible and not everything we (and I) wish for will happen, I think that STS approaches provide ways and means to still try thinking about and envisioning different futures and, ideally, even ones which are better for humans and non-humans.

5 Case and results

5.1 The case of the controversy around the glacier marriage project

In the following, I explore the case of the controversy around the glacier marriage project by illuminating various aspects, such as its location, history and actors. The controversy examined in this thesis revolves around a proposed ski tourism project in the Austrian Alps, the planned merger of the two glacier ski resorts located in the Ötztal and Pitztal valleys, both in Tyrol, Austria. The planned project is often referred to as “glacier marriage” (translation by author, from German “Gletscherhochzeit”) and envisions a permanent infrastructural connection between two high-alpine glacier arenas. The Ötztal, extending southwards from the town of Ötz, is among Austria’s most renowned tourism destinations. Its upper reaches are already densely developed, featuring high-capacity lifts, extensive pistes as well as the Rettenbachferner and Tiefenbachferner glaciers, well-known both for international ski world cup competitions and mass tourism. The neighboring Pitztal is comparatively less developed. Its Mittelbergferner glacier hosts Austria’s highest ski area but lacks the scale and visibility of the Ötztal resorts. The proposed merger aims to bridge these two valleys across a ridge, requiring new lifts, pistes and associated ski infrastructure. In figure 4, the location of the Ötztal and Pitztal valleys in the federal state of Tyrol is to be seen.

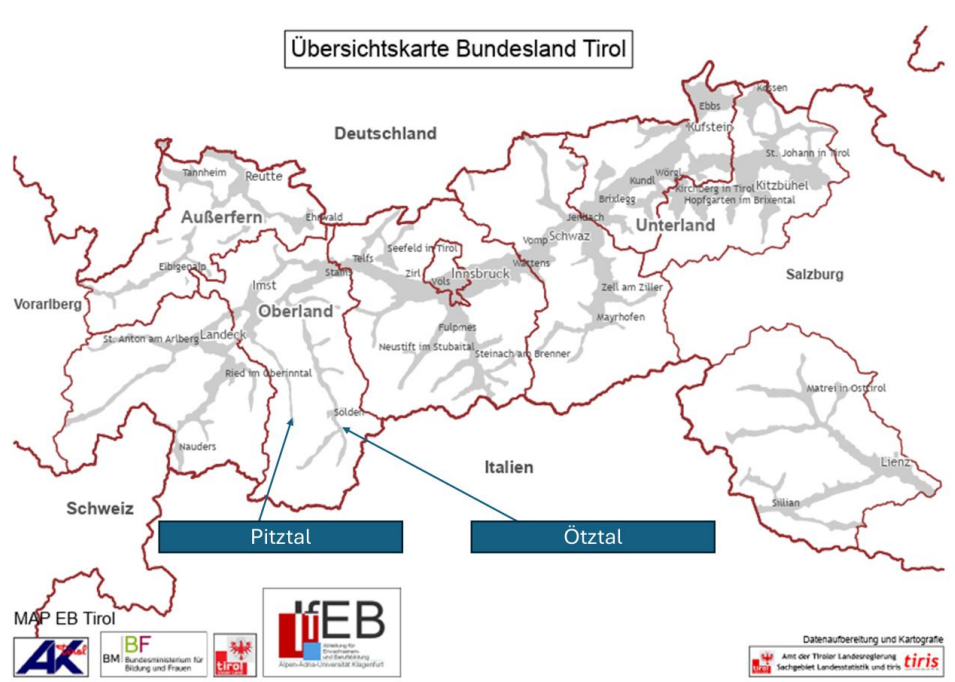


Figure 4: Map of Tyrol - boxes and arrows by author

Note. From *Übersichtskarte Bundesland Tirol* [PDF], Amt der Tiroler Landesregierung, https://www.tirol.gv.at/fileadmin/themen/arbeits-wirtschaft/arbeits-arbeitsmarktforderung/downloads/ZIP-Dateien/UEbersicht/Landkarte_MAP_EB_Tirol_Uebersicht.pdf.

The controversy unfolded over several years, even decades. Tracing this timeline helps in showing how local ideas and negotiations gradually scaled into a broader, highly visible public debate. The origins of the glacier marriage project date back to the 1980s but were more focused only from 2016 to 2018 with informal conversations among ski lift operators. At first, the idea of connecting the Ötztal and Pitztal ski areas circulated quietly, without major public attention, yet it gradually gained traction in local tourism circles. An important moment came in 2019, when a formal project proposal was submitted. With an investment volume of roughly €131 million, the operators marketed the merger through the slogan of “seven good reasons”, emphasizing competitiveness, regional livelihoods and the promise of securing economic stability for generations to come (Pitztal-Ötztal. 7 gute Gründe, 2021). Yet, 2019 also marked the rise of opposition because NGOs such as the Austrian Alpine Club and several local initiatives began to mobilize against the project. Their arguments foregrounded environmental destruction, accelerated glacier retreat and the contradiction between expanding ski infrastructure and climate mitigation goals (Herzog, 2019).

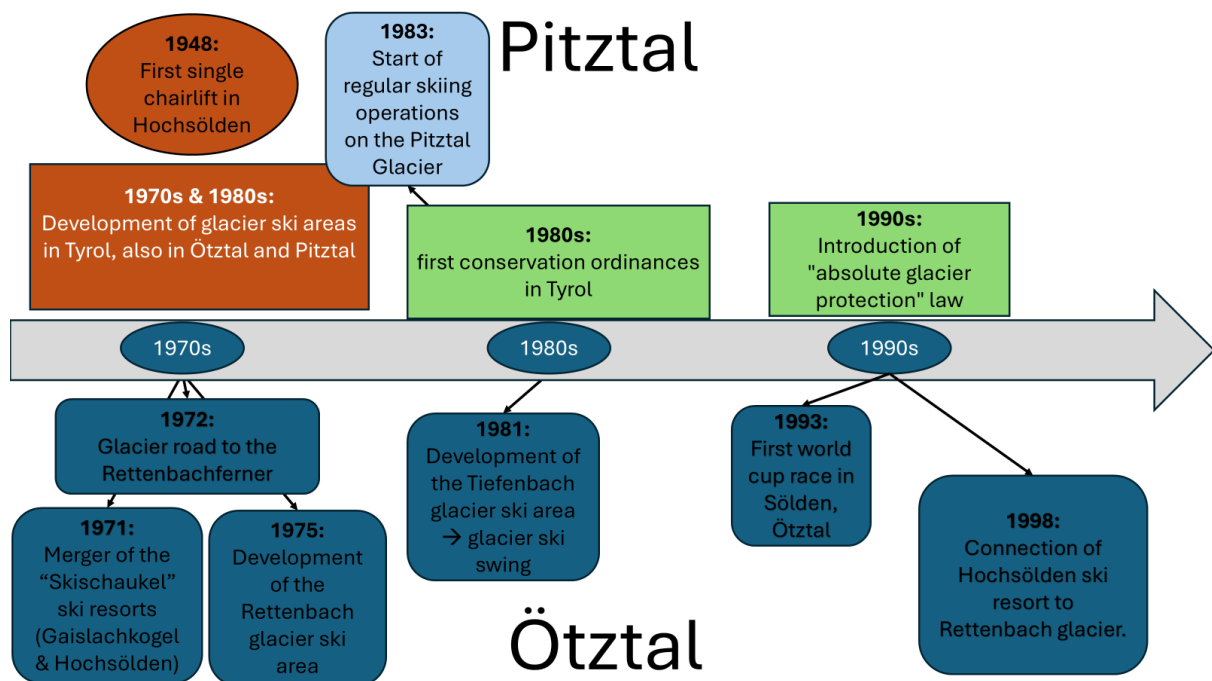


Figure 5: Timeline 1 - visualization by the author

From 2019 onwards, the controversy entered a new stage as not only international but also Austrian media picked up the story. From this moment on, the project became more than a local development plan and over time it turned into an issue beyond the local. Concrete figures circulated in critical discourses, for instance the planned destruction of 64 hectares of alpine

landscape, the relocation of 750,000 cubic meters of material and the lowering of a mountain peak by 40 meters (Herzog, 2019). By 2021, the Tyrolean government was forced to initiate environmental impact assessments. The project became a topic of provincial politics and local council meetings, with conflicts now unfolding in institutional arena, too. Between 2022 and 2023, the controversy expanded beyond the Tyrolean region and gained national and also further international attention.

In July 2022, a public referendum was held in St. Leonhard in the Pitztal valley. The question “Should the Pitztal-Ötztal ski resort merger be built?” was asked to be answered by 1,188 people in the municipality of the town. 701 votes were reported as valid votes and the result turned out with a majority of five votes more against the glacier marriage project than in favor. The numbers were 353 votes against the project and 348 votes in favor. In percentage this means 50.36 percent against the project and 49.64 percent in favor. After this referendum, the Pitztal glacier railway operators stated that they will no longer pursue the project (tirol.ORF.at, 2022).

However, in February 2023, the Pitztal railway operators publicly presented new plans which have their basis in the documents for the initial glacier marriage project (tirol.ORF.at, 2023). In the aftermath of the referendum in St. Leonhard in the Pitztal valley, a penalty was imposed on an election authority member for abuse of official authority due to ballot card manipulation (tirol.ORF.at, 2024). As of September 2025 (when this thesis is handed in), the glacier marriage project remains not carried out as planned. Yet, it is not clear whether the project initiators, the Pitztal and Ötztal railway operators, will pursue the project in the future or plan and carry out similar projects.

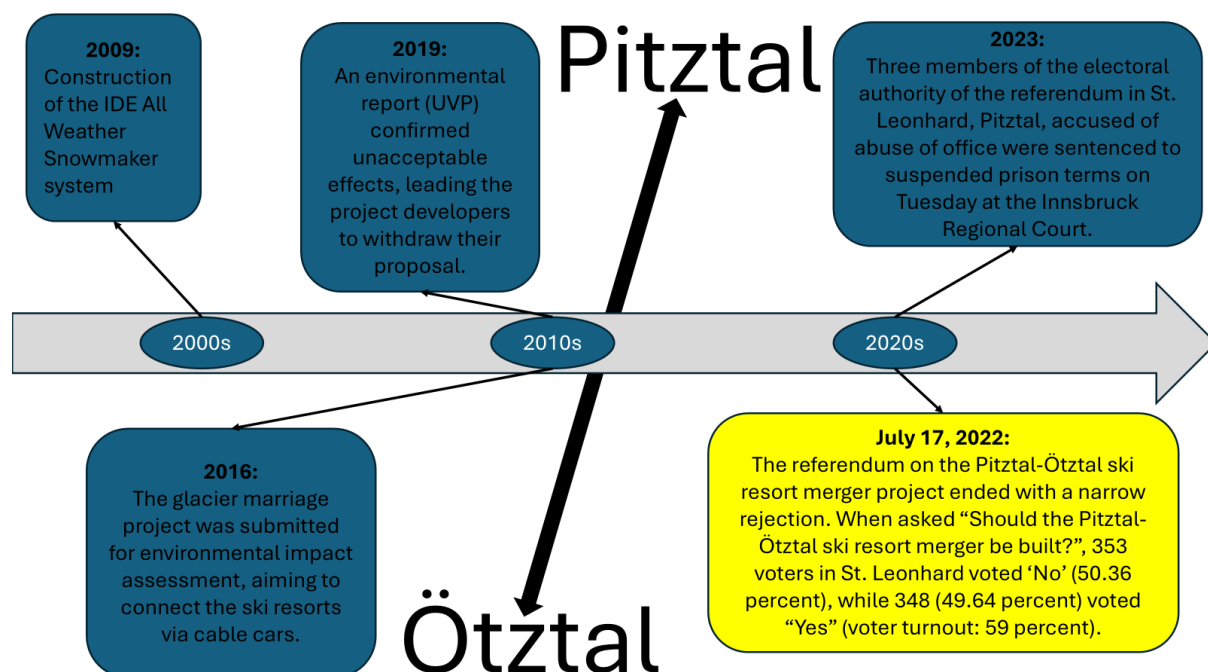


Figure 6: Timeline 2 - visualization by author

The glacier marriage project was not only formulated as a proposal for new ski infrastructure but also circulated as a media event. Across news articles, television features and online debates, it was and is still alternately framed as an economic rescue plan and as an ecological scandal. Furthermore, I argue that it is an instance of transformation from what might have remained a regional planning issue into a symbolic struggle over identities, climate and desirable futures (Hajer, 1995; Boykoff, 2011; Brüggemann & Engesser, 2017). Between the pro and contra poles, more ambivalent coverage rarely surfaced, stressing the dilemmas of regions that are at once dependent on winter tourism and increasingly confronted with the accelerating retreat of glaciers.

Therefore, the controversy also mobilized a heterogeneous set of actors, from local to national and beyond national level. While boundaries between them were and remained fluid, I argue that at least five broad clusters crystallized in my analysis. In my initial understanding of the controversy around the glacier marriage project, there were only two poles quite strongly opposing each other in a more or less binary relation of pro and contra the glacier marriage project. However, through my research I realized that there are also mediating actors, non-human actors as well as non-participating actors which I initially did not consider enough. The following lists underneath are very much my own perspective, and I do not claim that they are complete or fully correct. This is due to the fact that boundaries between the groups are fluid and blurry at times. These lists helped me in understanding the controversy a bit better. Nevertheless, the compilation of the actor lists is grounded in my research throughout this thesis. On the one hand, they are rooted in my online searches of news articles, documents and websites. On the other hand, they are also based on my ethnography as well as the semi-structured interviews I carried out. In the following, I share the lists of actors in the categories 1) proponents, 2) opponents, 3) mediating actors, 4) non-participating actors and 5) environmental entities as well as of processes:

1) **Proponents** of the glacier marriage project argue, amongst other things, for securing regional economies, safeguarding jobs, maintaining competitiveness within global ski tourism and preventing youth outmigration. I argue that this first group of actors includes:

- project initiators
- ski lift operators
- local business owners
- tourism managers
- local council members
- mayors of the surrounding villages

- officials of the Austrian Ski Federation
- state government of Tyrol (ÖVP & Green party)
- online community: Lebensraum Pitztal (young entrepreneurs)
- parts of the scientific community (e.g. economists and tourism researchers)

2) The group of **opponents** highlights the risk of irreversible damage to fragile alpine environments, contradictions with climate crisis discourses, loss of biodiversity and the erosion of cultural and aesthetic values. From my perspective, this group of actors is composed of:

- environmental NGOs such as WWF, Austrian and German Alpine Clubs (ÖAV & DAV), Naturfreunde Österreich
- local citizen initiatives (e.g. Bürgerinitiative Feldring)
- NEOS Tirol
- Liste Fritz Tirol
- climate activists
- Tyrolean State Environmental Advocate
- some Green party politicians
- parts of the scientific community (e.g. environmental scientists and glaciologists)

3) In my understanding, there exists a certain group of actors which are neither clear proponents nor distinct opponents of the glacier marriage project. I argue that they could be described as **mediating** actors, but they are at times more procedural and institutional instances. Nevertheless, this set of actors is composed of:

- media, press and news outlets (some with clearer opinions, some with less)
- administrative courts
- legislation and legal frameworks
- provincial government
- municipal authorities
- parts of the scientific community used as experts in the process (e.g. EIA)

4) From my perspective, there were also actors who did not prominently or only marginally participate in the controversy, although they would possibly have had opinions about the issues at stake or should have had a saying. These are a set of sort of **non-participating** actors:

- local citizens in the Ötztal and Pitztal valleys (except for local referendum in St. Leonhard in the Pitztal)
- other international environmental organizations
- tourism operators from other regions
- some academic and research institutions
- Austrian federal government
- Protected area designations (Natura 2000 sites)
- Environmental impact assessment (UVP)

5) Furthermore, my STS approach in this thesis also incorporates acknowledging the existence and agency of non-human actors in the controversy around the glacier marriage project. This set of actors is comprised of **environmental entities as well as of processes** which are prevalent:

- glaciers and ice, especially the Pitztal glaciers and the Ötztal glaciers (Rettenbach- and Tiefenbachferner)
- glacier retreat as a geophysical but also societal process
- Alpine landscape and topography in the area
- flora, fauna and ecosystems in the Ötztal and Pitztal
- biodiversity as a concept
- snow and especially its reliability and technical production
- both global climate change and local weather conditions
- ski infrastructure and technology such as ski lifts, cable cars, piste machines, water storage ponds, restaurants, etc.

Overall, as I tried to argue above, the controversy around the glacier marriage project is not merely a local planning dispute but a condensation of the central tensions of Alpine tourism in the local area of the Ötztal and Pitztal valleys and mountains. From an STS perspective, my case demonstrates how a tourism controversy can simultaneously be a technoscientific controversy. Because it brings together multiple forms of expertise, but it is at the same time circulating competing imaginaries of the future and deeply held values. Thus, the proposed merger of the glacier ski areas in the Ötztal and Pitztal becomes a site where not only different actors and their values clash, but where simultaneously ideas and imaginaries about good and desirable futures compete. Importantly, an STS inspired approach needs to take into account the multiplicity and variety of actors which means acknowledging and applying a relational understanding of actors, expertise, values and imaginaries. In this sense, the controversy around the glacier marriage project extends far beyond questions of simply building or not building new ski infrastructure. I argue that it becomes a debate about how

societies imagine possible futures in times of climate crisis and, hence, this can offer (my) research pathways for a better understanding of both contemporary environmental issues and technoscientific processes at play.

In the following chapter, I approach my empirical material by using the format of vignettes. While these are often used for data gathering in qualitative research in order to stimulate participants' responses, they also exist as a form of qualitative social science analysis (Jenkins et al., 2021):

“This approach to using vignettes tends to be located more within ethnographic, auto-ethnographic, participatory and arts-based forms of qualitative inquiry – as opposed to policy and practice-focused qualitative research and tends to draw upon literary (in addition to purely descriptive) forms of academic writing.” (Jenkins et al., 2021, p. 976)

While I do not see my research as participatory or arts-based form of qualitative inquiry, both ethnographic and auto-ethnographic elements were at the heart of my research in the Pitztal and the Ötztal. Although I only did a short-term ethnography, I still gathered material and data which informs my research process to a high degree. Not only did the ethnography help me in taking a look at the material, non-human and human components of the glacier marriage controversy, but it also proved to be an important point of reference for myself when thinking about my research. For instance, I could more easily understand what interviewees meant when they talked about the area of the planned glacier marriage or the Pitztal and Ötztal in general. I am aware that I use vignettes as a particular methodological tool for analysis and reflection and I, therefore, need to take into account the following concerning both reflection and reflexivity:

“Whether vignettes are used for purposes of data collection, data analysis or to present troublesome aspects of the research process, methodological principles of *reflection* and of *reflexivity* [emphasis by authors] tend to be central considerations. Whilst this is the case, the extent to which emphasis is placed on the former, as opposed to the latter, tends to shift according to the purpose for which the technique is being deployed.” (Jenkins et al., 2021, p. 977)

My vignettes focus on the part of reflexivity, rather than reflecting on a real-world situation that happened exactly how it is described. Nonetheless, I describe situations or, better, situatednesses as they could have been or could be. Such situatednesses are purely my understandings of the data I gathered, through interviews and ethnographic methods. In addition, I would also like to borrow another term to bring this point across even more explicitly.

When reading through my results in the form of empirical-/visual-/interview- vignettes, one should take into account that things could not only be otherwise (Law, 2007), but, so my argument, they will actually be enacted otherwise by the way I present my results. This does by no means lead to the conclusion that my research is worthless or valueless. On the contrary, my argument in the light of what I learned in STS is that this thesis profits from taking on approaches like described above. Reflexivity is not a value in and of itself. However, it can lead the way forward not only in complex worlds but also in complex research endeavors. To underline this argument and to explain the aforementioned borrowing of another term, I refer to the work of Donna Haraway who argues for “diffraction” because it “can be a metaphor for another kind of critical consciousness” (Haraway, 1997, p. 16). But what does diffraction mean in this case?

“An established concept within the physical sciences, diffraction refers to the disruption of wave-based systems as they encounter obstacles, so as to create an observable pattern of interference. This disruptive element is, for Haraway, of central value in the application of diffraction as a methodological metaphor within critical scholarship.” (Jenkins et al., 2021, p. 978)

Henceforth, the results presented in the next sections are to be understood as vignettes produced by me, written by me and presented in a certain way by me. These disruptive diffractions I made through my research serve me both as analytical tools and as a way of creatively engaging with the data I gathered. In doing so, first, I share an overview table with some characteristics of the people I interviewed in the course of the process of researching for and writing my thesis. The table gives a first impression of the different arguments, narratives and rationales the actors used and serves me as a preliminary glimpse of comparison. However, in what follows, I expand and elaborate on the actors’ positions by using the above-mentioned tools to develop what I call *diffracting vignettes* for each of the interviews I carried out. While at first sight this might seem like a conventional report of individual interviews, it is actual both a classical results chapter based on the interviews I carried out as well as a complementary analysis through elaborations on visuals and interpretation of my ethnographic experiences. I aim to break with conventional forms of writing down and reporting results by using these *diffracting vignettes*. Needless to say, that what I present here as my findings is not everything I experienced, gathered and learned. I sometimes took inspiration for the research in this thesis through adjacent or even nonadjacent literature. This led me to considering creative ways of writing, reflections on how writing is a process and questions around how I can make use of my writing as thinking tool (Lippert & Mewes, 2021; Schikowitz et al., 2025).

5.2 Maximilian Müller - “the historical futurist”

*“And I could imagine that a regionalisation of the tourism offer could be quite successful.”
(11)*

Maximilian Müller, a professor of geography from Germany, was the first person I interviewed in order to get insights into the topic of ski tourism in the Alps. We did not only touch upon the region I was interested in, the Ötztal and Pitztal valleys, but, from my perspective, explored several interesting topics and I, therefore, got an overall and preliminary picture. One major argument he made was that, as seen in the quote above, a regional shaping of ski tourism, or tourism more broadly, could be economically successful and beneficial for local communities, companies and social cohesion. As an exploratory interview, the data and knowledge from this interview served me not only as scaffolding for the finalization of my interview guideline but also proved to be rich itself, especially for further pathways of the research and the analysis. At first, Maximilian described historical and current developments in the Alps in much detail. Second, he tried to translate these analyses into some sort of prediction of the future in the Alps:

1. “Exactly, and there is the question, can we forecast this development [urbanization and depopulation or devaluation of the Alps] into the future? Will it stay like it has been for the last 30 or 40 years? And I would say very clearly, no, it will definitely not stay like that. It is extremely unlikely that things will continue as they have been.” (11)¹

This question of predicting or forecasting the future seems to be difficult to me. But, at the same time, Maximilian quite strongly argued that the historical changes



Figure 7: Photo of tourism office in Sölden by author

¹ Translation by author. See German original text from interviews in Annex. This applies for all numbered quotations from interviews.

that took place in the Alps will continue to have impacts. The picture on the right (figure 11), to me, symbolizes the connections and relations that pasts, presents and futures in the Alps have. I took it when visiting the tourism office in Sölden, Ötztal, where I was quite stunned to experience how the past is displayed and integrated in visual material, especially films. Modern and historical developments were entangled in ways which somehow reminded me of a museum, but with the goal of getting visitors to make purchases or book activities. In the picture underneath, glacier priest Franz Senn who, in Austria, is a popular, historical figure from the Ötztal valley is semantically connected to the slogan “roots and wings” colored

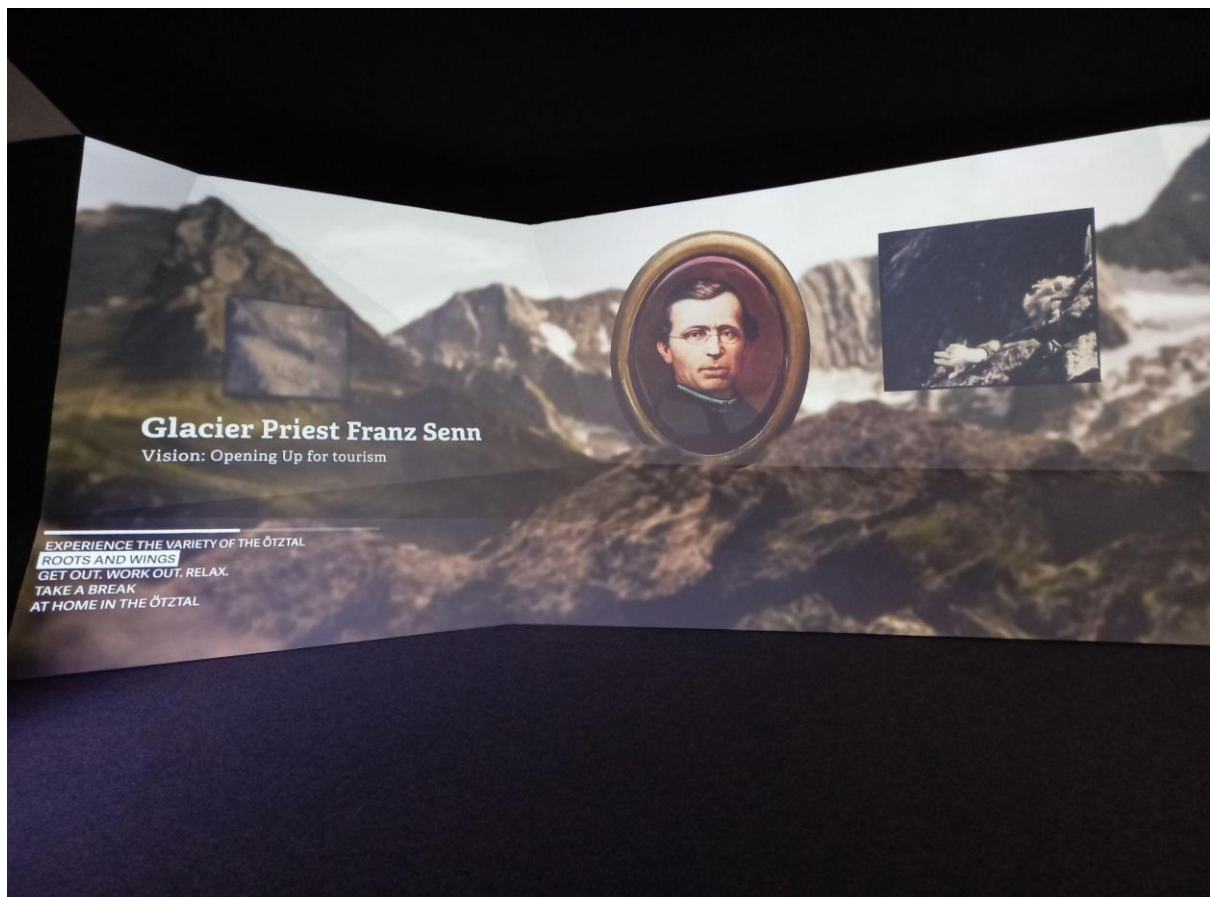


Figure 8: Photo of movie in tourism office by author

in white. His vision is stated as “opening up for tourism” by which he is seen as one of the early entrepreneurs of tourism in the region and beyond. Reflecting on my theoretical lens of envirotechnical regimes, I see this instance of enacting (ski) tourism as a symbolic attempt to bring together pasts, presents and futures of the Ötztal valley. Because envirotechnical regimes inhabit “the institutions, people, ideologies, technologies, and landscapes that together define, justify, build, and maintain a particular envirotechnical system as normative” (Pritchard, 2011, p. 23), I argue that this particular visualization at the tourism office can be seen as emblematic for some sort of re-enhancement of an Alpine identity of the Ötztal. Although this Alpine identity is a controversially discussed term (see Johler, 2002), I explicitly



Figure 9: Photo of movie in tourism office by author

make use of it here because I saw the visual and material efforts to re-enhance an identity in my ethnographic fieldwork at several points.

A second example is shown in the picture above. It is part of the short movie which is displayed in the Ötztal tourism office once visitors enter the building. I was surprised by the concerted effort to bring together the history of the Ötztal valley with its focus on ski tourism as well as the modern appearance of the tourism office itself, as shown in the picture on the previous page. While technoscientific issues have always played a role in societies, in our contemporary world they have increasingly and ubiquitously become important. This observation was also mirrored in the next passage of the interview with Maximilian. He pointed to the ongoing and accelerating complexities that current societies face and deal with. As STS scholars have argued, these complexities also bring uncertainties, fears and dangers to the fore which our sociotechnical systems try to minimize. However, the control mechanisms which are at play here seem to work most of the time and, hence, become invisible to most people. Maximilian said about these systems and our contemporary societal and economic workings:

2. “And in principle, I am of the opinion that our present economy and society is so over-complex and has become so unmanageable that small disturbances can quickly escalate into large catastrophes. And disrupt the entire system.” (I1)

While he was referring to the Covid19-pandemic as an example of disruption, I would agree with him on this point also with regard to other ongoing. And I would even go further in stating that the multiplicity of crises of current societies leads to a fragility which is hard or impossible to guard. For instance, it is not really predictable yet what impact both the climate crisis and the biodiversity crisis will have on our planet and the (non-)humans living in it. Although there are attempts to predict and forecast what these changing situations mean for the future, uncertainty stays a pivotal part of the equation. The notion of envirotechnical regimes helps me here, again, by pointing to the “historical and political production of envirotechnical systems” (Pritchard, 2012, p. 224). The “specific, often strategic reblending of natural and technological systems to serve particular ends, although [...] these configurations do not always develop exactly as the people and institutions promoting them intended” (Pritchard, 2012, p. 224) hints to the aforementioned uncertainties.

This brings me back to the empirical interview data of Professor Maximilian Müller and his assessment of the situation in the region in terms of the future of ski tourism. Linking historical developments with the ongoing controversy around the “glacier marriage”, he explains:

3. “So the situation in the Pitztal, I think, is a difficult situation. The Pitztal profits little from tourism. The great promises that were made with mass tourism when the Pitztal Glacier Railway was built have not actually materialized in this form. The promises made, with expansion and suchlike, have not materialized and the new promises that the valley should swell with this so-called glacier marriage will not materialize any more than the earlier promises.” (I1)

After discussing the advantages and downsides of the geography of the Pitztal which, according to Maximilian, would actually allow for “nature-oriented, adapted hiking and climbing tourism” (I1), he kept elaborating that “because of the fact that this Pitztal glacier skiing area is in the back, the image of the Pitztal is completely ruined for any form of gentle, adapted, decentralized tourism” (I1). This is interesting to me due to the reason that I did not consider the different geographical contexts so much beforehand. But, of course, it is essential to keep in mind that place matters. Although I am researching sociotechnical imaginaries and envirotechnical regimes of ski tourism in the Pitztal and the Ötztal, this does not mean that materialities, geographies and the matters of the place are out of the game. On the contrary, it is essential for me to also acknowledge the material contexts, and at times concrete, in which the controversy takes place.

As to be seen in the picture underneath (figure 14), which displays the end or bottleneck of the Pitztal towards the “Rechter Fernerkogel” - the area in which the glacier marriage would have its ski pistes, gondolas and restaurants -, the geography of it contains steep slopes and quite some narrowness. I find it interesting to imagine the infrastructure that would be needed for the ski area of the glacier marriage in such a terrain. There seems to be not a lot of space for new construction sites, buildings, roads, parking lots and everything else. Below, I want to share one more short passage of the interview with professor Maximilian Müller which deals with the question of who does (not) benefit from the glacier marriage project:

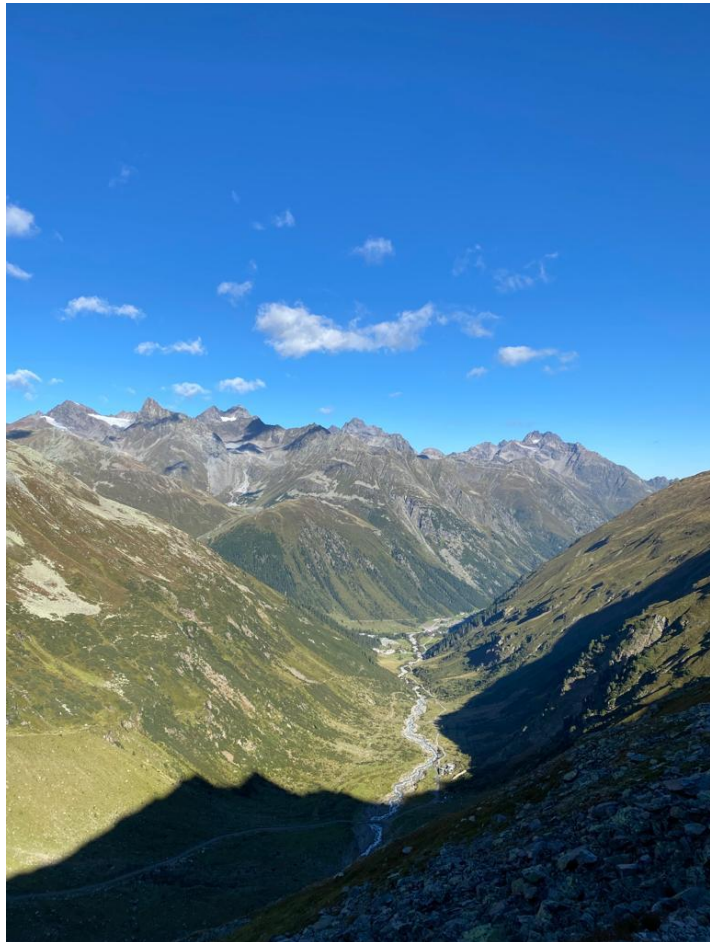


Figure 10: Photo of Pitztal valley by author

4. “C: Ok, yes, now you have already mentioned it, the planned glacier marriage of the regions in the Ötztal and the Pitztal. That is exactly the research interest I want to deal with. So what are the visions for the future in these two valleys and how is the controversy about them shaping up?

I1: Yes, they always say that this Pitztal will profit from it. I don't see it that way. I have the feeling that first and foremost the Ötztal benefits. The Ötztal is easy to reach, there are the big infrastructures, it has the big image. The Pitztal is an appendage. In addition, it is always at risk of avalanches as far as accessibility is concerned. I am afraid that the Pitztal will be left behind.” (I1)

This exchange is indicative of some of the pivotal questions in any controversy, and especially in the one around the glacier marriage project. For whom is it beneficial? Who profits, economically and otherwise? Whose voice is being heard and whose not?

Maximilian Müller - “the historical futurist”

“And I could imagine that a regionalisation of the tourism offer could be quite successful.” (11)

Maximilian Müller, a professor of geography, was the first interviewee and inspiration in my research on ski tourism in the Ötztal and Pitztal valleys in the Tyrolean Alps. His insights helped me not only in refining the interview guidelines but also by providing valuable data for analysis. A key argument he made was that regionalizing ski tourism, rather than expanding it indiscriminately, could be economically beneficial for local communities. He also argued that modern society's complexity increases vulnerability, where small disturbances can escalate into larger crises. Furthermore, he elaborated on his estimation that the developments in the Alps will not simply continue as they have over the past decades. Overall, he viewed the Ötztal as the main beneficiary of the glacier marriage project, while the Pitztal risks being marginalized due to limited infrastructure, geography and accessibility. His perspective highlights broader questions of power, benefit and representation in Alpine tourism development.

5.3 Felix Forsch - “the conservatist”

“We have 50 glaciers, if not more. So if two or three of them are affected, I wouldn't have that much of a problem with it.” (I2)

Felix Forsch is a well-connected businessman in the village Sölden and all over the Ötztal valley. He is solidly integrated in Sölden's and Ötztal's social and economic structure which is underlined by the positions, offices and responsibilities he held, some of which he still does. Several institutions in the area counted on his experience and he also held political offices on the local level. His as well as his ancestors' and family's situatedness in the Ötztal can be best described by what he said at the beginning of the interview: “I2: We are a very big family and original locals, as they say.”

When it comes to the project glacier marriage, he described himself as an important “opinion former” (I2). The quote at the beginning of this paragraph also already hints to some of his ideas around the project. The rich nature of the area, as he describes the valleys, is to be protected but, as demonstrated in the quote, not at all costs. However, looking back in history, 30 years ago the processes around the project glacier marriage started as Mr. Forsch remembered. He described that while most of the Ötztal was very much in favor of it, the Pitztal was rather against it out of the fear of getting virtually swallowed up or absorbed by the Ötztal. Interestingly, he talked about this as if the Ötztal and the Pitztal were two separate entities which hold positions, have interests and speak for themselves, while neither he articulates who or what exactly acts nor if there are gradations and variations of opinions within these two entities. Nevertheless, Felix Forsch also sometimes made use of the word or form “we” when talking about the positions and experiences of Sölden or the Ötztal. Whether that is the people who live in the Ötztal or someone else, remains unclear but is an interesting point in itself.

His thinking and arguing reminded me of a photo (figure 15) I took at the Ötztal Bahnhof on which you can see a map of the “Ötztaler Urweg”, the Ötztal primeval trail, a



Figure 11: Photo of Ötztaler Urweg by author

hiking route from the entrance of the Ötztal valley towards the higher elevations. To me, this seems to be a fitting metaphor for the ways and means Felix Forsch framed his arguments. He is very much grounded in the past of Sölden and the Ötztal and keeps the way forward which the history laid out. Coming from the primeval trail to the present, Felix Forsch said that the controversy turned around and that, in the meantime, the Pitztal would possibly be the bigger beneficiary than “us” but would also have to bear more investment. However, when it comes to supporters and opponents of the project glacier marriage Mr. Forsch explained that there were several information evenings, the biggest one in Imst with more than 700 hundred people. According to him, good arguments were made there, but the opponents were “of course, massively organized and nothing really came of it” (I2). Yet, who are those against the project glacier marriage when you ask Felix Forsch? In his opinion, there are some environmentalists, the Alpine Association (Alpenverein), ski tourers that fear the destruction of one or two bigger glaciers and greens that put massive pressure onto politics. And the main argument by these opponents brought into play is the “destruction of nature again and again [...]”, Mr. Forsch said and kept going:

5. “[...] but my opinion is that we have more than 100 3,000-meter peaks in the rear Ötztal. We have 50 glaciers, if not more. So if two or three are affected, then I wouldn't have that much of a problem with it. [...] Although I don't think there's much to destroy if you approach it carefully.” (I2)

I find this aspect particularly interesting and astonishing because of my own experiences at the glaciers in the Ötztal where the ski area is. On this and the next page (figure 16 and 17), you can find two photos I took of the area which is already used for skiing and how it looks like where ski infrastructure was already built. The question for me is what carefully actually means and what outcomes this careful approach has.



Figure 12: Photo of ski area in Sölden by author



Figure 13: Photo of ski infrastructure in Sölden by author

For Mr. Felix Forsch however, there was a lot to be discussed when it comes to the opportunities and advantages that the glacier marriage project in the Ötztal and Pitztal holds and brings. In his view, it is recommendable to carry out the project because the other glaciers in the region would stay untouched and the glaciers which are being used for skiing already anyways would absorb it. Moreover, he argued that more options and more generous offers would be beneficial for the tourists and guests in the area. Mr. Felix Forsch pointed this out by saying:

6. “So that’s certainly an advertising technique, because of course it’s something if you can trumpet the fact that we are the largest ski resort in the Alps. That is definitely a special position. [...] Because it simply offers even more.” (I2)

And, importantly, the money to finance the project would come exclusively from the two cable car companies in Ötztal and Pitztal and no public funds would be used to provide subsidies. One important issue that Felix Forsch underlines is the topic of traffic. Considering societal discussions in general and alternatives to the project in particular, I want to share a passage of the interview in which Mr. Felix Forsch shares his overall perception of and opinion on the controversy:

7. “C: That sounds super interesting. What I would perhaps like to ask briefly is how do you assess, or how would you describe the general social discussion in relation to the plan to merge the two ski areas?”

I2: Yes, how should I put it? That's a bit, so from the Ötztal side it's largely very well received. So basically there's not much happening on our side. There's a tunnel and a cable car, it's in a very confined space. If you stand up there on the mountain, you can see the Pitztal valley on the right and we are on the left. So we're not really worried that a lot will be destroyed, or we're actually very positive about the large crowd."

Nevertheless, and as mentioned above, Mr. Forsch acknowledged that there are some people who think "that tourism is not sensible or excessive, who are campaigning against it" (I2). And with regard to alternatives to contemporary manners of tourism and how it was carried out in the past and is pushed forward nowadays, he kept on going:

8. "It's no use if the suggestions that come from there are just quasi gentle tourism. We have relatively gentle tourism in Vent, it's part of Sölden. But I can't fill 20,000 beds with snowshoe hikers." (I2)

In this instance, it becomes clear that the ideas one has and future imaginaries one holds are also always tied to present conditions and circumstances. Because of the necessity to fill 20,000 beds, a gentle tourism seems to be impossible to achieve for Felix Forsch. In his opinion, tourism in its current state is both necessary and valuable for the Ötztalers – remember the "us" - in order to "earn their bread", whereas one cannot just deconstruct all the cable cars and re-naturalize areal developments.



Figure 14: Photo of protest sign in the town of Sölden by author

When it comes to the connections and relations of the glacier marriage project to local, regional and national politics, Mr. Felix Forsch stated the following which reminds me of the picture (figure 18) of a protest sign in Sölden above:

9. “And of course politicians are trying to prevent everything. Because the Ötztal already has everything, they are already doing too well anyway. And the people in Pitztal, “we help them”, but as limited as possible. That’s how I always feel.” (I2)

While the protest sign was with regard to a very different topic, namely the protest against the reintroduction of the wolf in the area, from my perspective, it can still be linked to what Mr. Forsch said. He speaks in a general way about politicians and that they are pushing to hinder the glacier marriage project which also resonates with his estimation of the developments in the controversy. In his account, the rather quiet phase that has arrived when it comes to the merger of the two ski areas can be described as a “rethinking phase” (I2) in which the project is being replanned and downsized. But Felix Forsch also admits that he does not believe that the Ötztal, and particularly Sölden, are on the wrong track. Rather, he argues that the past has shown how well the situation turned out for the area by saying:

10. "I suppose, so of course, if you think really hard, maybe you'll find something. But then you've done everything wrong in the past (C laughs). We've done things wrong, but the main thing is that we've done it well." (I2)

This quote makes me think about and reflect on the relationship between pasts, presents and futures, so to say temporalities. In this instance, I argue, it becomes visible that the interviewee extrapolates from the present status, "done it well", to the past, "then you've done everything wrong in the past". I find this particularly interesting as it juxtaposes regular comparisons or linearities from pasts to presents and futures. Rather, in this quote, the interviewee Felix Forsch traces back the past through its current state in the present and that it is the current, good state that hints to examinations whether there were or were not made mistakes in the past.

A pivotal part in my thesis is expertise and also in this interview expertise was brought up by me. The picture on the right (figure 19), from my perspective, hints at the processes of how imaginaries, visions, projects and proof of expertise can be thought of and linked. Because I regard this as one of the central passages of the interview, I want to share a larger part in which Maximilian Forsch reported to me



Figure 15: Photo of video in tourism office Sölden by author

how he experienced the planning of the project, what role expertise played in this process and what arguments and examples stand for the expertise that was and is at play:

11. "I2: The expertise was provided by the two clients, the ski resort in Pitztal and Sölden. The relevant authorities were always involved from the outset. And we presented this to them several times. And I was always present and of course tried to create a positive atmosphere. Basically, the extremely good preparation by the planning company that worked there made the decisions easy, of course. So it was really very well done. All the questions and fears were actually largely allayed. And the decision wasn't really that difficult from my point of view."

[...]

“C: I see, I see. You said it before, you also consulted facts and experts, also in the process. Was that planned from the start? So were you, so to speak, considering merging the two ski resorts at the beginning, it's been around for a relatively long time, were you in contact with experts and so on at the beginning or how did it go?

I2: Looking back, 30 years ago it was simply a vision. I don't think it was researched and prepared in such detail. But in the last 15 years, experts and appraisers were involved from the outset. It has been prepared, I don't know exactly how many 100 pages, but I think even 1000 pages, you have to ask the mountain railroads. Not just from our point of view, but from a general perspective.”

This general perspective can also be linked to Mr. Forsch's estimation of the different values which are prevalent in the controversy in the area, the Ötztal and the Pitztal. Because, for him, not only is the project well prepared and backed with expertise, but the whole area is also taken care of. This means that lots of investments in landscaping, maintenance and the like were and are carried out because it is of importance to keep the economic values in the future. The link between presents and futures becomes visible by Mr. Forsch's own words when saying: “So the main task for us is to secure the future” (I2). However, for Mr. Forsch not only economic values play a role in this as the following interview passage shows:

12. “I2: Thank goodness we have beautiful nature that we can use in both summer and winter. And of course we try to avoid sacrificing any of it. So we certainly have no intention of sawing off our own branches. [...] Yes, and we can't stop global warming. But because we are aware of it, there is a chance that in 30 years' time, or in 20 years' time if nothing goes down, we will at least be able to move up to the glaciers. I do believe that this would be an important safeguard for the future, given that we really have no industry, no small-scale industry, nothing else to offer.”

While he pointed to nature and the values that lie in it economically, Mr. Felix Forsch also hinted at the future and future imaginaries. When it comes to the relevance and prospects of skiing and ski tourism in the future, for him it was obvious that there is no ski fatigue of people which could be seen at the Ski World Cup opener in Sölden, Ötztal. Guests seemed to be having the latest gear and be willing to spend money into their skiing hobby or vacation, this is also a trend that Mr. Forsch extrapolated into the future. His view becomes more clear in the quote underneath:

13. “And that tells me that despite all the prophecies of doom that skiing is so extremely expensive, which is true, people are willing to spend money if the offer is right and their passion is achieved. So I don't really see any great fears for the future.” (I2)

However, these prospects which Mr. Forsch estimated as safe and sound, are accompanied by the already mentioned global warming as he named it. 1000-meter sea level seems to be a critical value for ski resorts and skiers, because of “global warming” (original German, I2: “Klimaerwärmung”). He says that this is important “[b]ecause global warming will probably not allow much more underneath.” But Sölden and its ski areas are well-equipped because the village itself is at 1374 meters above sea level, the middle stations go up to 2000 meters and the ski resorts only end when reaching around 3000 meters. So, Sölden has much to offer in terms of so-called snow safety or guaranteed snow (original German, I2: “Schneesicherheit oder Schneegarantie”). Despite or because of the dependency of the Ötztal from tourism - everyone’s business is more or less connected to the successfulness of the “saison” - Mr. Felix Forsch sees no trouble for the Ötztal region, and his future imaginaries were rather positive. The glacier marriage of the Ötztal and Pitztal ski resorts would contribute to this. It could perhaps increase the added value and possibly the quality would increase again. And there is much more to do when it comes to added value, but also linking back to different types of expertise and his own role in all of this, as Mr. Felix Forsch argued:

14. “We also have many opportunities to improve on this. We work with great hotels, apartments, jobs and restaurants. So it's all in very good shape. And I think that, in addition to the security that we also try to convey, is crucial for bookings. [...] Only the general findings with global warming and so on perhaps speak a different language. That perhaps we shouldn't work so hard after all. But that's my personal opinion. Even if we are co-owners of our family at the railroads, I am wary of giving advice. There are people who deal exclusively with this and they do a good job. So they'll know what they're doing.” (I2)

Felix Forsch - the conservatist

"We have 50 glaciers, if not more. So if two or three of them are affected, I wouldn't have that much of a problem with it." (12)

Mr. Felix Forsch, a long-established businessman in Sölden and the Ötztal, views himself as an influential and important voice in the debate around the glacier marriage project. He sees the project as a logical extension of tourism development, arguing that only a small part of the natural environment would be affected while most glaciers remain untouched. In his perspective, the merger would strengthen the region's competitive edge, attract more tourists and thereby secure economic stability, even without relying on public funds. He acknowledges climate change but believes Ötztal's and Sölden's altitude ensures long-term snow security, making the valley resilient compared to others. Overall, he envisions tourism growth as essential for the Ötztal's future and dismisses alternatives like gentle tourism as insufficient to meet local economic demands.

5.4 Paul Popper - “the change-tryer”

“So for us two things are absolutely necessary for a new tourism, that is nature compatibility [...] And of course it must also bring something for the people in the country, in the valley, that is no question.” (I3)

Paul Popper, initiator of a citizens' petition against the project glacier marriage, described the background of his activism, which began in 2018 with the establishment of the “Feldring” citizens' initiative. This initiative emerged to stop the proposed merger of two small ski areas in the Ötztal and Kühtai regions, an area right next to the village Oetz. It is located at the beginning of the elongated Ötztal valley and in a close neighborhood of the area I am interested in within my master's thesis. Paul Popper explained that the planned development would have destroyed an untouched area that served as a recreational and hiking spot for people of all generations, another similarity to the controversy around the glacier marriage. Thanks to the support of 18,000 people and by building a network of nature-oriented and engaged individuals, the project was halted, which was a big success for Mr. Paul Popper. After this success, the team that formed throughout this process thought about how they could use the gathered resources and public interest for future projects. They made a strategic decision to avoid starting from scratch in the next necessary environmental campaign. Interestingly, the next chance to make use of the gathered personnel, data, interest and importance showed up very soon as Mr. Popper explained to me:

15. “And the opportunity to take action arose sooner than expected. My personal story is that I have, of course, been following this glacier marriage project from the very beginning. And at first I didn't see it so critically, because the distance as the crow flies is relatively close. I know the area to some extent. You can even see it, you have a line of sight. And I thought to myself, yes, that's actually not so bad now.” (I3)

Hence, he initially did not see the project as overly critical, but his opinion changed after reviewing the environmental impact assessment (original German, I3: “UVP [Umwelt-Verträglichkeits-Prüfung]”) and the included data. The project's scale was planned in a massive manner, particularly in terms of the volume of materials to be moved and the huge buildings planned in a high-alpine region primarily used by hikers and nature lovers: “Only then did one see the dimension. What kind of material is to be moved, what kind of huge building is to be slammed into the landscape.” (I3)

With growing awareness of the environmental impacts, the second petition began, eventually gathering nearly 170,000 signatures, even far more than the first petition. Mr. Paul Popper emphasized that public pressure was essential to achieving political action, because without

it, nothing would have happened. The media response to the petition was both surprising and international as Popper explains that he had interviews with journalists from major international outlets like El País from Spain and National Geographic from the US. Early attention also came from German broadcasters ARD and ZDF. This wide and multiple media coverage, in his perception, could be attributed to the glacier marriage's mix of tourism, environmental concerns and social issues which naturally attracted media interest. Importantly, close collaboration with national and international environmental organizations like the Alpine Club, WWF and Fridays for Future, for him, was and is crucial to generate the public pressure needed to drive change.



Figure 16: Photo of plastic on the ground in the Sölden glacier area by author

To me, two symbolic pictures I took at the glacier area in Sölden (figure 20 on the left and figure 21 underneath) stand for the concerns that Mr. Popper had and presumably the media interested to a large extent. On the left, you can see a piece of plastic, Snickers packaging, which lies on the floor in an area close to the glacier tongue of the Rettenbachferner. The picture underneath shows two snow cannons which stand on concrete, also in an area close to the glacier. Can the glacier marriage project in the Ötztal and Pitztal area be seen as a symbol for the sociotechnical imaginaries of ski tourism in Tyrol? Or could it be described as being an emblematic event or issue (Hajer, 1995)?

As I wrote earlier, some issues and cases have a larger or even major role in raising publics' awareness of environmental problems and vulnerabilities. In the case of the Ötztal-Pitztal controversy one can argue that citizens' engagement with and publics' interest particularly in this controversy might be a



Figure 17: Photo of snow cannons in Sölden glacier area by author

symbolic interaction with the “emblematic issue” of (over)tourism and its environmental outcomes (Hajer, 1995).

Interestingly, as Mr. Popper shared with me, foreign media reported on the issue more quickly than Austrian outlets. This, in his estimation, is due to close ties between the regional government and the media in Tyrol but also all over Austria. These first and foremost economic connections, especially through advertising revenue, made it difficult at the beginning to get the issue covered by Austrian outlets. However, international pressure, press and publics eventually forced Austrian media to follow up on their foreign colleagues. Another central topic in the conversation with Mr. Paul Popper were the specific political entanglements and the structural problems in Tyrol. Because in his perception, there is a close relationship between the Tyrolean regional government and the ski lift operators where politicians and operators often work closely together, with nearly all proposals for ski area expansions being approved without much scrutiny. This practice, which he heavily criticized, where proposals from tourism areas are approved almost automatically, for Mr. Popper is a major obstacle to making changes, as shown in his perception of the situation in Tyrol:

16. “Because traditionally there is a very close connection in Tyrol between the provincial government on the one hand and the cable car operators on the other. Some of them are also direct politicians of the ropeway operators [...] And we want to change that.” (I3)

He also specifically mentions influential figures, amongst them powerful ski lift operators with strong political and economic influence in the region, and beyond. Despite the difficult situation, Paul Popper argued that there can also be mentioned some positive developments, successes and changes which emerged from the citizens’ petition but also from the general interest in the controversy. For example, a proposed five-year moratorium on the expansion of glacier ski areas was under review by the Tyrolean legislature, something he viewed as a step in the right direction which is described by him with the following: “In other words, a halt to construction or a halt to expansions and mergers. And that is currently being dealt with, it is now in the committees.” (I3). Another success he highlighted is increased transparency and public awareness surrounding such decisions. Whereas projects like the planned glacier marriage project were previously decided so to say behind closed doors, there is now at least to some extent more public discussion, deliberation and participation. However, he also shared with some skepticism that the Tyrolean government often tries to delay decisions by requesting more statements and studies. This already hints to the role of expertise which Mr. Paul Popper had a particular view on when I asked him about this issue:

17. "That's very easy to answer, you just have to ask yourself, who pays these experts? And that's the operators. They are experts who present themselves to the outside world as independent, but of course, he who pays, creates. And it is simply the case that an expert opinion almost always, if not always, bears the signature of the client. [...] But the experts, as I said, are of course in the pay of the operators, that has to be said quite openly and of course you can always present things this way or that way, change the scale a bit or downplay it a bit [...]." (I3)

Zooming out, Popper argued that the larger conflicts in the controversy lie between tourism, or more so mass- or over-tourism, and environmental protection which both seem to be diametrically opposed poles of the discussion. The actors as well as their positions and interests standing behind these poles work along the lines of this continuum where Mr. Paul Popper and his citizens' initiative argue for the need to protect nature. Furthermore, he shared, skiing is in long-term decline, particularly due to climate change and the associated lack of snow. He predicts that within 30 years, skiing will be mostly impossible in many regions of Tyrol, becoming more expensive and elitist. Despite this, operators continue to push for expansion, they know it's coming to an end but want to squeeze out the last bit before that happens. Connected to this is the issue of intergenerational responsibility, as he argues:

18. "I've used the quote a few times already, to me it seems like a dance of death. You know it's coming to an end, but now we're really stepping on the gas again. And we don't want that. We don't want to do that to the young guys either. I mean, I'm in an age group now where it only affects me marginally, but we have kids" (I3)



Figure 18: Photo of glacier in Sölden area by author

Another concern is the destruction of valuable natural landscapes, especially as glaciers retreat, exposing new areas that are biologically significant. As an example, you can see in the picture above (figure how the glacier area with the skiing piste looks like in summer. Paul Popper argued that these newly revealed glacier forefields should be protected as they represent untouched land with significant ecological importance. He also criticized the economic interests of ski lift operators and, importantly, investors, which often conflict with the needs of the local population. Many large operators and investors, in his view, have little to no connection to the locals, due to their foreign origin or due to their nature as international finance institutions. Instead, they are often external investors who treat tourism projects as profitable ventures, without regard for the community or the environment. These general considerations led to a crucial point by zooming in to the situation in Tyrol, but also in Sölden. While tourism has brought prosperity, it has also caused major side effects, such as the depopulation of locals, pushing up real estate prices and the erosion of quality of life. He describes this most dramatically in Sölden where party tourism has destroyed not only local private and social life but also much of the Tyrolean charme of the village, whereas the Pitztal still remained parts of this:

19. "The Pitztal would have from my point of view the chance to go another tourism way, and the Ötztal is already in this rail inside, like Ischgl also, on party tourism and just hardcore tourism, also structurally totally out of control, it is terrible, what was put there at architectural sins in the landscape. And the Pitztal is even better off, the Pitztalers still have a lot of undeveloped nature [...]." (I3)

This brings me to Mr. Popper's estimations and perceptions but also uncertainties and fears that the future of tourism in the Ötztal and Pitztal areas hold. While, in his opinion, the above mentioned processes have already taken place in Sölden, Ötztal, much of his hope for the future is grounded in the citizens' initiative's success and the enlarged interest in the area from an environmental point of view. Most dominantly, the desire to follow the pathway of sustainable alternatives connects to Mr. Popper's envisioning of a future where tourism shifts towards more sustainable and eco-friendly offerings. While there need not only to be limits on expansion of ski areas and more emphasis on the protection of untouched landscapes, additionally, he suggested a greater focus on the summer and hiking season, as skiing in his analysis will likely decline in the long term. Furthermore, social and cultural changes are also necessary to align tourism with the needs of the local population, like for instance in Vent, a so-called mountaineering village, where a more sustainable, higher-quality form of tourism has already been successfully implemented. Or, as Mr. Popper puts Vent in relation to Sölden:

20. "There is also a high-quality tourism, in Vent for example, there one has gone a different way, there one does not have these problems, has a bit more demanding clientele, there one does not have these Ballermann problems as in Sölden. And in Sölden it's just like that, now you can't get rid of the devil you called. The locals are already complaining about disturbances at night and the quality of life has been destroyed, as well as the family atmosphere that people otherwise have and appreciate in the country. And more and more people are noticing this, which is why I believe that this is also a reason why people are now starting to think about it." (I3)

In his opinion, the importance of continuing to apply political pressure and strengthening citizen participation can not be denied as he calls for more powers for the regional environmental lawyer and advocates for an overhaul of the Tyrolean Ski Lift and Ski Area Program, which he believes is too heavily tailored to the interests of ski lift operators, so to say the skiing industry. However overall, Mr. Paul Popper argued that he can sense growing awareness among the public, which he claims to be a significant achievement, by him and others connected to the citizens' initiative but also going beyond. The engagement of young people, especially through cooperation with Fridays for Future, gives him hope for future environmental endeavors, protests but also successes.

Mr. Paul Popper - “the change-tryer”

“So for us two things are absolutely necessary for a new tourism, that is nature compatibility [...] And of course it must also bring something for the people in the country, in the valley, that is no question.” (I3)

Paul Popper, initiator of a citizens’ petition, became engaged in activism through earlier campaigns to stop ski area expansions and later applied this experience to the glacier marriage project. Initially less critical, he grew concerned after realizing the scale of planned construction and mobilizing broad public support, leading to a petition with 170,000 signatures and significant international media attention. He highlights the close ties between Tyrolean politics and ski lift operators as a major obstacle but also notes small successes such as increased transparency and discussions on a moratorium for glacier expansions. For him, the controversy symbolizes the broader conflict between mass tourism and environmental protection, with climate change making skiing less viable and amplifying pressures on fragile alpine ecosystems. His vision for the future emphasizes sustainable, higher-quality tourism, stronger citizen participation, and alternatives to the destructive patterns of mass tourism he associates with Sölden.

5.5 Susanne Maier - “the analyst”

“Many people in local politics, um, uh, simply have roots or connections in tourism.” (I4)

Susanne Maier is a journalist who grew up in the Pitztal and has been reporting on western Austria for some time for newspapers and other institutions. Her first exposure to the controversy around the glacier marriage project was roughly in the year 2016 when she initially followed the developments through press releases and public referendums. A key moment in her understanding of the project was when she saw the project site in person while visiting the area. When it comes to the significance of the controversy around the glacier marriage, in her perception, it primarily revolves around the environmental impact and the encroachment on the glaciers. Susanne’s own interest took her back to the region she grew up in and looking at the area she knew from her childhood left a lasting impression on her:

21. “That was two weeks, I think, in August and um, and that was the first time I was there and I actually saw this piste and then you understand this project completely differently.” (I4)

Susanne’s perspective shifted after this experience. Previously, she had followed the topic in a purely journalistic capacity, but witnessing the landscape personally brought the concerns of the project’s opponents into sharper focus. She described the slopes running over the glacier as an encroachment on a landscape that is emblematic of the alpine environment and worth protecting. When it comes to the core conflicts of the controversy, a key theme of the interview was the tension between economic interests and environmental conservation. In Susanne Maier’s perception, the operators of the glacier cable cars argue that modern technology can minimize environmental disruption. They point to the use of new cable car technology that requires fewer support pillars and to the possibility of artificially snowing the slopes. Here, Mrs. Maier identifies one of the major issues, namely that even with technological advancements, the intrusion into the glaciers remains a reality that cannot be overlooked. Environmental organizations like WWF and the Alpine Club argue that such intrusions could have long-term consequences for the alpine landscape and nature. They fear that step-by-step expansions will blur the boundaries between protected natural areas and tourism zones. From the opponents’ point of view in the controversy, Susanne described the situation up there on the mountain where the ski infrastructure would be built like this:

22. “And the, the cable car that runs it, basically leads up to this link, up to this ridge. And the supports should not be on glacier surfaces. This was emphasized by the glacier operators, and and it is a very, um, the latest technology. That means that instead of many supports, as they used to build, you only need two. I think you can really keep the intervention, so the argument goes, on this side, to a minimum. But what is more problematic from the point of view of the other side is that the pistes, you

can then ski down two options and that is just glacier surface and when you, when you stand in front of it, you know, look at it at some point, then you see that they are actually just suitable for pistes, there are crevices, you have to, you have to level these surfaces. Of course you have to make snow. Mhm. And then it will be on this pass, this planned cable car is supposed to lead to this pass and it's really only a few hundred meters or 100 meters away. You can already see the mountain station from Sölden on the glacier.” (I4)

The area that Susanne Maier describes is located between the glacier ski areas of Sölden, Ötztal, and the Pitztal's glacier areas. In the pictures underneath (figure 23) and on the next page (figure 24) which I took on the hike across this landscape, you can see what the area looks like in late summer and what dimensions the glacier has.



Figure 19: Photo of glacier marriage project area by author



Figure 20: Photo of glacier marriage project area by author

As discussed with and brought up by other interviewees, there seems to be strong contradictions between economic interests and environmental concerns. Also, Susanne reported that the polarization of opinions is particularly noticeable within the region. While the Ötztal presumably has long embraced mass tourism and tended to support the project, the Pitztal with its smaller and steeper valley area and the local population saw the project as an excessive intrusion into their life and the nature around them. Susanne explained the regional difference to me with the following words:

23. "What I found really interesting, but that's just my observation, I have the feeling that the Ötztal is more of a pro camp and that the Pitztal is more of a contra camp and [...] I think we somehow came to the conclusion that one reason might be that in the Pitztal, when you drive along it, there is only this one narrow road, everything is very small-scale." (14)

In the Ötztal, large hotel complexes, numerous ski lifts and a well-developed infrastructure for mass tourism make the population more open to the idea of expanding the ski area. In contrast, the Pitztal is a narrow valley with only one main road and far less tourism development. Locals there worry that the mass tourism brought on by the glacier merger, the glacier marriage project, would overwhelm their region. Mrs. Maier further explained to me

that local politics are often closely tied to the tourism industry. Many politicians, particularly in Tyrol, have direct ties to tourism businesses or ski resorts, which mutually influences their decisions. This leads to conflicts of interest, as political decisions are frequently dominated by economic considerations. This connection between politics and tourism is particularly evident in the glacier marriage controversy, where economic interests often stand in strong contrast to environmental concerns. These critical stances often appear around the issue of sustainability which is a central argument made by both proponents and opponents of the project, of course in a very different way. The glacier cable car operators emphasize that their planned expansions are part of a strategy to secure the future of tourism by using greener technologies, such as photovoltaic systems to power the lifts. Susanne discusses sustainability from the different positions' perspectives:

24. "Well, I think you always have to consider from which point of view, from which perspective the people are speaking. And the management, of course, has, or you have to ask yourself, of course, what interests my conversation partner and, logically, the management of the Pitztal Glacier Railways are pursuing. For them, sustainability also means profitability. And how can I develop, grow or lead my company sustainably into the future? Do I have to think about capacity utilization? What can I offer my guests, etc. So what I believe sustainability means for the management of the Pitztal Glacier Railways means something completely different to that for the Alpine Association and something completely different to that for the WWF. Yes, logically."
(14)

Hence, Mrs. Maier points out that the understanding of sustainability largely depends on one's own perspective. For the operators, sustainability primarily means ensuring the profitability of the business, while environmental groups, such as NGOs or citizens' initiatives, see it as preserving natural resources and landscapes. The clash that comes into being here works not only along the lines of arguments but is rooted deeply in the cultural, contextual and political history and present of the area. Both groups, the one of the proponents and the one of the opponents, ground their argumentations and visions for the future in certain cultural narratives. In my view, this can be linked to the concept of technopolitical cultures (Felt & Müller, 2011; Felt et al. 2008) as well as the idea of envirotechnical regimes (Pritchard, 2001; 2012). In terms of technopolitical cultures, I argue that they matter in this case because they are not homogenous but, rather, point to the very different usages of cultural patterns. When technoscientific issues are debated and contested, it is of importance which sort and type of technology, science or, in this case, ski infrastructure and all the technologies associated with it, is discussed. The technology which is used to build the infrastructure in the case of the glacier marriage, consists of large machines such as excavators, drills, power plants, water reservoirs, snow lances, snow cannons, snow groomers and many more. The types of

technologies that these machines symbolize are associated with certain values, cultural meanings and sociotechnical imaginaries whereas the non-use of such technologies is connected to others. This also largely depends on the expertise, which is consulted, what role expertise or experts in general play and what function they have in connection to the glacier marriage controversy in particular. Asking Susanne about her opinion on the role of expertise in the discussion in the Pitztal and Ötztal, she answered: “Yes. Well, it's a good question. I think there is support. As with many questions, I think... Depending on your position, you tend to ask experts who reinforce your own position [...]” (I4)

In terms of the future of ski tourism and the project glacier marriage, Susanne shared that she believes that ski tourism in Tirol is facing major changes and challenges. In her view, climate change and the resulting global warming will not only but also increasingly impact glacier areas like the ones in the Pitztal and Ötztal. Scientific forecasts she knows indicate that the glaciers in these regions could disappear by 2050. Nevertheless, the pressure to maintain ski tourism as a key economic driver remains high. Mrs. Maier believes that future ski tourism will focus more on larger, higher-altitude ski resorts, while smaller ones might disappear. She sees a clear trend that skiing is becoming more expensive, making it increasingly a luxury sport for wealthier tourists. This could lead Tyrol to target more affluent visitors and simultaneously develop a tourism model focused on sustainability and high-quality offerings. At the same time, Susanne observed an ongoing shift towards alternative winter sports such as snowshoeing, cross-country skiing and ski touring. These trends are already reflected in the region's infrastructure, which is increasingly accommodating these alternative activities. This may also lead to a greater focus on conservation and environmental awareness in the tourism industry.

Mrs. Susanne Maier - “the analyst”

“Many people in local politics, um, uh, simply have roots or connections in tourism.” (14)

She highlighted the complex and multi-faceted conflicts surrounding the controversy around the glacier marriage project. Mrs. Susanne Maier described the debate as highly polarized, especially between regional supporters and opponents of the project. While economic interests play a major role and politics is often intertwined with tourism, the importance of environmental protection is emphasized by conservation groups. Susanne’s observations suggest that the pressure to make ski tourism sustainable will largely shape the future of the industry. However, the question remains whether sustainability can truly be achieved in a tourism model that is increasingly threatened by climate change and the eventual disappearance of glaciers.

5.6 Magdalena Gruber - “the existentialist”

“[...] and yes, in the event that we simply don't achieve this climate turnaround, then I really see black for the Pitztal.” (I5)

Mrs. Magdalena Gruber, a journalist from the Pitztal region, began her narration in the interview by sharing a brief insight into her personal history and connection to the Pitztal region. Her family moved back to the Pitztal when she was four, after spending 20 years in Innsbruck. She mentions that she had indirectly heard about the idea of merging the Pitztal and Ötztal ski areas from a young age, but it only became more significant to her during her teenage years when she began working as a local journalist. Magdalena also explained to me that her parents always had a critical view of the tourism industry, particularly the planned merger project, the glacier marriage. Since her family was not involved in tourism but worked in the social sector, the economic benefits of tourism were less relevant to them. Instead, in raising Magdalena they focused on the environmental impacts caused by mass tourism and ski resort expansions. Mrs. Magdalena Gruber explained how her connection to the controversy evolved when she said:

25. “And accordingly, um, the environmental aspects were always the topic of the whole project for us and from that perspective I mostly got to know about it somehow, for example when the demolition of the summit was the topic. Um, so from that point of view, I can't name a specific time when I found out about the project. But it's something that I think has always been there as an approach, ever since I lived there or was aware of it because of my age.” (I5)

Her mostly critical perspective on mass ski tourism came across when emphasizing the significant environmental damage caused by ski tourism. Her family, though they also enjoyed skiing from time to time, believed that there was no need to build new ski lifts. Existing ski resorts were sufficient, and the idea that every mountain must be developed was unnecessary. When I asked her about her explanation for interventions in nature, she shared with me an interesting metaphor around biodiversity:

26. “C: Mhm mhm, yeah yeah yeah. Um, you said that the intervention in nature, that an alpine pasture is also an intervention in nature. And I would find it very interesting to hear, perhaps if you could briefly explain again, how you differentiate, so what are good interventions in nature that are perhaps even beneficial for nature or for nature to thrive? Or how would you differentiate, so to speak?”

I: could perhaps put it this way. We have a large garden at home with fruit trees and terraces, it's a cultural landscape, I would say. But there is somehow the idea that, firstly, we would never have simply laid turf or something like that, because then it's basically dead nature. Insects can no longer live there, there's no biodiversity. On the other hand, if you build a dry stone wall, insects can find a habitat there. And if you

plant a fruit tree, bees can pollinate it. And then the neighbor, who has honey, then that somehow creates added value without harming nature. So somehow this aspect, cultural landscape can actually be a healthy habitat in which biodiversity is present.”
(15)

In the pictures on this page (figure 25 and figure 26), it becomes visible what interventions and interferences with nature can be made through ski tourism infrastructure. The white plastic tarpaulin in figure 25 looks a bit like snow from further away, but it is a technological fix to protect the glacial ice from melting, circumventing the albedo-effect by reflecting more sunbeams back into the atmosphere than the dirty and therefore darker ice would. Though, this leaves its traces on the glacial ice, in the form of microplastics.



Figure 21: Photo of white plastic tarpauline on glacier in Sölden by author



Figure 22: Photo of water guidance at the glacier in Sölden by author

The other picture (figure 26) shows how the water from one of the glaciers in the Ötztal, the Rettenbachferner, is guided by stone walls. These infrastructural and technical measures, to me exemplify how a high Alpine region needs to be adjusted and constructed in order to enable skiing and make it safe for humans.

Continuing with the major impacts which ski tourism has in Magdalena's opinions, she said:

27. "But that always has to be a) reflected. So, am I somehow limiting other species, species diversity by doing this? And b) you have to say that the negative aspects of ski areas are well known, right? Soil erosion, which is made worse by this. The fact that animals are being pushed back into their habitat. The noise and air pollution, which somehow also results from this, and light pollution. From my bedroom I saw the night skiing spotlights coming down from the mountain. I don't have to be a trained biologist to know that this can't be good for the wildlife there. So of course, an alpine pasture is an intrusion on nature, I said, it's clear that Austria is densely populated and there is a lot of cultivated land. But in moments where people are fundamentally interested in nature remaining intact because they live with it, it is somehow usually a more sustainable approach than if nature is seen as a usable area, in the sense of 'I just want to slide down on two boards, have fun and then go home again'." (15)

Another major issue Mrs. Magdalena Gruber highlights is the increased traffic during the ski season. Although tourism is economically vital for some villages, the higher traffic in the region is seen as a burden. Local residents, especially in less tourism-dependent areas, often find their everyday lives disrupted by the seasonal influx. In the picture on the left (figure 27), you can see a relatively empty parking space in front of the Pitztal glacier cable car in the last



Figure 23: Photo of parking space at Pitztal valley station by author

outskirts of the Pitztal valley. Due to the late summer season when the picture was taken by me, it seems like the area is not so crowded. However, I am wondering what this looks like in winter. How many cars make their way on the only road through the Pitztal valley to enter the glacier ski area? And how many of them park in this space?

Magdalena explained to me that the Pitztal has always been overshadowed by the larger and more successful Ötztal in terms of tourism. The Ötztal, especially Sölden, has experienced significant economic growth through tourism expansion in recent years, while the Pitztal has remained more of a

"neglected sister." The idea of merging the two ski areas sparked economic hopes for many,

not only in the Ötztal but also in the Pitztal. Some younger people, in particular, hoped that tourism would help improve local infrastructure and create more opportunities for them. Because many young people had already left the Pitztal to find work in more developed areas like the Ötztal or elsewhere. However, Magdalena shared with me that from around the 2010s a shift in opinion began. More locals, even those involved in tourism, started recognizing the downsides of mass tourism. Many now believed that the existing level of tourism was sufficient and that further expansion was unnecessary. Or, as Magdalena described it to me with the interesting notion of tipping point:

28. "I noticed that there was a tipping point at some point, because it became more and more clear what the downsides of mass tourism were. And somehow many people became aware that this regional development had fewer advantages for the local population than they often thought at first glance. And that was something that many tourism professionals, especially those in the gender sector, were not consciously telling us (laughs). I had the feeling that, especially from the 2010s onwards, the majority of people, those who perhaps had their own holiday homes, said that what we had in terms of tourism was actually enough for us and that there was no need for more." (I5)

The project, particularly the planned blasting of a mountain peak to make way for a ski lift, became symbolic of the "gigantomania" and disregard for nature in the ski tourism industry. While such blasting is not unusual in the industry, the media picked up on it and turned it into a highly emotional and sensational story. Mrs. Magdalena Gruber described how the image of the peak that was supposedly to be blown away became a strong symbol of the environmental destruction caused by ski tourism: "So to speak, we blow up the summits if they are in the way of our lifts, while the glaciers melt away before our eyes." (I5)

Further, she explained to me that, in her perception, the debate often became oversimplified, making it easier for people to project their emotions onto the topic. The media played a significant role in amplifying these emotions by reducing complex issues into simple, sensational images, like the one mentioned in the quote above. This reductionist view also shaped public discourse which can be linked to the role of expertise, as Magdalena also described the use of expertise in the debate around the merger project when I asked her. She noted that tourism is an area with a wide range of opinions, and it is common for multiple studies to come to different conclusions and that a recurring issue is the one of scientific expertise often being discredited or dismissed by interest groups which support the project. Or, how Magdalena relates science to the tourism sector when she said: "I have to be honest, I find expertise in the tourism sector in general incredibly difficult, because in Tyrol, to put it bluntly, the independence of science is not even completely guaranteed, is it?" (I5)

And, interestingly, she connects expertise to its framing and its usage: "It seems to me that the problem is not so much the expertise but how the expertise is sometimes framed by the people who have an interest in the projects being implemented." (I5)

Thereby, she also criticized the lack of honest engagement with the long-term consequences of climate change, particularly regarding the future of ski tourism. Many decision-makers are aware that the climate conditions will likely be very different in 50 years, but they often leave the responsibility for these future challenges to the next generation. I want to share one more larger passage from this interview which dealt with how the future can be imagined and what this has to do with the climate crisis:

29. "C: Mhm mhm mhm, yes yes yes but you have described it very well, also the perspective from the point of view of the project, to what extent it could make sense for certain people. What would you ask, or perhaps quite bluntly - how do you imagine the future of, or what are your ideas about the future of ski tourism or tourism in general? Now in the Pitztal, for example."

"I5: Wow, that's really something, you just can't imagine it without the way we deal with the climate crisis. There's just a massive difference between whether we manage to reach 1.5 degrees (laughs) or not. I would really hope that winter as we know it won't be completely history in 50 to 100 years. And then for me there's nothing wrong with trying to keep more sustainable ski tourism alive. There's just a bit of, I'm thinking about technical development. I think, why shouldn't we think about more environmentally friendly ski tourism? Why, I'm just thinking along those lines - yes, but more sustainable and further developed. And if you rethink ski areas, then not bigger and with a gondola. Instead I think, can you work with renewable energies? Maybe it's just that people generally don't want to spend forever riding the lift? I think that ski touring is becoming more and more attractive. And generally, I just think that winter tourism needs to radically reinvent itself. And what I really don't see are new major interventions that don't have any real added value for climate protection. To put it bluntly, if anyone comes up with an idea of how to combine lift construction and wind turbines, I'm up for that (laughs)." (I5)

Mrs. Gruber makes it clear that the future of ski tourism in Tyrol is heavily dependent on climate change, or the climate crisis. Without limiting global warming to 1.5°C, she sees little long-term future for winter sports in the Alps. Therefore, she advocates for a radical rethinking of tourism, with a focus on more environmentally friendly and sustainable concepts. Alternative tourism options, such as focusing more on summer tourism, which has become increasingly important in some regions is one way for her to follow such pathways, but she also believes that mountain tourism must reinvent itself by shifting towards sustainable practices, including the use of renewable energy in ski areas or promoting ski touring as an alternative to lifts. Magdalena seemed concerned that without significant climate action, many ski resorts in the

Alps, including those in the Pitztal, will have no future at all. This is exemplified by the larger quote underneath:

30. "C: Um, and what would you say, where do you see parallels to Pitztal or especially Ötztal, I assume? And where are the differences in the approach to ski tourism?
#00:19:25-3#

I5: Well, what is really striking is that nobody in the industry wants to honestly deal with the fact that ski tourism in Tyrol simply has an expiration date against the backdrop of climate change, the climate crisis. And that it is actually massively irresponsible to intervene in nature in this way when in 50 years these projects may simply be industrial ruins of a different kind. Because there is simply no longer any guarantee of snow. Because the snow no longer stays on the ground. Because, well, maybe we just have multiple crises. It is simply impossible to predict how the situation will develop. And I'm not saying that all ski areas should close because of this and we should actively start dismantling them. But in some respects perhaps sooner than we should build new ski areas [...]." (I5)

Mrs. Magdalena Gruber - "the existentialist"

"[...] and yes, in the event that we simply don't achieve this climate turnaround, then I really see black for the Pitztal." (I5)

Magdalena Gruber, a journalist from the Pitztal region, critiqued ski tourism for its environmental damage and discusses the community's shifting perception of the planned glacier marriage project with the Ötztal ski area which some initially saw as economically beneficial. She emphasized that the future of ski tourism is contingent upon addressing climate change, advocating for sustainable practices and renewable energy use. She also argued for a radical rethinking of tourism, prioritizing eco-friendly alternatives like ski touring over new infrastructure development.

5.7 Jakob Jauker - “the future-resister”

“Mhm, just go for a diversified offer, all-year-round offer” (I6)

Mr. Jakob Jauker is an environmentalist at an NGO that operates internationally but also on Austrian level. The interview began with a long narration, nicely highlighting some of the historical steps that the project glacier marriage took, or did not take. I want to describe some of the considerations that Mr. Jauker shared with me, by beginning with his answer to my initial question where the idea of the glacier marriage merging plan came from:

31. “Mhm, yes, the idea is actually quite old. It was in the 70s and 80s that the glacier ski areas were developed in Austria. There are 8 glacier ski areas, actually only 7, because the glacier ski area on the Dachstein closed last year. And this phase also saw the opening of the Pitztal glacier ski area and, a little earlier, the Ötztal glacier ski area, and at the same time there was a political phase, especially in the 1980s, when we realized that we couldn't continue to open ski areas at this rate in the future.” (I6)

In Jakob Jauker's account, the development of glacier ski resorts in the 1970s and 1980s led to increased usage, higher numbers of skiers but also subsequent political regulations. In the 1980s, the first conservation ordinances were enacted, including the Ötztal Alps conservation area, which aimed to protect the region from further development. This regulation targeted nature conservation but still allowed potential ski resort expansions, which operators had already considered. In 1991, the "absolute glacier protection" law was introduced in the Tyrolean Conservation Act, prohibiting any modifications to glacier areas. However, due to political pressure, this protection was later relaxed to allow future projects. The glacier marriage project was submitted for environmental impact assessment in 2016, aiming to connect the ski resorts via cable cars. Despite positive assessments from the operators, significant landscape impacts were identified. A 2019 environmental report confirmed these unacceptable effects, leading the project developers to withdraw their proposal.

Increasing public resistance and rising media attention, including international coverage, led to the formation of citizens' initiatives and a referendum in St. Leonhard, Pitztal. In 2020, a narrow majority voted against the project, ultimately ending the proposal. Despite the withdrawal of the original plans, the operators introduced a new, smaller project in 2023, officially not aimed at a merger. However, Mr. Jakob Jauker expressed his skepticism, suspecting "salami-slicing tactics," where the original goal is pursued in smaller steps. The planned new cable car to Fernerjoch is highly controversial due to its proximity to the Ötztal ski area. Project opponents fear long-term environmental damage and gradual expansion, which conflicts with conservation goals. In Jakob's perception, climate change is a central issue in this debate, while glacier retreat makes the region less attractive for ski tourism and

creates new challenges for operators. Higher-altitude ski resorts like those in Pitztal and Ötztal are increasingly difficult to maintain as glaciers recede. Mr. Jauker also criticized the short-term economic benefits that ski operators hope to gain from new projects and advocated for absolute glacier protection and diversification of tourism offerings. He points to stagnating skier numbers and a decline in winter tourism, particularly in lower-altitude regions. According to him, the public discussion around the project was highly influenced by media coverage. A particular photo of an excavator on the Pitztal Glacier, published by the WWF, garnered international attention. He emphasizes the emotional connection many people have with glacier landscapes and the wilderness they represent. The image of construction sites on glaciers is widely rejected by the public. The story about a media echo the NGO had which Mr. Jauker works for was particularly interesting, astonishing but also funny to hear about for me:

32. "C: Yes, that's very exciting. You've already mentioned the wider social discussion, for example in the media and so on. What would you say, how would you describe it? Apart from the environmental impact assessment, but rather what has come from the media or in the social discourse, how would you describe it?

I6: Yes, we were surprised that the media response was so great, especially in 2019. So there's the famous picture of the WWF with the now really famous excavator picture taken on the Pitztal glacier, which has gone all over the world. So it's been all over the world, from the moon to I don't know which media have picked it up. And then it was interesting for us to observe how the tabloid media work and how shoddily they sometimes work (laughs), the effect was perhaps not so bad for us looking back, but that's how it was in the original project, so in this glacier marriage, a ridge top on the left Fernerkogel would have had to be removed for the construction of this mountain station, blown up, in other words, they always denied that it would be blown up, but there's no other way, remove about 40 meters and then level it out, and that's how we've always communicated it, it's about this ridge top on the left Fernerkogel, which is being blown up, then somehow the small newspaper was the first to pick up on it and then the Bild newspaper suddenly came along and ran the headline, how did they write it? They ran a picture of the left Fernerkogel, the left Fernerkogel and its three glaciers have to go, Tyrol is blowing up or wants to blow up the summit, so it really read as if the ski resort operators were planning to blow up the whole mountain. And that was actually partly a false report, which we never communicated in that way, so we were always consistent, but sometimes you have no control over what the media do with the information afterwards, and in that case they formulated it that way, and then it was already out there, there was never a correction, now from the Bild newspaper, they were never really interested. They caused a brief outrage and the case was already over. Yes, I guess it was kind of interesting. So there was certainly a lot of outrage in society about such projects, in this case intensified by a false report, but I'm convinced that even without this false report there would have been a lot of outrage. It's still like that, well, we notice it now, I have to look, because I'm anonymous, if you follow the social media, and something is posted, especially about construction

measures on the glacier and so on, so you can already see that people are very upset about it, even about such measures.” (I6)

This story tells a lot about media processes in Austria and beyond, but, in the interview, it also led Jakob Jauker to think about the future by pointing to multiple crises:

33. “So you can't watch the glacier swim away under our feet and still try to squeeze the last bit out of it and penetrate into untouched areas and set up a construction site there. In view of the global crises we are facing, the climate crisis, the biodiversity crisis, these are precisely the wrong answers.” (I6)

Therefore, he advocated clear limits on ski resort expansions and a new legal framework for glacier protection. He believes policymakers must create clear guidelines to stop unchecked ski area developments. Additionally, Jakob Jauker called for operators to develop more sustainable concepts that go beyond traditional ski tourism. He also pointed to alternative tourism models, like the Alpine Club's "mountaineering villages" initiative, which promotes gentle, eco-friendly tourism while benefiting local economies. Such concepts aim to diversify tourism offerings, for example, through winter hiking or sustainable year-round tourism.

Mr. Jakob Jauker - “the future-resister”

“Mhm, just go for a diversified offer, all-year-round offer” (16)

Jakob Jauker, an environmentalist working with an NGO, traced the glacier marriage project back to the boom of glacier ski resorts in the 1970s and 1980s, when expansion was later curbed by new conservation laws. He sees the current downsized proposals as part of a long-term “salami-slicing” strategy and remains skeptical of their environmental impacts, especially given accelerating glacier retreat and the decline of skiing as a mass sport. For him, media attention, particularly the famous excavator photo on the Pitztal Glacier, played a crucial role in mobilizing public outrage, even when reports became exaggerated or distorted. He frames the controversy within broader global crises, arguing that short-term economic gains from ski expansion are the wrong answer to climate and biodiversity challenges. Instead, he calls for absolute glacier protection, legal safeguards, and diversification into sustainable, year-round tourism models such as mountaineering villages.

5.8 Noah Nadel - “the fore-seer”

“I think that [climate change] should be better taken into account and, as far as I can see, this is generally not done today. A snowmaking system is planned in such a way that it is sufficient for today's conditions and that's it.” (17)

Mr. Noah Nadel, an Alpine researcher, began with his account of the multiple connections he has with the controversy around the planned glacier marriage project. He shared with me that he has long-standing relations to issues of nature and environmental protection in the Alps and first became involved with the Ötztal and Pitztal ski area merger project, the glacier marriage, in the 2000s when he was working for an NGO. Back in 2005, he encountered the emergency route (“Notweg”) issue, which was originally planned as an evacuation route in case of a funicular breakdown. However, there were suspicions that this emergency route was being used as a pretext for future expansion projects. This led to intense political debates because the planned construction would pass through protected glacier moraines. Despite not having the necessary permits, illegal construction began, marking a significant turning point, also in Mr. Nadel's relationship with the project, as he shared with me:

34. “The construction work then started illegally before a permit had been granted. So it was a very intense topic and I think for me it has a certain connection with what happened later. At that time I got to know the area very well because I was up there a few times and saw the construction of the emergency route and experienced what it was like before and after. And yes, then, at some point the concrete project plans came about because an environmental impact assessment was necessary.” (17)

As the project developed, a comprehensive Environmental Impact Assessment (EIA, German: “UVP, Umwelt-Verträglichkeits-Prüfung”) became necessary. In this context, Mr. Nadel was asked by an NGO to provide an assessment of the future of the glaciers in the region, the Ötztal and the Pitztal. He worked closely with a colleague, who developed both global and regional glacier models. Together, they provided a, in his account, neutral assessment of the glacier's future, which contradicted the more optimistic scenarios presented in the official environmental impact statement. In Mr. Noah Nadel's account:

35. “Yes, after that, as a more interested observer, I heard about the referendum or vote on the project, which he then held, which was narrowly negative, and now I've heard again - I still have some connections with my old friend - that another modified project is being planned. I don't know exactly how, but yes, that's my story, partly directly involved, then again as an interested observer over the years.” (17)

When it comes to expertise, science and interdisciplinarity, he described his role as more of a coordinator, bringing together input from different disciplines to get a broader perspective on

environmental, economic, and tourism-related issues. This interdisciplinary approach allows him to keep a wide view rather than focusing on a specific scientific field. For him, science is not just about providing data but also understanding and incorporating emotions into the debates. Emotions should not be dismissed but instead directed toward constructive discussions to reduce polarization and enable more fact-based decision-making. On the topic of the role of science, Mr. Nadel said:

36. “Yes, in my view, science has or should have the task of understanding emotions and not demonizing them. That is quite clear, we have emotions ourselves. And at the same time, try to steer emotions in a positive direction, i.e. less polarization and more facts on the table in a community context.” (17)

He emphasizes the need for collaboration between natural scientists and other disciplines to bring in various perspectives, such as economic and social factors. Science should offer solid grounds for decision-making without making unilateral judgments. He uses the example of the emergency route, which was seen as economically viable, but in practice, it often failed due to natural hazards like rockfalls. For him, science needs to consider long-term impacts and critically analyze future projects.

37. “That means that if science is able to process these facts from different perspectives and then provides information that can be used as a basis for decisions when balancing interests, then I would say that it has played its role. And that would be my personal opinion on the role that science can play.” (17)

A central part of the interview was Mr. Noah Nadel's commitment to sharing knowledge about mountain regions and climate change by describing his work with school groups and other interested parties, where he raises awareness about local environments and the climatic changes happening in the Alps. As an example of distributing knowledge, I want to share the information board (figure 29) which I saw in the Pitztal valley. It highlights the changes that glaciers undergo but also hints at issues like climate change as well as glacier retreat. In Noah's opinion, linking the past and present makes the impacts of climate change more tangible. Mr. Nadel highlights the important aspect of balancing economic development with environmental protection, in his case his educational work. He pointed out the wealth that ski tourism brought to the region after World War II and how this economic growth was closely tied to the Alpine climate. At the same time, he demonstrated to students the problems arising from shrinking glaciers, such as the loss of water reserves and changes in the landscape. Following his lines of argument, he helps people understand that tourism is both an opportunity and a challenge for the region. One important issue discussed in the interview was the future prospects for ski tourism in the Alps generally and in the region Ötztal and Pitztal more specifically. Mr. Noah Nadel points to the need to make tourism more sustainable and



Figure 24: Photo of information board in Pitztal valley by author

diversified. The traditional "bigger, faster, better" model may lose relevance in the future, as both climate conditions and tourist needs change. He described two possible directions for ski tourism. First, what he calls business as usual, meaning the traditional model, where ski resorts continue expanding to stay competitive. Mr. Nadel refers to the "development spiral", where resorts need to expand to keep up with others in a competition-driven market. And second, the diversification of offerings because an alternative future could lie in diversifying tourism offerings. He gives the example of smaller, slower-paced ski resorts with fewer crowds and slower lifts. These types of resorts could offer a more sustainable and less resource-intensive alternative to mass tourism. However, he acknowledges the economic challenges this model could face, as the traditional model is more financially tested. Mr. Noah Nadel also acknowledges that the diversification might be troublesome and difficult to reach for some, but beneficial and sustainable in the long run, when stating:

38. "Of course it doesn't work for the whole mass, which is again dependent on capacity, but a diversification of the offer, where you perhaps no longer just say faster, bigger, further, is ultimately the most successful, but there are also different forms where the consumer then says, this sustainability component is particularly important to me, this family friendliness is particularly important to me, there are, there are already these tendencies, but perhaps the differentiation could be even greater, so that

you really can see the differences, also in terms of economics, affordability, because that is a huge issue.” (17)



Figure 25: Photo of view from room in the Braunschweigerhütte by author

Interestingly, Mr. Nadel also sees great potential in cooperation between ski resorts to reduce competition and find sustainable solutions together. According to him, collaboration could improve efficiency and reduce pressure on sensitive natural areas. A key theme in Mr. Noah Nadel's perspective is the societal balance between economic interests and environmental protection. He argued that decisions should not be made solely by economically powerful actors but should also involve the local population and environmental advocates. The picture on the left (figure 30), to me connects to the arguments by Noah in at least two ways. First, it points to the existing culture of

mountaineering and hiking in the Ötztal and Pitztal areas which, I argue, is symbolized by the Nepalian prayer flags on the left. According to the believers of Buddhism, the prayers are carried up to heaven through these flags. A lot of hikers and climbers in the mountain and glacier areas of the Ötztal and Pitztal might not be Buddhists, however they aim to protect this environment in order to be able to perform their activities. And second, the background in form of opaque fog, to me, stands for the uncertainties which the touristic endeavor of the glacier marriage entails. The participation of the local population and the balancing of economic and environmental interests is at stake and not reached easily. While Noah suggests that this ideal balance would be beneficial, the actors seem to stand in contradiction and not in a cooperative or mutually beneficial relation to each other. This is especially relevant in Tyrol, where there is a stark contrast between urban areas and rural valleys. The rural population is often more directly dependent on tourism, so their voice should not be overlooked in discussions. At the

same time, Mr. Noah Nadel emphasized that the balance between economic development and environmental protection is not static. What was considered a balanced solution in the 1970s may no longer be seen as such today. This dynamic balance must be regularly renegotiated based on current facts and scientific findings. When it comes to the future of tourism and alternative ways of doing tourism, Mr. Noah Nadel shared his ideas about some possible alternatives to the current forms of tourism and land use in the Alps. He said that a wide range of tourism models already exists, from very intensive to very soft forms. The challenge, in his view, lies in making mass tourism more efficient and sustainable without exceeding social and ecological limits. Mr. Noah Nadel also sees potential in a “low-budget ski tourism” model, where tourists would prioritize slow-paced, family-friendly options that are less resource-intensive. However, he admits that this is risky, as it depends on consumer preferences, and shifting away from the traditional model introduces more uncertainty. Concerning the specific situations in the Ötztal and Pitztal, Mr. Noah Nadel concludes:

39. “Ötz and Pitztal are very special, you have to ask yourself the fundamental question. There isn't really a merger at the moment, Pitztal wants to expand because they think they are too small. There was once a plan to simply span the borders, with a gondola ride from A to B, as they are already close to each other, and this could also be something, like today's panoramic ride through the high mountains, that it would be something attractive. I find that very special because it is so concrete, don't you think.”
(17)

Overall, Mr. Noah Nadel reflected on the breadth of the topics covered in the discussion when acknowledging the complexity of the different interests and perspectives in the region but also seeing it as an opportunity to find innovative and sustainable solutions. He emphasized how important it is to build a solid foundation for societal decisions, involving a wide range of actors and disciplines and, thereby, hints to public participation methods.

Mr. Noah Nadel - “the fore-seer”

“I think that [climate change] should be better taken into account and, as far as I can see, this is generally not done today. A snowmaking system is planned in such a way that it is sufficient for today's conditions and that's it.” (17)

Noah Nadel, an Alpine researcher, became involved in the glacier marriage debate in the 2000s, first through controversies over an “emergency route” and later by contributing glacier impact assessments that challenged official optimism. He sees his role as interdisciplinary, bringing together science, economics, and emotions to support balanced decisions while cautioning against dismissing the affective ties people have to glaciers. For him, climate change makes the traditional growth model of ski tourism unsustainable, pushing toward diversification, cooperation between resorts, and more family-friendly, resource-light alternatives. He stresses that the balance between economic development and environmental protection must be continuously renegotiated, as past solutions no longer fit present realities. In his view, the Ötztal and Pitztal case illustrates these tensions vividly, but also shows opportunities for innovative and sustainable tourism models if diverse voices and scientific insights are truly integrated.

5.9 Elias Eglhofer - “the diversifier”

“But so different, so a diversification of the offer, where you perhaps no longer say only the “faster, bigger, further” is the most successful in the end.” (I8)

Mr. Elias Eglhofer, a researcher focusing on the interaction between climate change and winter tourism, not only shared his insights into tourism, sustainability and climate change with me, but also pointed to other emerging topics during the interview, such as transportation, CO2 emissions or the role of different types of expertise in the controversy around the planned glacier marriage project. When he first heard about the project between Ötztal and Pitztal, this project was initially driven by a citizens' initiative and media coverage. Importantly, one of the pivotal topics that Mr. Elias Eglhofer is researching is sustainable development:

40. “C: Okay, okay, that's a question I've been asking myself anyway and I'm reading a bit about it at the moment. What does sustainable development mean to you in terms of tourism?

I8: Um, yes, that the development is taking place in such a way that I mean, tourism has to reorient itself again and again, orient itself to the market, so to speak, in order to develop further in whatever direction and that should be done in the best possible way so that it is as resource-friendly as possible, because of course the classic one must not consume the resources of future generations and so on, that's clear. But in the knowledge that tourism is constantly reinventing itself, we simply have to bear in mind that the resources that we don't use in tourism today are also valuable for tourism because they will easily be our future resources in tourism, yes, so we shouldn't just look at the resources that tourism needs today, that tourism needs today and say that we have to treat them with care, but that we also preserve potential resources that are not yet being used, because we know that this is a potential for the future of tourism, because we know that it is always changing.” (I8)

Elias Eglhofer's research is also mostly concerned with the impacts of climate change on winter tourism and how tourism, in turn, affects climate change through emissions. Additionally, he is interested in consumer behavior, specifically how tourists respond to sustainability and how sustainable regional development can be achieved. I find it very interesting that Mr. Eglhofer criticized the idea that high economic value in tourism is directly linked to ecological quality.



Figure 26: Photo of Pitztal valley by author

Although tourists pay for ski passes and gastronomy, the ecological status of the landscape often has a limited direct impact on the perceived economic value, as seen in the picture on the left (figure 31) which is at the proximities of the Pitztal valley. However, Elias Eglhofer advocates for the conservation of resources, like protected areas, which might be more valuable in the future, especially in light of growing environmental awareness. While from the perspective of mountain railway operators, natural reserves or protected areas are not always seen as beneficial, as they often restrict infrastructure

development, such areas can be a marketing asset if they are on the periphery of ski resorts, allowing operators to promote their proximity to protected environments without sacrificing infrastructure within the resort. When asking about the entanglements and reciprocity of tourism and climate change, the following passage in the interview took place:

41. “C: Yes, now you are also dealing with, uh, as you said before, with the effects of climate change and also the, yes, you said both sides, right? So both the impact of climate change on tourism and the impact of tourism on climate change, if I understood correctly. Could you perhaps briefly explain what the situation is like in Tyrol? I don't know if you have exact data in Ötztal, Pitztal, or how you assess it.

I8: I think, so, I once did a snow reliability model for the whole of Austria, for every ski resort, so the question is, can I still make snow in the future, will I still be able to offer a certain length of season and the further we look into the future and the more negative the climate scenario is, the emissions scenario is, the more emissions we have, the fewer ski resorts will be snow reliable. So in the middle of the century we're at about 80 percent of Austrian ski resorts, which is still relatively high, but with snowmaking

and the assumption that every ski resort can make as much snow as is planned in the model, i.e. I have unlimited water, financial resources, electricity, etc. available.

C: Okay

I8: So it's quite an optimistic view, but from a purely technical point of view, you could say that 80 percent of the ski resorts could still be kept snow-sure, which would then be reduced to one third to two thirds of the ski resorts towards the end of the century, depending on which climate scenario I look at now. And you mean general development, if you look at Ötztal-Pitztal, you have to say that the higher you go up, the less climate change will affect you, at least when it comes to the question of being able to offer a reasonable ski season. That will still be possible at the end of the century, you have to say that the very high altitudes, the high alpine, the glacier areas, are the most suitable retreats for ski tourism towards the end of the century. However, what has not yet been considered in this question is the issue of thawing permafrost, of retreating glaciers, because the landscape there has changed and will change considerably in recent years and in the next few years. That's another issue that doesn't play a role in my mind right now, but it does play a role in the question of whether it's really suitable to expand there." (I8)

While recognizing the environmental sensitivities, in the quote above, it is visible what Elias Eglhofer's ideas for solutions would look like. He suggests that if skiing expansion is to continue, high-altitude areas like glaciers are the most logical places for development. This stance, however, raises conflicts between the need to preserve sensitive areas and the desire to maintain skiing as a viable industry.

Another important topic covered throughout the interview was emissions. Not only do they occur when touristic activities are taking place in the respective area, but, of course, they are also emitted before, while and after a touristic stay because of transportation. The interviewee, Mr. Eglhofer, reminded me of the fact that a significant portion of emissions from winter tourism stems from travel, with about half of the total emissions attributed to the arrival and departure of guests. Activities at the ski resort itself contribute less. What does this mean for winter tourism? Overall, but especially for remote areas such as the Ötztal and the Pitztal? Here, Elias Eglhofer highlighted the dilemma between reducing snowmaking in low-lying regions, in order to save energy, and the potential increase in travel distances to higher-altitude resorts, which could offset the environmental benefits.

In terms of future scenarios, vision as well as adaptation strategies in light of the climate crisis, and, with that, the ever-decreasing natural snow amount, Mr. Eglhofer opened up a variety of further pathways. On the one hand, ski resorts could invest money in more efficient snowmaking systems and strengthen their ambitions in fostering and ensuring artificial snowmaking. On the other hand, they could develop alternative activities further, for example, mountain biking or summer tourism offers in general. Nevertheless, to him, ski resorts seem reluctant to take on approaches which move away from classical winter, and therefore, ski

tourism. While some ski resorts have been experimenting with snow farming or even have been carrying it out for quite some time, others lack the financial resources to do so. While snow farming, at first, to me sounds like a funny endeavor for winter agriculture, it is actually a way of storing snow from one winter season for use in the next. Nowadays, this approach is used to prevent lack of snow at the beginning of the ski season through preserving “old” snow from the previous one. I also experienced this process when I visited the Ötztal and the Pitztal. Or, rather, I saw it in the Ötztal, at the Rettenbachferner glacier. At this place, huge white plastic tarpaulins, or fleeces, are put over the glacier’s area. The reason for this is to prevent the snow and the glacier’s ice from melting. And, ultimately, to reduce costs and enable the use of the snow in the future. However, this procedure is time and money intensive, but it still adds up cost wise for those who can afford it and are big enough.

Most ski resorts, though, are either not high enough up the mountains or lack the financial resources to afford snow farming. Another challenge which mostly smaller ski areas face, is the change from classical winter and ski tourism to other approaches such as a focus on summer tourism. The following quote summarizes Elias Eglhofer’s arguments about snow farming and his perception of the shift towards summer tourism:

42. I8: [...] and from today's point of view, it's difficult to imagine the effort involved on a large scale, although we had exactly the same argument 30 years ago with snowmaking. Then it was also said that we would only cut the valley run, only the critical areas. We will only cut the area, it's far too expensive. And that's exactly what we're doing today. We only cut back areas and not individual points. And apart from that, the necessary developments would be to try and create a stable summer pillar. If I look at the destination now, I would say that all destinations in Austria are already trying to do this anyway, some more successfully than others.”

When it comes to success and failure, it was interesting to see for me that Mr. Eglhofer also referred to ambivalences and issues in the public debate, and its relations to scientific findings. I really appreciated the nuanced way that Elias Eglhofer shared with me and, especially, that he let me know about an incident where, in his opinion, various different perspectives clashed. In the passage that I share underneath, he referred to the Ötztal and Pitztal area and, specifically, to the glacier marriage controversy. The project, in his eyes, is negotiated and discussed in ways which sometimes do not align with his research and arguments. At least in some respects, he reported to have issues with the means by which actors in the controversy are arguing, in what rationales they think and to what extent this affects their actions. The following passage, in my perspective, nicely shows how difficult and complex the controversy around the glacier marriage is and points to the differences that arise in the light of varied circumstances and on multiple levels:

43. "I8: But from that point of view, also with regard to the project now. I was also asked by [first name, last name] if I didn't have time to give a presentation on the subject and I didn't have time on the date, but I told him straight away that if you invite me then I'll present my results, and that means from a climatological point of view these are exactly the areas where you can still do ski tourism, so if it still makes sense somewhere, then it's there. You have to think about whether you want this statement at your event. So, from a purely climatic point of view, you have to say, if you're going to expand, then right there.

I: Okay

I8: Then always dismantle it somewhere else and turn it into a protected area, for example, or renaturation

I: I see, I see. I also find that a very exciting aspect, because that's where tensions or slight differences or ambivalences actually come up when your results actually suggest or imply that you can still make skiing possible in such areas and not in other areas. Exactly, I don't have a question about that now, but I find that a very interesting point in any case. Exactly

I8: That's why, but I have a bit of, I have a bit of, what do you mean difficulties, I always wince a bit when the argument comes up that we can't expand skiing on the glacier because of the climate. So you can have the opinion that it's highly sensitive up there and you shouldn't expand, that in itself is a valid argument, but from my point of view it has nothing to do with the climate. Yes, so I'm not doing any more harm to the climate than if I expand in Kitzbühl and

I: Yes

I8: Climate change doesn't have a stronger impact, doesn't have a stronger effect on the glacier because there's a slope over it, as a rule. So the research also shows that it doesn't play a big role whether there's a slope over it or not

I: okay

I8: That's why I have a bit of difficulty with the argument"

This clash of Elias' perspective and other arguments highlights the need for a more thorough investigation and discussion of the issues laid out, some of which, from my point of view, did not take place in the case of the glacier marriage project. Henceforth, the general public discourse on the merger of the Ötztal and Pitztal glacier ski areas was dominated by concerns about environmental destruction, particularly the impact on glaciers already under threat from climate change. These arguments were put forward by various actors in the controversy, as reported in other interviews, while other arguments, like economic benefits, job creation or regional development, were not as prevalent. This, of course, also has to do with the

availability of interviewees that I was able to recruit within the research process. I will elaborate on this issue more in the next chapter where I discuss these and other superordinate aspects. Nevertheless, It is also important to mention here the different framings that the glacier marriage project was put into. Some actors, for instance environmental groups and associations like the Alpenverein, were influential in framing the project as a threat to future generations and the glacier area as particularly valuable in terms of flora, fauna and recreation area. These and other aspects of opponents of the glacier marriage have been put forward in predominant fashion to the effect that, in my opinion, different understandings of the issues at stake lack importance and visibility. Furthermore, the overarching environmental concerns in the public discourse dominated and framed the controversy in certain ways, while omitting and vanishing other actors' rationales and concerns. This is nonetheless only a partial and, importantly, my view of the arguments which Mr. Elias Eglhofer shared with me.

The framing of the project as a threat to future generations and the glacier area as particularly valuable in terms of flora, fauna and recreation area also leads to ideas and visions about the future. With regard to this, the interviewee underscored the importance of integrating climate change into tourism planning, including the question of whether expansions will remain viable in 20 to 30 years. Hence, the future of ski tourism and sustainable development in tourism highly depends on integrating scientific research, while at the same time allowing for nuanced perspectives. He also suggests that larger-scale spatial planning might be needed to regulate ski resort development, ensuring that expansion happens where it makes the most long-term sense from both environmental and economic perspectives. This interesting argument points to the possibility, or eventually the need, of going beyond the framing of the controversy around the glacier marriage project in the dichotomy of the Ötztal and Pitztal, the two valleys, as is often referred to, also by me. The issues of building new ski infrastructure and the general question of how the future of ski tourism should and will look like are complex interactions between various actors and levels of governance. Hence, this argument enlightens that there could be other political ways to resolve the issue, such as, for instance, a regulatory institution that examines and looks beyond single ski tourism projects but focuses on levels of development beyond the local.

These considerations also shape the role that Elias Eglhofer gives to expertise in the controversy around the glacier marriage in the Ötztal and Pitztal, but also, more generally, in such big tourism projects. Though Mr. Eglhofer has not been directly involved in the Ötztal-Pitztal project, he has consulted on snowmaking and ski area closures, advising on whether investments in snow infrastructure still make sense in light of future climate scenarios. He stresses that his role is to assess the risks and viability of tourism developments over the long term, helping operators make informed decisions about their investments.



Figure 27: Photo of sign in the Pitztal by author

An interesting and funny instance during my ethnographic trip was when I had to pass the cows pictured in the background of the photo on this page (figure 32). When coming from the Pitztal valley, one would see the sign and be informed about the fact that this path is closed and that trespassing means danger of life. However, I came from the other side and therefore could not be warned. Nevertheless, I anticipated the danger and circumvented the cows by jumping through a nearby stream. To me, this instance informed my understanding of dangers and moreover risks which are often and commonly discussed in STS. How are risks understood when they are not communicated properly? How are risks perceived in general? Before they are in action or when they are in action? The glacier marriage project symbolizes an incident where risks are at play, whether they are communicated and realized a priori, in existence or in the aftermath.

So, what is Elias Eglhofer's suggestion to move forward in the glacier marriage project? While he did not argue and decide for or against the project, he pointed to interesting aspects that need to be considered. First, it is unlikely that the idea has been completely abandoned which, ideally, leads to various actors' continued observing and engaging with the controversy. And second, he emphasized the need for careful, climate-conscious planning in ski tourism to

ensure that investments made today can still be beneficial in the future. Interestingly, one idea that Mr. Eglhofer shared with me was to zoom out from the stumbling blocks, niggles and little things that sometimes stand in the way of finding solutions which are beneficial for most, if not all, actors. What he meant by this is probably best described by the quote I share in the following, when he called for superior authorities with an eye for the detail and the big picture:

44. "I8: [...] And one question that I keep asking myself is whether there should be some kind of authority at the top that has a regulating effect. And I'm too ambivalent about that myself. I actually come from the field of geography, from a professional background, and there you have a bit of an overarching view of supra-local spatial planning and so on. With the idea that you should do things where they work best. Which would mean that for a region, for example Tyrol, I basically look at where the most suitable areas for tourism are and that a different kind of development is permitted there than in the areas that are less suitable. [...]" (I8)

Mr. Elias Eglhofer - "the diversifier"

"But so different, so a diversification of the offer, where you perhaps no longer say only the "faster, bigger, further" is the most successful in the end." (I8)

Elias Eglhofer, a researcher on climate change and winter tourism, stresses that sustainable development in tourism must conserve today's and tomorrow's resources, while recognizing that tourism constantly reinvents itself. He highlights the tension between high-altitude glacier areas, which remain technically suitable for skiing, and the environmental sensitivities that make expansion controversial, noting that transport-related emissions often outweigh those from resort operations. In his view, diversification into summer tourism, alternative activities, and more efficient snow management will be crucial, though many ski resorts remain hesitant to move away from traditional winter models. He emphasizes that expertise should guide long-term, climate-conscious planning, ideally through spatial regulation that looks beyond local conflicts and ensures developments occur where they make the most sense. For him, the glacier marriage debate illustrates both the dominance of environmental framings in public discourse and the need to integrate nuanced scientific perspectives into broader governance of Alpine tourism.

5.9 Answering my research questions

RQ: How do different actors imagine the future of ski tourism in the Ötztal and Pitztal valleys in light of the “glacier marriage project” controversy?

The future of ski tourism in the Ötztal and Pitztal valleys is imagined very differently across actors, yet these imaginaries are rarely simplistic. Most are nuanced, context-sensitive and shaped by personal, professional, emotional and also geographical positions. While some actors foresee a prosperous future grounded in infrastructural expansion and economic benefit, others advocate for more sustainable or even radically alternative visions that question the foundational logics of ski tourism or glacier tourism altogether. These imaginaries are shaped not just by ideologies but by concrete attachments to place, profession, experience and memory. The controversy around the glacier marriage project thus becomes a symbolic and material site where broader questions about the future of Alpine tourism, environmental responsibility and regional identity and economy are negotiated, contested and enacted.

SQ2: What arguments and narratives do the actors use?

Actors use a wide spectrum of arguments, as seen in the vignettes, ranging from economic viability, regional development and job security, to concerns about environmental degradation, climate change and long-term sustainability. These are embedded in broader narratives which are hard to carve out and delineate, however, I argue that there are at least three different but larger narratives, or tropes, which shape the controversy around the glacier marriage project. The narratives underneath are formulated by me in a provocative and overly simplistic way, but I argue that they still form the basis of the discussions around:

1. *Keep it and keep going!*

- a. skiing and ski tourism are vital to the region, economy and culture
- b. economic security and prosperity are key
- c. investment in infrastructure secures our future
- d. technological solutions help us in facing challenges

2. *Keep it but make it more sustainable!*

- a. we need ski tourism, but we need to do it responsibly
- b. diversification of touristic offers is pivotal
- c. sustainability both environmentally and economically is important

- d. technology can help us but cannot do the job alone

3. *Keep it out!*

- a. no more expansion of ski resorts
- b. protect the glaciers, nature, environment and climate
- c. alpine ecosystems are at risk, so the glaciers need to stay untouched
- d. technological fixes cannot help us

The underlying positions of the actors as well as the narratives in use are often not fixed. Furthermore, arguments and narratives are rarely congruent. Even actors who support the project may voice doubts about its environmental consequences, while opponents may acknowledge the economic stakes involved. This reflects a fluid interplay of values, pragmatism and personal positioning. The controversy is thus not shaped by clear binaries, but by overlapping and sometimes contradictory lines of reasoning.

SQ3: How do the actors utilize expertise for legitimation?

Expertise is strategically and selectively mobilized to support or challenge the project, depending on the actors' various stances. Proponents rely on technical reports, feasibility studies and economic forecasts, often invoking institutional and engineering expertise to demonstrate the glacier marriage project's viability. Opponents, on the other hand, draw on scientific studies, environmental assessments and legal frameworks, emphasizing climate science, biodiversity loss and the irreversibility of ecological damage. Importantly, many actors express ambivalence or caution toward expertise itself by recognizing its importance, but also its limits, contestations, and political entanglements. Expertise is not treated as neutral. Rather, it is situated, contextual, and subject to interpretation. This reflects a broader STS insight, namely that expertise is not only about knowledge, but also about credibility, authority and strategic positioning.

SQ4: How do different understandings of temporalities matter?

Temporalities - how actors relate to the past, present, and future - play a crucial role in shaping both their arguments and their imaginaries. For example, some actors draw on historical continuity, imagining ski tourism as a tradition to be maintained or updated for future generations. Others emphasize urgent present-day challenges, such as the climate crisis, biodiversity loss or ecological damage, which demand a rupture from past practices. Still others adopt a long-term, intergenerational view, highlighting the responsibility to preserve the

Alpine environment for future inhabitants. These temporalities often overlap or conflict: one actor's vision of progress may be another's sign of regression. Moreover, temporal uncertainty about climate trends, political will, or economic futures adds to the controversy's complexity. Furthermore, contemporary societies - as a whole, but also in Alpine valleys - face disruptive happenings like COVID-19 or societal developments like wars, inflation or energy crises. This fact cannot be left out of the equation when thinking about the temporalities and imaginaries at play. Actors navigate these uncertainties differently, revealing not only divergent futures but also multiple presents and competing pasts.

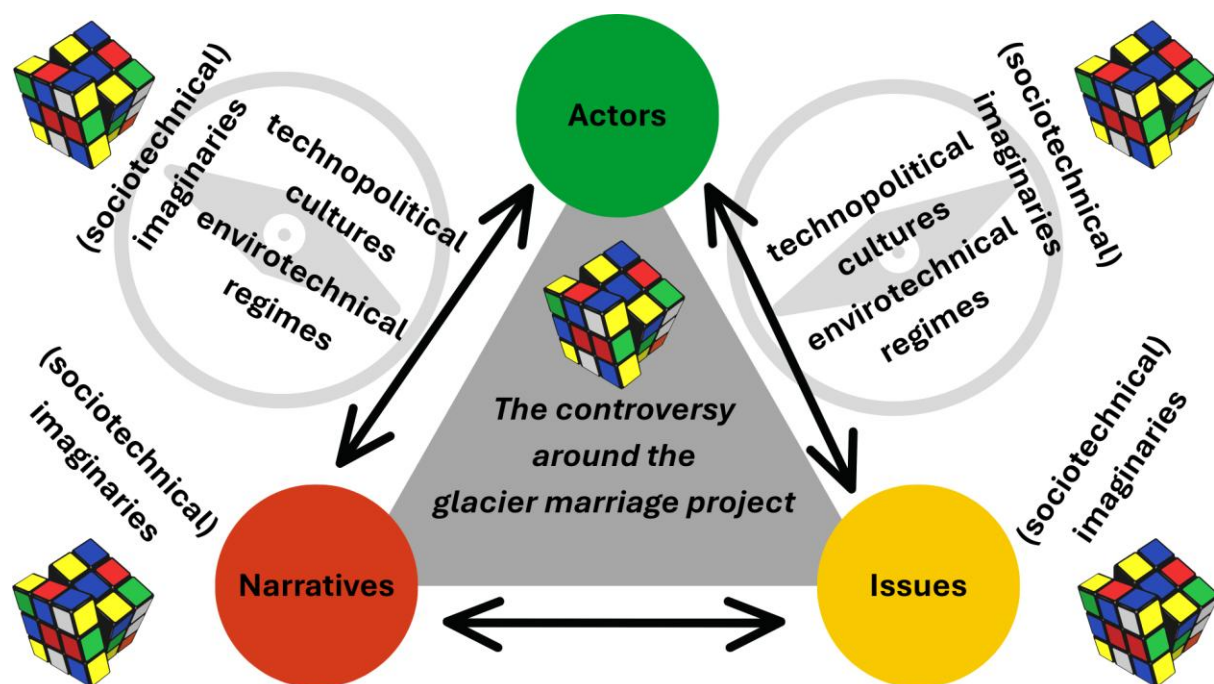


Figure 28: Inter-relations of concepts by author

5.10 Further remarks

With the empirical-/visual-/interview-vignettes above, I tried to bring the point across that the controversy around the glacier marriage in the Ötztal and Pitztal is comprised of both different clashing perspectives and multiple, and at times nuanced, understandings of the issues at stake. What I gathered and learned throughout the analysis of the different material within this thesis' research is, in a nutshell, not to assume in advance, towards no direction and in no direction. Whether it was the engagement with the selected material, including interview data, photos, literature, memos and such, or writing down the ideal-type-like persons which symbolize certain patterns of arguments, it has become clear to me that the controversy around the glacier marriage is even more complex than I thought at the beginning. My argument is that the journey of analyzing the material I gathered led through different phases which are also reflected in the ways I portrayed the different characters. From very clear and distinct positions I learned about, and also had in mind, to various and different understandings than I had imagined and further towards nuanced and often surprising - and at times paradoxical - views with contextual knowledges and dependencies.

I want to summarize briefly what I did in this chapter by pointing to the different portraits and linking the analysis I carried out throughout. First, I intentionally chose the format of vignettes in order to expand and elaborate in a, to me, suitable way what was important in my research for the analysis of the data. The results in form of the different characters, aliases and their "stories", shed light on the multiple and oftentimes contrasting ways in which my interviewees, and I, understood the controversy around the glacier marriage. This allowed me to dive into depth, carve out the specific scaffoldings that interviewees hold onto and accompany their reported views with my own understanding of the issues at stake. Whether this is concerning rationales, framings or arising questions, I argue that this way of presenting my results is by far not the only one, let alone the best one, but it suited me and my research to take further shape and bring together my lines of thinking. Hence, the portrayed Maximilian Müller, Felix Forsch, Paul Popper, Susanne Maier, Magdalena Gruber, Jakob Jauker, Noah Nadel and Elias Eglhofer are in some sense symbols for the complexity of the glacier marriage controversy.

Second, through the variety of backgrounds, professions and arguments of the portraits above, I shed light on obvious but sometimes hidden arguments, individual but also multiple perspectives and unambiguous and at times paradoxical rationales that are prevalent in the controversy around the glacier marriage project. What I mean by this is the overlapping of some portraits, but also the distinct characterization and delineating of the actors' positions, arguments and visions. For instance, while the "historical-futurist Max Müller's" key argument was that a regionalizing of ski tourism - rather than expanding it indiscriminately - could be

economically successful and beneficial for local communities, he also acknowledged the complexity of modern societies and the uncertainties of (scientific) expertise as well as contemporary issues like climate change or the COVID-19 pandemic. Hence, he had a certain way he viewed the controversy and his critical stance towards the glacier marriage project came through. However, by pointing out the possible benefits for the Ötztal and the presumably costs or risks for the Ötztal, the contextual, geographical and historical embedding came into play. This, at the first glimpse one-sided view on the merger of the glacier ski areas, turned out to be leading to larger questions such as who benefits on the costs of whom, who profits economically, socially and environmentally or whose voices are being heard and ignored.

Third, these larger points fed into the analysis made by me throughout the sub-chapters and with regard to the arguments carved out. Whereas the “conservatist Felix Forsch” and the “change tryer Paul Popper” might at first sight seem like being on the opposite ends of a fictional, open and non-linear scale with regard to support and opposition of the glacier marriage project, they both have in common their big investment into the area of the Ötztal and Pitztal valleys alongside their respective glacier areas. It became clear that they have not only a stance in the controversy, but they also were and still are invested in the outcome of the controversy. While their opinions, arguments and visions might be incommensurable, they share a certain way of being situated in the locality and particularity of the area.

Moreover, it became clear to me that all the actors I interviewed were being careful, in their respective sense and understanding. No matter if it was the “analyst Susanne Maier” who turned out to be not only analytical but also emotional in some passages, or “the existentialist Magdalena Gruber” whose critique of ski tourism for its environmental damage lead to a radical rethinking of sustainability and infrastructure projects like the glacier marriage. Further, the analysis of the persons “the optimist Jakob Jauker” and “the fore-seer Mr. Noah Nadel” illuminated how long-standing conflicts between economic interests of ski resort operators and nature conservation in the context of climate change are accompanied by complex ecological, economic and social challenges associated with the controversy around the glacier marriage project in the Ötztal and Pitztal valleys.

Overall, amongst most participants in my research, there seems to be growing hesitancy or even resistance to the development of new glacier areas and the urgent need for alternative tourism strategies. This is not only because of local circumstances, but also to meet the challenges of the 21st century. I argue that it is ever more important to consider STS inspired research and interdisciplinary approaches which, from my perspective, ensure thoughtful and careful approaches to technoscientific and environmental issues. Because of the multiple crises as well as different and multiple roles of expertise in contemporary societies, it is

essential to gain and share knowledge from and with multiple actors, in order to offer pathways for political and social change.

6 Discussion

In the previous chapter, I elaborated on the results which emerged from the analysis of the gathered material. This endeavor took the form of vignettes which served me both as a thinking tool and as a way to shape and write up my analysis. In the following chapter, I discuss the results of my analysis in the light of previous arguments made in the State-of-the-Art chapter and in relation to my theoretical lenses. For this purpose, I structure this discussion in the following parts which evolved as themes, or themes with questions, which, in my perspective, need further elaboration:

- 1) sustainability and sustainable development: an attempt to tackle multiple crises?
- 2) (regional and local) sociotechnical imaginaries: visions for different (better) futures?
- 3) mundane technologies: “low-tech” skiing infrastructure in rural areas?
- 4) diverse and nuanced perspectives of and with actors: an STS approach with different vignettes and facettes?

6.1 Sustainability and sustainable development: an attempt to tackle multiple crises?

Whereas some speak about our current times using the word post-modern (Derrida, 1986 [1967]; Foucault, 1972 [1969]) or being in late capitalism (Adorno 2003 [1969]; Mandel, 1972 [1975]), David B. Weaver, geographer and tourism researcher, says that this “era, however else it can be characterized, is also an era of mass tourism” (2020, p. 1). But why does he claim that? And what does it mean?

First of all, it is worth looking at one definition of tourism, offered by Weaver and Lawton. Here, tourism is defined as

“the sum of the processes, activities, and outcomes arising from the relationships and the interactions among tourists, tourism suppliers, host governments, host communities, and surrounding environments that are involved in the attracting, transporting, hosting, and management of tourists and other visitors.” (Weaver and Lawton, 2014, p. 3)

Defining tourism like this means not narrowing down the phenomenon to individual instances, places, people or things, but rather broadening the horizon for an understanding that is relational, processual, and intertwined. In this vein, also STS research and theory has gone, yet not in many instances with the explicit attempt to investigate tourism. I argue that it is

promising to try to understand the complexities that enhance, enable, prohibit and accompany phenomena around tourism. Because there is not a comprehensive and established definition of tourism from an STS perspective yet, I stick with the one stated above. Recently, climate change and its implications have given a different relevance and discussion to the meaning of tourism with all its outcomes. While there have been attempts to explain and measure the exact effects of climate change on tourism - as well as importantly of tourism on climate change - Weaver (2020, p. 2) states that the boundaries often are hard to draw: "Indeed, permeable boundaries between tourism and other activities repeatedly confound attempts to precisely measure the contributions of tourism as an agent of environmental, economic and social change."

This line of argument is also mirrored in what, for instance, my analysis of "the diversifier - Mr. Elias Eglhofer's" showed. As he emphasized not only the need for sustainable tourism development, but he also vouched for doing research which acknowledges that reciprocal relationships exist between tourism and other areas of social life. Most prominently, Mr. Eglhofer's interest is rooted in an interest towards both directions of effects of tourism and climate change. On the one hand, how (much) climate change affects winter tourism and, on the other hand, how (much) tourism affects climate change. From my perspective, this research interest is an example of approaches ever more needed in order to investigate and understand complex phenomena like climate change and tourism. Because they are not only singularized entities without relation to other spheres of technoscience, on the contrary, they are embedded in contexts and influenced by surrounding circumstances.

Following the quote by Weaver, and in line with the arguments made above, it is necessary to underline that tourism not only has effects on the environment, but it also profoundly impacts economic, social, and cultural spheres. While some might envision tourism as a simple traveling from people to a different place than they are usually in (and back), phenomena around tourism often have multiple, complex, sometimes even contradictory or paradoxical sources, meanings, and effects. Nevertheless, tourists - as the main elements of tourism - can be distinguished from other means of moving from one place to another by looking at the variables of purpose, time, and space (Weaver, 2020, p. 2). Although there exist mixtures and overlaps between different categories, tourists in most cases are unlike migrants, work related travelers, or diplomatic or military travelers (Weaver, 2020, p. 2). These different groups of people and their varying means of mobility can, nonetheless, be seen as entangled. Not only do some people end, extend, limit, change or diversify their means of traveling and staying, but there are also the current paradigms of mobility in general which play a role in this. Therefore, we can also speak of a broader "sustainable mobilities" paradigm (Moscardo et al., 2013 as in Weaver, 2020, p. 2).

Scholars who have investigated issues around tourism have also been interested in ontologies (for ontologies in STS see: van Heur et al., 2013). The question that comes forward in such approaches is: How exactly can we know about tourism and its phenomena? This includes many different aspects, ranging from people to things and from animals to places. Some even say that “tourism need not merely cater to the paying client, but that it must also welcome untidy guests” (Veijola et al., 2014, p. 2). But who and what are these untidy guests? In Veijola and co-authors’ words these are “the ones who give an unexpected twist to the social citation [circumstances] we live in, as well as the human condition in general, and who, ultimately, make life worth living and the world liveable” (2014, p. 2). This emphasis on the untidiness of the guests, metaphorically, also speaks to the hosts perceiving their role. Whereas usually hosts are seen as having to keep the places in which tourists stay clean, tidy and neat, Veijola and co-authors argue that “untidy hosts who live their lives instead of becoming the animators of it, turning invisible at the sight of a guest” should be accepted and possibly even enhanced (2014, p. 2).

In the case of the controversy around the glacier marriage project, I argue that the concept of untidy hosts can be attributed to at least the following actors. First, some of the hosts seem to apply this sort of perspective on their activities. With this I mean, for instance, it can happen that locals disappear from the skiing pistes when most tourists are there in the main season and only use “their” mountains in the off-season when it is not so crowded. This hints to questions around who mountains belong to actually? Second, when being in the Ötztal and Pitztal I could sense a certain vibe (Watson, 2025) which was ambivalent in terms of the “welcoming” of guests. I mean with this argument that I did not feel very welcomed by certain actors, persons and institutions when approaching them, or even when just being around. This atmospheric context matters in terms of what is mentioned above through the term of untidy guests. In my view, I could be perceived as an untidy guest because I had a certain agenda indeed. And third, I guess that the opponents of the glacier marriage project, like the citizens’ initiative or some NGOs, through their positions and arguments in the controversy maintain to a certain degree a picture of untidy hosts. Because they do not act in favor of the progress and development of touristic offers, but they actually oppose them.

While this dichotomy at first sight seems to be odd and, furthermore, not in the common understandings of the desires of both tourists and hosts, it nevertheless points to the fact that tourism is not a tidy business. Not in its goals, means, ways, and effects. If people speak of sustainable tourism, the question remains for whom and what it is sustainable. Is it sustainable for a local or even national economy? Is it sustainable for the social cohesion of a village, town, city or country? Is it sustainable in terms of environmental aspects or its CO2 emissions? In the glacier marriage controversy, the questions above seem to be critical for understanding different actors’ positions and arguments. The term *sustainable* was oftentimes used by the

actors I talked to, however, with very different meanings. For example, Mr. Elias Eglhofer critiqued how climate arguments are used, arguing that the expanding of ski areas at high altitudes is not necessarily worse for the climate than lower-altitude expansions. This understanding of sustainability concentrates on CO₂ emissions and the impact tourism has on climate change. Very different, though, argued “the analyst - Mrs. Susanne Maier” who criticized the glacier marriage project leaders’ idea of doing something sustainably. Namely, she pointed to purely economic and business management aspects which, to her, seem ubiquitous among railway operators in the Ötztal and Pitztal, but also in Tyrol more generally. At the same time, she acknowledges that the skiing industry is developing strategies for sustainability, yet, in her perspective, these are solely strategic in order to appear as “green”. Other ideas of sustainability included nature-preservation, social aspects or also generational justice, meaning to care for sustainable living conditions for the next generations.

Questions around sustainability are often latently subsumed, but indeed need to be investigated, argued for and proved. Because despite tourism’s beneficial aspects for certain actors, others might be well forgotten or left out of the equation. This brings me to the point of differentiation between visibility and invisibility (Star & Strauss, 1999). Whereas some things, people, work, or infrastructures are clearly visible, labeled as such and categorized in certain ways, others are left behind, made invisible or not accounted for. These sorts of issues speak to the point that there exist many aspects of touristic phenomena which are not only understudied, but they also go beyond what is visible to us. The sheer quantitative amount and extent of tourism make it almost impossible to measure, calculate and follow every tourist or touristic flow. Therefore, Weaver (2020) speaks of “an evolving pan-global “tourisystem” characterised by its complexity, holism, variability, ubiquity, concentration of direct effects, and massification” (p. 14). This means looking at tourism in all its different facets, on different levels, and with different outcomes. “Tourism influences everything and everyone and understanding basic differences in kind and magnitude between domestic and international, or stayover and excursionist tourists is critical towards achieving sustainable tourism outcomes that will be as environmentally, socially and economically beneficial as possible.” (Weaver, 2020, pp. 17-18)

But what do sustainable tourism outcomes really mean? Is that the case when everything is done to ensure the visitors’ expectations and the longevity of an economic project or business? Or is it when “[...] preparing spaces, places and locations to be as shiny, comprehensible and visitable as possible for anyone coming by”? (Veijola et al., 2014, p. 3)

The multiple, often contradicting ideas of sustainable tourism prevalent in my analysis shed light onto the fact that words, terms and concepts matter, but, at the same time, it is important to thoroughly question what is really meant by them. Hence, I argue for more research on the term sustainable tourism itself, for example through linguistic or material-semiotic approaches.

Because this sort of research could illuminate how different understandings of sustainability also affect visions of the future.

6.2 (Regional and local) sociotechnical imaginaries: visions for better futures?

As one of my theoretical lenses to look at the case of the glacier marriage controversy was the notion of sociotechnical imaginaries, I now dive a bit deeper into what my results show in this regard. While sociotechnical imaginaries are oftentimes deployed as a lens through which to look at national or beyond-national settings and cases in comparative ways, I deliberately chose to approach a regional phenomenon with it, the case of the controversy around the glacier marriage project. Following Jasanoff and Kim (2009; 2015), this notion allows researchers to get a glimpse of how visions of the future are shaped. They can either be desirable or worth attaining or, on the contrary, build a focal point to individually and collectively work against. It does not matter, however, if the common vision of people pursuing such a sociotechnical imaginary is concerning societal or environmental issues. Nevertheless, nation-building and large-scale technological projects are usual suspects when the notion of sociotechnical imaginaries comes into play. In my research, though, I made use of it in a very different way, namely, to investigate the local and regional issue of the glacier marriage controversy. Although I do not look at a coherent community, collective, nation or imagined community (Anderson, 1991 [1983]) to be investigated in the case of the Ötztal and Pitztal valleys, I argue that it is exactly the fitting context to deploy the notion of sociotechnical imaginaries. Not only is it here where technoscientific and political orders are co-produced at different scales, but it is particularly valuable to understand how local and regional moldings of these matter. In the case of the glacier marriage controversy, my argument is still grounded in the idea that “to imagine futures is a crucial constitutive element in social and political life” (Jasanoff & Kim, 2009, p. 122).

However, for the particular case in a rural area of Austrian Tyrol, I see both similar patterns and contradictions to what Ulrike Felt called an “[...] imaginary of the absent” (Felt, 2015, p. 104). When it comes to Austria’s and Austrians’ relations to science and technology, research has shown that a strive for innovation and technological development, particularly with regard to specific technologies, might be objected to and rejected in Austria (Felt, 2015). With my research, I would like to suggest that this phenomenon could not only differ from technology to technology (Felt, Fochler & Winkler, 2008), but, importantly, that it can also make a difference at what scale researchers look at it. Whether the national level is taken as a sphere of co-production or a small entity like a local controversy, makes a difference.

Sociotechnical imaginaries, so my argument goes, have regional or even smaller equivalents or smaller entities which not only feed into national sociotechnical imaginaries or identities, but they can, paradoxically, also contradict a larger, for instance, national imaginary. I would like to use the case of the glacier marriage controversy in the Ötztal and Pitztal valleys in Tyrol, Austria, as an empirical example where the framework of “a national identity, a specific kind of “Austrianness”” is actually partially contradicted by local sociotechnical imaginaries (Felt, 2015, p. 104). From my point of view, this is the case in two very different ways. First, the specific Austrian idea of “keeping a set of technologies out of the national territory and becoming distinctive as a nation precisely by refusing to embrace them”, is counteracted by the embracing of a specific set of technologies, namely that of skiing infrastructure (Felt, 2015, p. 104). This set of technoscience is spread widely across the country and it is also a desired vision by some actors in the case of the glacier marriage project in Tyrol. However, and second, the argument goes even further by acknowledging that within the counteracting, regional and local sociotechnical imaginary there exist multiple, oftentimes contradicting visions, or sociotechnical imaginaries, of what a desired future should look like. Hence, my argument goes, sociotechnical imaginaries are at play on both national and local level, depending on the context sometimes with contradicting or paradoxical visions. But, importantly, the specific kind of “Austrianness” to prohibit certain technologies does not apply to skiing infrastructure, which is embraced, as long as it seems beneficial. This brings me back to questions evolving around the beneficiaries of projects like the glacier marriage. And who decides what vision of the future is good or bad, better or worse?

6.3 Mundane technologies: “low-tech” skiing infrastructure in rural areas?

It has also become clear to me that a central concern of STS has been part of my research. Yet, in very different ways than expected. The use or non-use of technologies was already mentioned above, but in what follows, I want to elaborate further on the types and sets of technologies my research was interested in. While public media has always shown interest in “disruptive” technologies and groundbreaking innovations, much STS research has focused on large-scale technoscience, infrastructures and technological disasters, but also the very mundane technologies of everyday life. I think that the results of my research allow me to contribute to some of these STS interests and conclusions. For example, through my research engagement with the possible implementation or rejection of technologies involved in the glacier marriage project, such as snow producing machines or gondolas but also other rather mundane machines like excavators and construction site vehicles, I could observe how technology is interwoven and entangled with the social and also the environmental. These

machines are not just human vehicles, and they are not neutral, rather they are essential actors in what shapes the controversy around the glacier marriage project in the Ötztal and Pitztal.

Another argument often made is that, in contrast to public media, STS research has, rightly, criticized the suddenness, unstopability and irreversibility that is often associated with and conveyed by disasters or catastrophes (Fortun et al. 2017; Knowles, 2020). My research, I argue, contributes to this line of thought by illuminating the various ways in which actors in the controversy around the glacier marriage project speak and feel about the planned merger. While there is no literal formulation of disaster or catastrophe prevalent in the material I gathered, still I found some hints to people experiencing a slow disaster taking place. For some actors, the glacier marriage project is one step further in the destruction of “untouched” nature, while for others it is the symbol of economic thinking and acting in capitalism. This suggests the increased need for STS inspired research on slow disasters and more or less debatable infrastructure to illuminate experiences, perceptions and feelings of various actors affected by such projects. Because “infrastructure is not a neutral background” it indeed has implications for peoples’ lives and other actors like glaciers, flora, fauna and furthermore (Slota & Bowker, 2017, p. 530). Additionally, my results enable a close look into the processes, deliberations and temporalities that are prevalent in “unbuilt or unfinished” infrastructure, such as the glacier marriage project (Carse & Kneas, 2019, p. 9). In Carse’ and Kneas’ heuristic, I argue that the glacier marriage project can be attributed to at least two categories. First, it is, for now, a shadow history (path not taken) because the project is currently on hold (Carse & Kneas, 2019). Nevertheless, through my research I carved out that there are already social consequences which resulted from the project being thought of, discussed and initiated. And second, in my sense, the infrastructure already built into and onto the mountains and valleys of the Ötztal and the Pitztal can be seen as present absences (what is left behind) (Carse & Kneas, 2019). This is due to the fact that the infrastructure already built leaves its traces in the landscape and in humans’ lives, while sometimes not used (anymore). For instance, the many construction sites on the slopes and at the gondola stations which disappear in winter when there is snow on them but remain visible in summer when the landscape is highly characterized by this sort of infrastructure.

Another fascinating facet of my research was the mundane technologies which STS is genuinely interested in (Latour, 1993; Michael, 2000). In the light of Andrew Denning’s (2014) arguments on the history and contemporary state of ski tourism in the Alps, my results contribute to further elaboration on the technologies in use where ski tourism is carried out. Not only did I discuss skiing infrastructure like gondolas, slopes, piste machines and so forth, but I also touched upon the use of artificial snow making and other more or less mundane technologies, such as snow farming. Additionally, technologies around energy and water

management play a pivotal role in skiing areas like the Ötztal and Pitztal valleys in Tyrol. Historically, and how Denning showed, ski tourism could only exist and thrive where snow fell in the right places at the right times. However, with “[t]he technological manipulation and, eventually, production of snow [...]” which are also carried out in the glacier marriage areas, the dependency of ski tourism on snow is limited to minimum thresholds (Denning, 2014, p. 96). These technoscientific advancements led the way to a ski tourism existing almost independent of nature, weather and climate. But the *almost* is very important here. Because artificial snow making can only function at low levels of temperature, climate change and increasing temperatures also play a role in this. And the question remains at what costs the snow is produced? Energy consumption and economic investments have to be considered as well as aesthetic landscape values and the destruction of flora and fauna for such mundane technologies. The overarching goal is to save and secure the future of ski tourism or, as my interviewee Elias Eglhofer put it: “a lot is being invested in this direction, one is trying to secure themselves in the best possible way” (I8).

It is also fascinating to me how historical trajectories shift in terms of the way in which ski tourism was conceived of. Like Denning (2014) described skiing before ski lifts, gondolas and slopes, it was perceived as “beneficent, natural alternative to the crass capitalism of summer Alpine tourism” (p. 83). This crass capitalism now seems on the other side of the coin. Ski tourism is now mostly discussed as capitalistic endeavor, whereas summer tourism and other components of winter tourism, like ski touring or cross-country skiing, is understood as the *sustainable* alternative to skiing. The envirotechnical system of ski tourism is composed of “the institutions, people, ideologies, technologies, and landscapes [...]” which keep ski tourism in Austria, in Tyrol and particularly in the Ötztal and Pitztal valleys to be “[...] normative” (Pritchard, 2012, p. 23). Normative meaning that (these aspects of) ski tourism are seen as standard procedure and normality, the patterns that people are used to living in. The envirotechnical scaffolding of the area suggests keeping going with and expanding on ski tourism as much as its citizens, local councils, understandings, ski infrastructure and nature debate about this. The envirotechnical regime of ski tourism which, I argue, is not only prevalent in the Ötztal and Pitztal but beyond in most of the Austrian Alps forms pathways from which it is hard to deviate.

6.4 Diverse and nuanced perspectives of and with actors: an STS approach with different vignettes and facettes

So, what can STS perspectives and research do? As John Law (2017) explored how things could be otherwise, I tried, with an explicit STS approach, to make certain things visible which otherwise would have remained invisible. Yet, it is obvious that these partial and situated

accounts of research and results could have been done differently (Haraway, 1988). What are STS researchers' tasks? For this purpose, I again borrow John Law's words:

"Though we need to remind ourselves that the world is not open and that not everything is possible, this does not mean that we cannot try, just a little, to open up and enact alternative and better possibilities." (Law, 2017, p. 49)

Alternative and better possibilities should be opened up and even enacted. I think that the ways in which I did my research and the results that came to the fore through my analysis do allow me to contribute to an STS understanding of environmental controversies and, more broadly, the world we live in. In the controversy around the glacier marriage, opposing actors' values and visions - or sociotechnical imaginaries - of the future clashed. While I was not able to carve out every single perspective of the controversy, I am still confident that the pathways I took on in my research led to results of opening up complexity in a stuck or even deadlock situation.

STS research can help us in illuminating various (world)views and in exploring nuanced understandings of technoscientific issues. The possibilities we gain through this are comprised of the expertise we gain through investigating (together with) our research participants, but we also insert our very own views, positionality and knowledges into the process. This, for instance, means that we critically engage with our own knowledge and situatedness and how expertise is distributed among different actors, including ourselves. While we often strive for disinterestedness and impartiality when it comes to expertise, STS research and scholarship has shown that this is a problematic approach and we should indeed be aware of the relational, social and performative nature of expertise (Grundmann, 2017; Evans & Collins, 2008). Reiner Grundmann lines out how expertise is thought of from an often-prevalent perspective when writing:

"Definitions of expertise usually revolve around the specialist craft or knowledge a person is said to possess. An often-used synonym is specialist. The opposite of an expert or specialist is an amateur, or a layperson (the term lay expert in this sense is an oxymoron)." (Grundmann, 2017, p. 26)

Furthermore, experts or specialists are often associated with certain roles, jobs or scientific positions and, additionally, they are said to even have moral virtue, for instance, the aforementioned "disinterestedness or impartiality" (Grundmann, 2017, p. 26). Why is this important to note? From my point of view, the terms expert and expertise cannot be researched, critiqued and critically engaged with enough. Because the ones who carry out or

exercise expertise usually are the ones who possess power, or vice versa. As the saying goes, knowledge is power, but it also needs to be initiated, maintained and made stable (Rodríguez García, 2001).

“However, expertise is essentially something delivered at the request of someone else who wants it. This makes expertise relational in a double sense: it relates to clients and it relates to their needs, which often is the need for guidance in decision-making.” (Grundmann, 2017, p. 26)

Grundmann interestingly is citing sociologists Marx, Durkheim and Simmel here and arguing that science and society have a key incommensurability when it comes to solving issues. And this has to do with temporalities, again. Grundmann writes:

“Society cannot wait until its problems are solved scientifically; it must decide which course of action to take.” (Grundmann, 2017, p. 28)

7 Conclusion

This thesis explored how different actors imagine the future of ski tourism in the Ötztal and Pitztal valleys in light of the “glacier marriage” controversy. The findings show that while actors take very different positions, these positions are often nuanced and shaped by intersecting concerns about economy, identity, nature, climate and community. These diverse perspectives are not fixed or binary (like I thought at the beginning of this research) but fluid, ambivalent, and entangled. Actors do not merely argue for or against the project, however they imagine distinct futures. Some are driven by economic security and regional tradition (“keep on going”), others advocating for more balanced or “sustainable” development (“keep it but make it more sustainable”) and still others rejecting further expansion entirely (“keep it out”). These imaginaries reflect what Jasanoff and Kim (2009) call sociotechnical imaginaries, visions of desirable futures that are collectively held and institutionally stabilized.

In my case of the controversy around the glacier marriage project, they are deeply shaped by local identities, past experiences with tourism and hopes or fears about environmental and economic change. Across all positions, actors employ narratives that weave together memories, values, technical claims and emotional framings. Some interviewees, for instance, expressed longing for a “purer” past or emphasized intergenerational responsibility. Others rationalized support for the merger through claims of resilience, job creation and modernization. These narratives also reveal distinct temporal orientations, certain engagements with temporalities. While some actors speak with urgency (e.g. climate collapse), others advocate patience, continuity or strategic adaptation. The controversy thus plays out not only across space but across different understandings of time. This also has to do with what is urgent, what is lasting and what must be preserved or changed.

A key theme emerging from the analysis is the role of expertise. The different actors mobilize scientific, technical, economic or local knowledges to legitimize their positions. But these knowledges are not neutral. As Jasanoff (2004) argues, science and society are co-produced. They both shape and are shaped by political cultures, institutions and imaginations. In this controversy, technoscientific knowledge is performative, I argue. It not only informs decisions but constitutes what is thinkable, negotiable or excluded. Who gets to speak as an expert and who is excluded becomes a matter of power. Some local actors felt ignored or tokenized, while institutional voices (e.g., tourism boards, consultants, political authorities) appeared more frequently in public discourse. As Grundmann (2017, p. 26) notes, expertise is relational: “Experts mediate between the production of knowledge and its application; they define and interpret situations; and they set priorities for action.” Yet, in post-modern societies, the role of intellectuals and experts has shifted: “In modern societies, the role of intellectual is akin to the legislator, whereas in post-modern societies intellectuals are more like interpreters,” and “post-

modern societies deny intellectuals the role of all-knowing, guiding and leading figures” (Grundmann, 2017, p. 29). This shift is visible in the glacier marriage controversy, where expertise is contested, and legitimacy often depends more on perceived fairness and resonance than formal credentials. While the controversy is grounded in local experience, it also raises regional and systemic questions. The current framing - focused narrowly on the Ötztal and Pitztal - may obscure the need for strategic spatial planning that evaluates tourism development on a broader, more integrated scale. Regulating expansion based on long-term environmental and economic sustainability, rather than local political pressure or short-term profit, might be necessary. This approach shifts the debate from a binary “yes or no” to the glacier merger, toward questions of where, how, and under what conditions development should occur. Here, the controversy touches on wider debates about planetary complexity.

Ulrike Felt has pointed to emerging issues such as microplastics on and in glaciers - recently covered in both scientific and popular media - as examples of environmental entanglements that defy easy solutions (Felt, 2025). Like the glacier marriage, these issues reveal the limits of linear planning and the need for reflexive governance that acknowledges uncertainty, interdependence, and the shifting nature of evidence and value. This thesis was conducted using short-term ethnography, photographs, and semi-structured online interviews. Inspired by Marcus’s (1995) multi-sited ethnography, it also adopted elements of multi-sided ethnography as defined by Phoenix (2025). Rather than merely tracing different locations, this approach explored how the controversy itself is composed of interrelated “sides”, each with their own logics, emotions, and networks. As Phoenix argues: “multi-sided ethnographies provide insight into how controversies are enacted, their heterogeneities, and how relations between sides shape interwoven identities. This methodology has the potential to help sides to empathize with one another, re-make relations and potentially re-make the controversy going forward. Through this lens, the glacier marriage becomes not only a conflict, but a potential site for relational reconfiguration. In line with Anna Tsing’s (2004) concept of friction, the controversy is also a point of encounter - between global logics (climate science, tourism economies), national identity (Austrian “ski culture”), and local lifeworlds. These frictions are not failures of consensus, but productive spaces where different worlds meet, clash, and sometimes transform.

Ultimately, this thesis is an STS-informed attempt to make visible what is otherwise invisible. Not only the controversies, but the values, knowledges, and temporalities entangled within them. It shows how technoscientific controversies are not only about facts or technologies, but about futures, identities, and worlds in the making. In studying such controversies, we also study ourselves. How we choose to live, govern, and imagine together. Following John Law (2017), the role of STS is not to prescribe answers but to “open up and enact alternative and better possibilities.” By examining this Alpine controversy through STS lenses, this thesis

contributes not only to understanding a specific development project, but to a broader inquiry: how can we reimagine development, expertise, and environmental care in the face of entangled crises and contested futures?

8 Epilogue

“Nur an dem, was einer nicht sagt, sollte er stets festhalten.” (Enzensberger, 2013)

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“The only thing you should always hold on to is what you don't say.” (Translation by author)

9 Bibliography

- Adam, B., & Groves, C. (2007). *Future matters: Action, knowledge, ethics*. Brill.
- Adorno, T. W. (2003). *Can one live after Auschwitz? A philosophical reader* (R. Livingstone et al., Trans.; R. Tiedemann, Ed.). Stanford University Press. (Original lectures and essays delivered 1965–1969)
- Amt der Tiroler Landesregierung. (2023). *Übersichtskarte Bundesland Tirol* [PDF]. https://www.tirol.gv.at/fileadmin/themen/arbeitswirtschaft/arbeitsmarktfoerderung/downloads/ZIP-Dateien/UEbersicht/Landkarte_MAP_EB_Tirol_Uebersicht.pdf
- Anderson, Benedict (1983/1991). *Imagined Communities: Reflections on the Origins and Spread of Nationalism*. London: Verso.
- Aranda-Cuéllar, P., López-Morales, J. M., & Such-Devesa, M. J. (2021). Winter tourism dependence: A cyclical and cointegration analysis. Case study for the Alps. *Tourism Economics: The Business and Finance of Tourism and Recreation*, 27(7), 1540–1560. <https://doi.org/10.1177/1354816620932007>
- Armiero, M., & De Angelis, M. (2017). Anthropocene: Victims, Narrators, and Revolutionaries. *The South Atlantic Quarterly*, 116(2), 345–362. <https://doi.org/10.1215/00382876-3829445>
- Bätzing, W. (2005). *Bildatlas Alpen: eine Kulturlandschaft im Portrait*. Wiss. Buchges.
- Bätzing, W. (2015). *Die Alpen: Geschichte und Zukunft einer europäischen Kulturlandschaft*. CH Beck.
- Bätzing, W. (2017). *Zwischen Wildnis und Freizeitpark: Eine Streitschrift zur Zukunft der Alpen*. Rotpunktverlag.
- Beck, G., & Kropp, C. (2011). Infrastructures of risk: a mapping approach towards controversies on risks. *Journal of Risk Research*, 14(1), 1–16. <https://doi.org/10.1080/13669877.2010.505348>
- Bender, O., Borsdorf, A., Fischer, A., & Stötter, H. (2011). Mountains under climate and global change conditions—research results in the Alps. *Climate Change—Geophysical Foundations and Ecological Effects*, 403–22.
- Berthoud, Gerald (1972). From Pleasantry to Capitalism: The Meaning of Ownership in the Swiss Alps. *Anthropological Quarterly* 45(3): 177–195. Special Issue: Dynamics of Ownership in the Circum-Alpine Area.
- Boykoff, M. T. (2011). *Who speaks for the climate?: making sense of media reporting on climate change*. Cambridge University Press.
- Brüggemann, M., & Engesser, S. (2017). Beyond false balance: How interpretive journalism shapes media coverage of climate change. *Global Environmental Change*, 42, 58–67. <https://doi.org/10.1016/j.gloenvcha.2016.11.004>
- Buckingham, S., & Turner, M. (Eds.). (2008). *Understanding environmental issues*. Sage.

- Callon, M. (1986). Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. In J. Law (Eds.) *Power, Action and Belief. A New Sociology of Knowledge* (pp. 196-233). London: Routledge & Kegan Paul.
- Carey, M., Jackson, M., Antonello, A., & Rushing, J. (2016). Glaciers, gender, and science: A feminist glaciology framework for global environmental change research. *Progress in Human Geography*, 40(6), 770–793.
<https://doi.org/10.1177/0309132515623368>
- Carse, A., & Kneas, D. (2019). Unbuilt and Unfinished. *Environment and Society*, 10(1), 9–28. <https://doi.org/10.3167/ares.2019.100102>
- Charmaz, K. (2006). *Constructing grounded theory : a practical guide through qualitative analysis* (1. publ.). SAGE.
- Chen, N. N. (2015). Ten. Consuming Biotechnology: Genetically Modified Rice in China. In S. Jasanoff & S.-H. Kim (Eds.) *Dreamscapes of Modernity* (pp. 219-232). Chicago: Chicago University Press.
- Clarke, G. K. C. (1987). A short history of scientific investigations on glaciers. *Journal of Glaciology*, 33(S1), 4–24. <https://doi.org/10.3189/S0022143000215785>
- Cole, J. W., & Wolf, E. R. (1974). *The Hidden Frontier: Ecology and Ethnicity in an Alpine Valley*, Berkeley.
- Collins, H. M., & Evans, R. (2007). *Rethinking expertise*. University of Chicago Press.
- Cordner, A. (2015). Strategic Science Translation and Environmental Controversies. *Science, Technology, & Human Values*, 40(6), 915–938.
<https://doi.org/10.1177/0162243915584164>
- Cronon, W. (1996). The Trouble with Wilderness; Or, Getting Back to the Wrong Nature. *Environmental History*, 1(1), 7–28. <https://doi.org/10.2307/3985059>
- Cruikshank, J. (2001). Glaciers and climate change; perspectives from oral tradition. *Arctic*, 54(4), 377–393. <https://doi.org/10.14430/arctic795>
- de Laet, M., & Mol, A. (2000). The Zimbabwe Bush Pump: Mechanics of a Fluid Technology. *Social Studies of Science*, 30(2), 225–263.
<https://doi.org/10.1177/030631200030002002>
- Denning, A. (2014a). From Sublime Landscapes to “White Gold”: How Skiing Transformed the Alps after 1930. *Environmental History*, 19(1), 78–108.
<https://doi.org/10.1093/envhis/emt105>
- Denning, A. (2014b). *Skiing into Modernity: A Cultural and Environmental History* (Vol. 3). University of California Press.
- Davies, J. (2016). *The Birth of the Anthropocene*. University of California Press.
- Davies, S. R. (2024). *Science Societies: Resources for Life in a Technoscientific World* (First edition.). Bristol University Press.

- Delamont, S. (2007). Ethnography and participant observation. In C. Seale, G. Gobo, J. F. Gubrium, & D. Silverman (Eds.), *Qualitative research practice* (pp. 205–217). SAGE Publications Ltd., <https://doi.org/10.4135/9781848608191.d19>
- Derrida, J. (1986). *Of grammatology* (Johns Hopkins paperbacks ed., 7. [print.]). Johns Hopkins Univ. Press.
- Elzinga, A., & Jamison, A. (1995). Changing Policy Agendas in Science and Technology. In S. Jasanoff, G. E. Markle, J. C. Petersen, & T. Pinch (Eds.), *Handbook of Science and Technology Studies* (pp. 572–597). Thousand Oaks, CA: SAGE.
- Enzensberger, H. M. (2013). *Herrn Zetts Betrachtungen, oder Brosamen, die er fallen ließ, aufgelesen von seinen Zuhörern*. Suhrkamp Verlag.
- Evans, R. & Harry Collins, H. (2008). Expertise: From Attribute to Attribution and Back Again?. In Hackett, E. J., Lynch, M. E., Amsterdamska, O., & Wajcman, J. (Ed.). In *The Handbook of Science and Technology Studies*. MIT Press.
- Falk, M. (2009). Are multi-resort ski conglomerates more efficient? *Journal of Organizational Behavior*, 30(8), 529–538. <https://doi.org/10.1002/mde.1470>
- Falkenberg, R., & Fochler, M. (2024). Innovation in Technology Instead of Thinking? Assetization and Its Epistemic Consequences in Academia. *Science, Technology, & Human Values*, 49(1), 105–130. <https://doi.org/10.1177/01622439221140003>
- Felt, U. (2015). Keeping Technologies Out: Sociotechnical Imaginaries and the Formation of Austria's technopolitical identity. In S. Jasanoff & S.-H. Kim (Eds.), *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power* (pp. 103–125). Chicago: Chicago University Press.
- Felt, U., & Davies, S. R. (Eds.). (2020). *Exploring science communication: A science and technology studies approach*. London: Sage.
- Felt, U., & Fochler, M. (2008). The bottom-up meanings of the concept of public participation in science and technology. *Science & Public Policy*, 35(7), 489–499. <https://doi.org/10.3152/030234208X329086>
- Felt, U., Fochler, M., & Winkler, P. (2009). Coming to Terms with Biomedical Technologies in Different Technopolitical Cultures: A Comparative Analysis of Focus Groups on Organ Transplantation and Genetic Testing in Austria, France, and the Netherlands. *Science, Technology, & Human Values*, 35(4), 525–553. <https://doi.org/10.1177/0162243909345839> (Original work published 2010)
- Felt, U., Fochler, M., & Winkler, P. (2010). Coming to Terms with Biomedical Technologies in Different Technopolitical Cultures: A Comparative Analysis of Focus Groups on Organ Transplantation and Genetic Testing in Austria, France, and the Netherlands. *Science, Technology, & Human Values*, 35(4), 525–553. <https://doi.org/10.1177/0162243909345839>
- Felt, U., & Müller, R. (2011). Tentative (id)entities: On technopolitical cultures and the experiencing of genetic testing. *BioSocieties*, 6(3), 342–363. <https://doi.org/10.1057/biosoc.2011.5>

- Felt, U. (2025). Residues that matter: Why innovation societies need to rethink their responseability. *Proceedings of the Paris Institute for Advanced Study*.
<https://doi.org/10.5281/zenodo.15827925>
- Feyerabend, P. K. (1999). *Knowledge, science and relativism* (Vol. 3). Cambridge University Press.
- Fischer, A., Olefs, M., & Abermann, J. (2011). Glaciers, snow and ski tourism in Austria's changing climate. *Annals of Glaciology*, 52(58), 89-96.
- Fleck, L. (1979 [1935]). *Genesis and development of a scientific fact*. Chicago/London: University of Chicago Press.
- Foucault, M. (1972). *The archaeology of knowledge* (A. M. Sheridan Smith, Trans.). Pantheon Books. (Original work published 1969)
- Fortun, Kim, Scott Gabriel Knowles, Vivian Choi, Paul Jobin, Miwao Matsumoto, Pedro de la Torre, Max Liboiron & Luis Felipe Rosado Murillo. (2017). Researching Disaster from an STS Perspective. In U. Felt, R. Fouché, C. A. Miller, & L. Smith-Doerr (Eds.), *The Handbook of Science and Technology Studies*. Fourth edition (pp. 1003-1028). Cambridge, Mass.: MIT Press.
- Franklin, S. (2003). Re-thinking nature—culture: Anthropology and the new genetics. *Anthropological Theory*, 3(1), 65–85.
<https://doi.org/10.1177/14634996030003001752>
- Gagné, K., Rasmussen, M. B., & Orlove, B. (2014). Glaciers and society; attributions, perceptions, and valuations. *Wiley Interdisciplinary Reviews. Climate Change*, 5(6), 793–808. <https://doi.org/10.1002/wcc.315>
- Glenna, L. L. (2010). Value-Laden Technocratic Management and Environmental Conflicts: The Case of the New York City Watershed Controversy. *Science, Technology, & Human Values*, 35(1), 81–112. <https://doi.org/10.1177/0162243909340268>
- Greenhough, B. (2014). More-than-human geographies. In *The SAGE Handbook of Human Geography: Two Volume Set* (pp. 94–119).
<https://doi.org/10.4135/9781446247617.n5>
- Grundmann, R. (2017). The Problem of Expertise in Knowledge Societies. *Minerva (London)*, 55(1), 25–48. <https://doi.org/10.1007/s11024-016-9308-7>
- Hajer, M. (1995). *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford: Clarendon.
- Hanna, P. (2012). Using internet technologies (such as Skype) as a research medium: A research note. *Qualitative Research*, 12(2), 239–242.
<https://doi.org/10.1177/1468794111426607>
- Harding, S. G. (1991). *Whose Science? Whose Knowledge?: Thinking from Women's Lives* (1st ed.). Cornell University Press.

- Harding, S. G. (2008). *Sciences from below: Feminisms, postcolonialities, and modernities*. Duke University Press.
- Hartl, L., Helfricht, K., Stocker-Waldhuber, M., Seiser, B., & Fischer, A. (2022). Classifying disequilibrium of small mountain glaciers from patterns of surface elevation change distributions. *Journal of Glaciology*, 68(268), 253–268. <https://doi.org/10.1017/jog.2021.90>
- Haraway, D. (1988). Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, 14(3), 575–599. <https://doi.org/10.2307/3178066>
- Haraway D (1997) *Modest_Witness @ Second_Millennium. FemaleMan Meets_OncoMouse*. New York: Routledge.
- Haraway, D. (2003). *The Companion Species Manifesto: Dogs, People, and Significant Otherness*. Chicago: Prickly Paradigm Press.
- Haraway, D. (2008). *When Species Meet*. Minneapolis: University of Minnesota Press.
- Hecht, G. (2001) Technology, politics, and national identity in France. In: M.T. Allen and G. Hecht (eds.) *Technologies of Power*. Cambridge: MIT Press, pp. 253–293.
- Hess, D. J. (1997). *Science studies: An advanced introduction*. NYU press.
- Holstein, J. A., & Gubrium, J. F. (1995). *The active interview*. Sage.
- Holt, A. (2010). Using the telephone for narrative interviewing: A research note. *Qualitative Research*, 10(1), 113–121. <https://doi.org/10.1177/1468794109348686>
- Horvath, A., Thomassen, B., & Wydra, H. (Eds.). (2015). *Breaking boundaries: Varieties of liminality*. Berghahn Books.
- Jasanoff, S. (2004). *States of knowledge: The co-production of science and the social order*. Routledge.
- Jasanoff, S. (2005) *Designs on Nature: Science and Democracy in Europe and the United States*. Princeton, NJ: Princeton University Press.
- Jasanoff, S., & Kim, S.-H. (2009). Containing the atom: Sociotechnical imaginaries and nuclear power in the United States and South Korea. *Minerva*, 47(2), 119–146. <https://doi.org/10.1007/s11024-009-9124-4>
- Jasanoff, S., & Kim, S.-H. (2015). *Dreamscapes of modernity: Sociotechnical imaginaries and the fabrication of power*. University of Chicago Press.
- Jenkins, N., Ritchie, L., & Quinn, S. (2021). From reflection to diffraction: Exploring the use of vignettes within post-humanist and multi-species research. *Qualitative Research*, 21(6), 975–989. <https://doi.org/10.1177/1468794120920258>
- Jensen, E. A., & Laurie, C. (2016). *Doing real research : a practical guide to social research*. Sage.

- Johler, Reinhard (2002). Is There an Alpine Identity? Some Ethnological Observations. In: B. Baskar and I. Weber (Eds.), *MESS – Mediterranean Ethnological Summer School*, Vol. 4 (Piran/Pirano, Slovenia 1999 and 2000). Ljubljana, University of Ljubljana, 101–113.
- Kinchy, A., & Schaffer, G. (2018). Disclosure Conflicts: Crude Oil Trains, Fracking Chemicals, and the Politics of Transparency. *Science, Technology, & Human Values*, 43(6), 1011–1038. <https://doi.org/10.1177/0162243918768024>
- Kirksey, S. E., & Helmreich, S. (2010). THE EMERGENCE OF MULTISPECIES ETHNOGRAPHY. *Cultural Anthropology*, 25(4), 545–576. <https://doi.org/10.1111/j.1548-1360.2010.01069.x>
- Kleinman, D. L., Suryanarayanan, S., McGoey, L., & Gross, M. (2015). Ignorance and industry: Agrichemicals and honey bee deaths. In *Routledge International Handbook of Ignorance Studies* (1st ed., pp. 183–191). Routledge. <https://doi.org/10.4324/9781315867762-22>
- Knoblauch, H. (2021). Reflexive Methodology and the Empirical Theory of Science. *Historical Social Research*, 46(2), 59–79. <https://doi.org/10.12759/hsr.46.2021.2.59-79>
- Knowles, S. G. (2020). Slow Disaster in the Anthropocene: A Historian Witnesses Climate Change on the Korean Peninsula. *Daedalus (Cambridge, Mass.)*, 149(4), 192–206. https://doi.org/10.1162/daed_a_01827
- Lambrecht, A., & Kuhn, M. (2007). Glacier changes in the Austrian Alps during the last three decades, derived from the new Austrian glacier inventory. *Annals of Glaciology*, 46, 177–184.
- Lamont, M., & Molnár, V. (2002). The study of boundaries in the social sciences. *Annual review of sociology*, 28(1), 167–195.
- Latimer, J., & Miele, M. (2013). Naturecultures? Science, Affect and the Non-human. *Theory, Culture & Society*, 30(7–8), 5–31. <https://doi.org/10.1177/0263276413502088>
- Latour, B. (1993). *We have never been modern* (1. publ.). Harvester Wheatsheaf.
- Latour, B. (2007). *Reassembling the social : an introduction to actor-network-theory* (1. published in paperback). Oxford University Press.
- Law, J. (2002). Objects and Spaces. *Theory, Culture & Society*, 19(5–6), 91–105. <https://doi.org/10.1177/026327602761899165>
- Law, J. (2017). STS as Method. In U. Felt, R. Fouché, C. A. Miller, & L. Smith-Doerr (Eds.), *The Handbook of Science and Technology Studies. Fourth edition* (pp. 31–57). Cambridge, Mass.: MIT Press.
- Law, J., & Urry, J. (2004). Enacting the social. *Economy and Society*, 33(3), 390–410. <https://doi.org/10.1080/0308514042000225716>
- Levenda, A. M., Richter, J., Miller, T., & Fisher, E. (2019). Regional sociotechnical imaginaries and the governance of energy innovations. *Futures: The Journal of*

- Policy, Planning and Futures Studies*, 109, 181–191.
<https://doi.org/10.1016/j.futures.2018.03.001>
- Lippert, I., & Mewes, J. S. (2021). Data, Methods and Writing: Methodographies of STS Ethnographic Collaboration in Practice. *Science & Technology Studies*, 34(3), 2–16.
<https://doi.org/10.23987/sts.110597>
- Luckman, B. H., Wiegandt, E., & Orlove, B. S. (2008). Darkening peaks: glacier retreat, science, and society. Univ of California Press.
- Lupton, D. (2014). *Digital sociology*. Routledge.
- Lupton, D. (2023). *Doing fieldwork in a digital age: Sociological methods in the online environment*. Routledge.
- Macnaghten, P., Davies, S. R., & Kearnes, M. (2019). Understanding Public Responses to Emerging Technologies: A Narrative Approach. *Journal of Environmental Policy & Planning*, 21(5), 504–518. <https://doi.org/10.1080/1523908X.2015.1053110>
- Malinowski, Bronislaw. (1922/2001). Argonauten des westlichen Pazifik. Eschborn: Klotz.
- Mandel, E. (1975). *Late capitalism* (J. de Bres, Trans.). Verso. (Original work published 1972)
- Marcus, G. E. (1995). *Ethnography in/of the world system: The emergence of multi-sited ethnography*. *Annual Review of Anthropology*, 24, 95–117.
<https://doi.org/10.1146/annurev.an.24.100195.000523>
- Marres, N. (2015). Why map issues? On controversy analysis as a digital method. *Science, Technology, & Human Values*, 40(5), 655–686.
<https://doi.org/10.1177/0162243915574602>
- Marres, N., & Lezaun, J. (2011). Materials and devices of the public: an introduction. *Economy and Society*, 40(4), 489–509.
<https://doi.org/10.1080/03085147.2011.602293>
- Martin, B., & Richards, E. (1995). Scientific Knowledge, Controversy, and Public Decision Making. In S. Jasanoff, G. E. Markle, J. C. Petersen, & T. Pinch (Eds.), *Handbook of Science and Technology Studies* (pp. 506–526). Thousand Oaks, CA: SAGE.
- Mueller, S. M. (2019). Hidden Externalities: The Globalization of Hazardous Waste. *Business History Review*, 93(1), 51–74.
<https://doi.org/10.1017/S0007680519000357>
- Meixner, W., & Siegl, G. (2010). Historisches zum Thema Gletscher, Gletschervorfeld und Obergurgl. In Eva-Maria Koch & Brigitta Erschbaumer (Eds.): *Glaziale und periglaziale Lebensräume im Raum Obergurgl*. Innsbruck: Innsbruck University Press. (pp. 13–29).
- Michael, M. (2000). *Reconnecting Culture, Technology and Nature: From society to heterogeneity* (1st ed.). Routledge. <https://doi.org/10.4324/9780203135334>

- Michael, M. (2017). 'Classical' Actor-Network Theory. In *Actor-Network Theory: Trials, Trails and Translations* (pp. 28–51). SAGE Publications Ltd.
<https://doi.org/10.4135/9781473983045.n3>
- Nelkin, D. (1995). Science Controversies: The Dynamics of Public Disputes in the United States. In S. Jasanoff, G. E. Markle, J. C. Petersen, & T. Pinch (Eds.), *Handbook of Science and Technology Studies* (pp. 444–456). Thousand Oaks, CA: SAGE.
- Oliffe, J. L., Kelly, M. T., Gonzalez Montaner, G., & Yu Ko, W. F. (2021). Zoom Interviews: Benefits and Concessions. *International Journal of Qualitative Methods*, 20, 16094069211053522. <https://doi.org/10.1177/16094069211053522>
- Paulus, T. M., Lester, J. N., & Dempster, P. G. (2016). *Digital tools for qualitative research*. SAGE.
- Phoenix, J. (2025). How can we do ethnographic research in a controversy? Lessons and reflections from a multi-sided ethnography of badger culling and bovine Tuberculosis. *Qualitative Research : QR*, 25(1), 90–109.
<https://doi.org/10.1177/14687941241234287>
- Pink, S., & Morgan, J. (2013). Short-term ethnography: Intense routes to knowing. *Symbolic Interaction*, 36(3), 351–361. <https://doi.org/10.1002/symb.66>
- Pollack, H. (2010). *A world without ice*. Penguin.
- Pritchard, S. B. (2011). *Confluence*. Harvard University Press.
- Pritchard, S. B. (2012). An envirotechnical disaster: Nature, technology, and politics at Fukushima. *Environmental History*, 17(2), 219–243.
<https://doi.org/10.1093/envhis/ems021>
- Plesner, U. (2011). Studying Sideways: Displacing the Problem of Power in Research Interviews With Sociologists and Journalists. *Qualitative Inquiry*, 17(6), 471–482.
<https://doi.org/10.1177/1077800411409871>
- Rivas, C. (2018). Finding themes in qualitative data. In C. Seale (ed.), *Researching Society and Culture* (pp. 431–453). London: Sage.
- Rodriguez Garcia, J. (2001). Scientia potestas est — knowledge is power: Francis Bacon to Michel Foucault. *Neohelicon (Budapest)*, 28(1), 109–122.
<https://doi.org/10.1023/A:1011901104984>
- Rudaz, Gilles (2009). Stewards of the Mountains. The Poetics and Politics of Local Knowledge in the Valaisan Alps. In: D. Cosgrove & V. della Dora (Eds.), *High Places. Cultural Geographies of Mountains, Ice and Science*. London, New York: I.B. Tauris, 147–161.
- Schikowitz, A., Dessewffy, E., Davies, S. R., Pham, B.-C., Gregory, K., Goldberg, E., Avkiran, A., & Gámez, F. M. (2025). Writing Choreographies: (STS) Knowledge Production in Post-digital Academia. *Tecnoscienza – Italian Journal of Science & Technology Studies*, 16(1), 65–85. <https://doi.org/10.6092/issn.2038-3460/18169>
- Schirpke, U., Altzinger, A., Leitinger, G., & Tasser, E. (2019). Change from agricultural to touristic use: Effects on the aesthetic value of landscapes over the last 150 years.

Landscape and Urban Planning, 187, 23–35.
<https://doi.org/10.1016/j.landurbplan.2019.03.004>

- Silverman, D. (2006). *Interpreting qualitative data: Methods for analyzing talk, text and interaction* (3rd ed.). Sage.
- Sismondo, S. (2010). *An introduction to science and technology studies* (Vol. 1). Chichester: Wiley-Blackwell.
- Slota, S. C., & Bowker, G. C. (2017): How Infrastructures Matter. In Felt U., Fouché R., Miller C.A. & Smith-Doerr L., *The Handbook of Science and Technology Studies* (pp. 529-554). The MIT Press.
- Star, S.L. (1991) Power, technologies and the phenomenology of conventions: On being allergic to onions. In: J. Law (ed.) *A Sociology of Monsters? Essays on Power, Technology and Domination*. London: Routledge, pp. 26–56.
- Star, S. L., & Strauss, A. (1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. *Computer Supported Cooperative Work*, 8(1–2), 9–30.
<https://doi.org/10.1023/A:1008651105359>
- Stotten, R. (2020). Tourismuseinwirkungen auf zwei Dörfer mit unterschiedlichen Entwicklungspfaden: Vent und Obergurgl (Tirol). *Jahrbuch für Geschichte des ländlichen Raumes*, 17, 116-132.
- Tauber, E., & Zinn, D. L. (2023). Malinowski and the Alps: An Elusive Historical-Ethnographic Footprint: Introduction. In *Malinowski and the Alps: Anthropological and Historical Perspectives* (pp. 1-11). Bozen-Bolzano University Press.
- Tomás, L., & Bidet, O. (2024). Conducting qualitative interviews via VoIP technologies: reflections on rapport, technology, digital exclusion, and ethics. *International Journal of Social Research Methodology*, 27(3), 275–287.
<https://doi.org/10.1080/13645579.2023.2183007>
- Trier-Bieniek, A. (2012). Framing the telephone interview as a participant-centred tool for qualitative research: a methodological discussion. *Qualitative Research : QR*, 12(6), 630–644. <https://doi.org/10.1177/1468794112439005>
- Tsing, A. L. (2015). *The Mushroom at the End of the World*. In *The Mushroom at the End of the World*. Princeton University Press.
- van Heur, B., Leydesdorff, L., & Wyatt, S. (2013). Turning to ontology in STS? Turning to STS through ‘ontology.’ *Social Studies of Science*, 43(3), 341–362.
<https://doi.org/10.1177/0306312712458144>
- Varga, Lucie (1936/2006). In an Alpine Valley. Translated into English by George Huppert 2006. *The Journal of the Historical Society* 5(2): 251-274.
- Veijola, S., Molz, J. G., Pyyhtinen, O., Höckert, E., & Grit, A. (2014). Introduction: Alternative tourism ontologies. In *Disruptive tourism and its untidy guests: Alternative ontologies for future hospitalities* (pp. 1-18). London: Palgrave Macmillan UK.

- Venturini, T. (2010). Diving in magma: how to explore controversies with actor-network theory. *Public Understanding of Science (Bristol, England)*, 19(3), 258–273. <https://doi.org/10.1177/0963662509102694>
- Warren, C. A. B. (2012). Interviewing as Social Interaction. In J. F. Gubrium, J. A. Holstein, A. B. Marvasti, & K. D. McKinney (Eds.), *The Sage Handbook of Interview Research. The Complexity of the Craft* (pp. 129-142). London: Sage.
- Watson, A. (2025). Vibes-based methods. *Qualitative Research : QR*. <https://doi.org/10.1177/14687941241308707>
- Weaver, D. B. (2020). *Advanced introduction to sustainable tourism*. Edward Elgar Publishing.
- Weaver, D. B., & Lawton, L. J. (2014). *Tourism management* (5th ed.). John Wiley & Sons.
- Weber, M. (2002). *Economy and society: An outline of interpretive sociology* (G. Roth & C. Wittich, Eds.; Original work published 1922). University of California Press.
- Wolf, Eric R. (1962). Cultural dissonance in the Italian Alps. *Comparative Studies in Society and History* 5(1): 1-14.
- Wynne, B. (2007). Public Participation in Science and Technology: Performing and Obscuring a Political–conceptual Category Mistake. *East Asian Science, Technology and Society*, 1(1), 99–110. <https://doi.org/10.1215/s12280-007-9004-7>
- Wynne, B. (1995) Public understanding of science. In: S. Jasanoff, G.E. Markle, G.C. Petersen and T.J. Pinch (eds.) *Handbook of Science and Technology Studies*. Thousand Oaks, CA; London; New Delhi, India: Sage, pp. 361–388.

10 Other sources

- Herzog, C. (2019, November 5). Neue Grafiken zeigen die gewaltigen Ausmaße des Megaprojekts Pitztal-Ötztal—WWF fordert Stopp der Gletscher-Verbauung. *WWF Österreich*. Retrieved September 27, 2025, from <https://www.wwf.at/neue-grafiken-zeigen-die-gewaltigen-ausmasse-des-megaprojekts-pitztal-oetztal-wwf-fordert-stopp-der-gletscher-verbauung/>
- Hinterramskogler, D. (2021). Many of Austria's glaciers are melting faster. Retrieved September 27, 2025, from <https://www.oeaw.ac.at/en/news/many-of-austrias-glaciers-are-melting-faster>
- Willim, C. (2020, August 28). *Ski-Verbindung Pitztal/Ötztal: Umstrittene Gletscherehe wackelt*. Retrieved September 27, 2025, from <https://kurier.at/chronik/oesterreich/ski-verbundung-pitztal-oetztal-umstrittene-gletscherehe-wackelt/401014895>
- Gasser, H. (2019). *Zusammenschluss Ötztal-Pitztal—Wenn nur Größe zählt*. Süddeutsche.de. Retrieved September 27, 2025, from <https://www.sueddeutsche.de/reise/tourismus-winter-pitztal-oetztal-skifahren-1.4688614>
- Hruby, D. (2020, December 23). *In the Alps, ski resorts are desperately battling climate change—And local resistance*. Environment. Retrieved September 27, 2025, from <https://www.nationalgeographic.com/environment/article/alps-ski-resorts-desperately-battling-climate-change-local-resistance>
- Huber, I. (2021). *Umstrittene Gletscherehe*. oe1.orf.at. Retrieved September 27, 2025, from <https://oe1.orf.at/artikel/678917/Umstrittene-Gletscherehe>
- Pitztal-Ötztal. (2021). 7 gute Gründe. Pitztal-Ötztal Projektgesellschaft. Retrieved July 2, 2021, from <https://pitztal-oetztal.at>
- Pitztal-Ötztal. (2021). Aktuelle Beiträge. Pitztal-Ötztal Projektgesellschaft. Retrieved July 2, 2021, from <https://pitztal-oetztal.at>
- Petition gegen die geplante Gletscherberbauung Pitztal—Ötztal*. (n.d.). Retrieved September 27, 2025, from <https://www.alpenverein.at/innsbruck/Naturschutz/aktuelles/petition-zur-Gletscherverbauung-Oetztal-Pitztal-2019.php>
- Schuldsprüche in Prozess um Volksbefragung zu Tiroler “Gletscherehe.”* (2023, October 3). Retrieved September 27, 2025, from <https://kurier.at/chronik/oesterreich/gericht-schuldspruch-prozess-urteil-tirol-gletscherehe/402617880>
- tirol.ORF.at. (2022, July 17). *Knappe Abfuhr im Pitztal für Gletscherehe—Tirol.ORF.at*. Retrieved September 27, 2025, from <https://tirol.orf.at/stories/3165231/>
- tirol.ORF.at. (2023, February 17). *Statt Gletscherehe neue Ausbaupläne*. tirol.ORF.at. Retrieved September 27, 2025, from <https://tirol.orf.at/stories/3195074/>
- tirol.ORF.at. (2024, October 3). *Strafreduktion bei Gletscherehe-Prozess*. tirol.ORF.at. Retrieved September 27, 2025, from <https://tirol.orf.at/stories/3275788/>

11 Annex

Original quotes

Original quotes, i.e., those that are depicted in block quotes:

1. „Genau, und da ist die Frage, kann man diese Entwicklung in die Zukunft prognostizieren? Bleibt es so wie es die letzten 30, 40 Jahre war? Und da würd ich sehr deutlich sagen, nein es bleibt auf keinen Fall so. Dass es so weiter geht wie bisher, ist extrem unwahrscheinlich.“ (Maximilian Müller, p. 57)
2. „Und ich bin prinzipiell der Meinung, dass unsere heutige Wirtschaft und Gesellschaft dermaßen überkomplex ist und dermaßen unüberschaubar geworden ist, dass kleine Störungen sich schnell zu großen Katastrophen aufschaukeln können. Und das gesamte System stören können.“ (Maximilian Müller, p. 60)
3. „Also die Situation im Pitztal, denke ich, ist eine schwierige Situation. Das Pitztal profitiert wenig vom Tourismus. Die großen Versprechungen, die mit dem Massentourismus gemacht worden sind damals beim Bau der Pitztaler Gletscherbahn, sind eigentlich in dieser Form nicht eingetreten. Die Versprechungen, die gemacht werden, mit Ausbau und sowas sind nicht eingetreten und die neuen Versprechungen, dass das Tal aufblühen sollte mit dieser sogenannten Gletscherehe werden genauso wenig eintreffen wie die früheren Versprechungen.“ (Maximilian Müller, p. 60)
4. „C: Ok ja jetzt haben Sie es schon angesprochen, die geplante Gletscherehe von den Regionen im Ötztal und im Pitztal. Das ist genau das Forschungsinteresse, mit dem ich mich beschäftigen will. Also wie schauen Zukunftsvisionen in diesen beiden Tälern aus und wie gestaltet sich die Kontroverse darüber?
M: Ja die sagen ja immer, da wird dieses Pitztal davon profitieren. Das sehe ich nicht so. Ich habe das Gefühl, in erster Linie profitiert das Ötztal. Das Ötztal ist leicht erreichbar, da sind die großen Infrastrukturen, das hat das große Image. Das Pitztal ist Anhängsel. Zudem ist es halt immer wieder lawinengefährdet, was die Erreichbarkeit betrifft. Ich habe die Befürchtung, dass das Pitztal dann dadurch erst recht abgehängt wird.“ (Maximilian Müller, p. 61)
5. „Wobei meine Meinung ist, mir haben im hinteren Ötztal mehr als 100 3000er. Mir haben 50 Gletscher, wenn nicht noch mehr. Also wenn da zwei, drei in Mitleidenschaft

gezogen werden, dann hätt ich nicht so große Probleme damit. [...] Wobei ich glaube, dass da nicht so viel mehr hin gemacht wird, wenn mans behutsam angeht.“ (Felix Forsch, p. 64)

6. „Also das ist amal sicher werbetechnisch, weil es gibt natürlich schon was her, wenn man hinausposaunen kann, dass ma mitunter das größte Skigebiet in den Alpen sind. Das ist amal auf jeden Fall eine Sonderstellung. [...] Weil einfach noch mehr geboten wird.“ (Felix Forsch, p. 65)
7. „C: Das klingt super interessant. Was ich vielleicht wo ich vielleicht noch kurz nachhaken würde, ist die Frage, wie schätzen Sie das ein, oder wir würden Sie das beschreiben, die generelle gesellschaftliche Diskussion in Bezug auf den Plan, die beiden Skigebiete zu fusionieren?
F: Ja wie soll ich sagen? Das ist bissl also von Ötztaler Seite wird das größtenteils für sehr gutgeheißen. Also auf unserer Seite passiert ja im Grunde genommen so viel wie nix. Es kommt ein Tunnel und eine Bahn, das ist ja auf engstem Raum. Wenn man da oben am Berg steht, da sieht man auf der rechten Seite das Pitztal und links sind wir. Also wir haben da nicht wirklich große Angst, dass da viel zerstört oder wir sehen die breite Menge eigentlich sehr positiv.“ (Felix Forsch, pp. 65-66)
8. „Es nützt nichts, wenn die Vorschläge, die da kommen, halt so quasi sanften Tourismus. Wir haben einen relativ sanften Tourismus in Vent, gehört zu Sölden dazu. Nur von dem kann ich nicht 20.000 Betten füllen mit Schneeschuhwanderer.“ (Felix Forsch, p. 66)
9. „Und von Seiten der Politik wird natürlich alles versucht zu verhindern. Weil das Ötztal hat sowieso schon alles, denen gehts eh schon zu gut. Und die Pitztaler, denen helf ma halt, aber möglichst eingeschränkt. Hab ich so immer das Gefühl.“ (Felix Forsch, p. 67)
10. „Vermute ich, also natürlich, also wenn man ganz scharf nachdenkt, vielleicht dann findet man was. Aber dann hat man in der Vergangenheit alles falsch gemacht (C lacht). Wir haben Sachen falsch gemacht, aber der größte Teil ist, dass wirs gut gemacht haben.“ (Felix Forsch, p. 68)
11. „Zu der Expertise, die haben eben die beiden Auftraggeber, das Skigebiet im Pitztal und in Sölden, getätigt. Die zuständigen Behörden sind immer von Anfang an mit

involviert gewesen. Und denen haben wir das auch mehrfach präsentiert. Und da war ich auch immer anwesend und hab natürlich auch versucht, positive Stimmung zu machen. Grundsätzlich durch die extrem gute Aufbereitung von der Planungsfirma, die da gearbeitet hat, sind die Entscheidungen natürlich leichtgefallen. Also des ist wirklich sehr gut gemacht worden. Alle Fragen und alle Ängste konnten da eigentlich größtenteils entkräftet werden. Und die Entscheidung war nicht so wirklich schwierig, aus meiner Sicht. [...]

C: Verstehe verstehe. Sie hams ja vorher schon gesagt, Sie haben ja auch Fakten und Experten zu Rate gezogen, auch in dem Prozess. War das von Anfang an so geplant? Also waren die sozusagen am Anfang in der Überlegung, die beiden Skigebiete zu fusionieren, gibts ja schon relativ lange, waren Sie dann am Anfang auch schon mit Expertinnen und Experten und so weiter in Kontakt oder wie ist des gelaufen?

F: Wenn ich des so rückblickend verfolge, dann war des vor 30 Jahren einfach eine Vision. Da glaube ich nicht, dass das so genau durchforstet und vorgearbeitet worden ist. Aber einmal die letzten 15 Jahre, da waren von vornherein Experten und Sachverständige und Gutachter mit involviert. Es ist aufbereitet, ich weiß jetzt nicht genau, wie viele 100 Seiten, aber ich glaub sogar 1000 Seiten, da müsst ma dann bei den Bergbahnen nachfragen. Nicht nur aus unserer Sicht, sondern aus allgemeiner Sicht.“ (Felix Forsch, pp. 68-69)

12. „Also wir haben Gottlob eine wunderschöne Natur, die wir im Sommer wie im Winter nutzen können. Und natürlich tunlichst vermeiden, davon irgendwas zu opfern. Also wir haben sicher nicht vor, am eigenen Ast zu sägen. Also es wird unheimlich viel in Landschaftspflege, Instandhaltung und der gleichen investiert. Also die Hauptaufgabe für uns ist die Zukunft abzusichern. Und da glaube ich würde ein Zusammenschluss schon dazu beitragen. Zum einen könnten wir vielleicht die Wertschöpfung erhöhen, die Qualität würde glaube ich nochmal steigern. Ja und die Klimaerwärmung können wir nicht aufhalten. Aber aufgrund dass wir das ja mitbekommen, hat man halt die Chance, dass man in 30 Jahren oder in 20, wenn herunter nichts mehr geht, zumindest in die Höhe an Gletscher ausweichen können. Ich glaub schon, dass des unter dem Titel Absicherung der Zukunft, nachdem wir ja wirklich keine Industrie, keine Kleinindustrie, nichts anderes zu bieten haben, dass das schon eine wichtige Absicherung darstellen würde.“ (Felix Forsch, p. 69)

13. „Und das sagt mir so, dass trotz allen Unkenrufen, dass der Skisport so extrem teuer ist, was ja stimmt, die Menschen schon bereit sind, Geld auszugeben, wenn das

Angebot stimmt und ihre Leidenschaft erreicht wird. Also ich sehe da nicht wirklich große Zukunftsängste.“ (Felix Forsch, p. 69)

14. „Wir haben zudem viele Möglichkeiten, das noch zu verbessern. Wir arbeiten mit tollen Hotels, mit Apartments, Jobs, Gastronomie. Also das ist alles sehr gut in Schuss. Und das glaube ich ist, neben der Sicherheit, die wir ja auch versuchen, zu vermitteln, buchungsentscheidend. [...] Nur die allgemeinen Erkenntnisse mit Klimaerwärmung und und und sprechen eben vielleicht ein bisschen eine andere Sprache. Dass man vielleicht doch nicht so groß arbeiten sollte. Des ist aber meine persönliche Meinung. Selbst wenn wir Mitgesellschaftler sind unsere Familie bei den Bahnen, da hüte ich mich, Ratschläge zu erteilen. Es gibt Leute, die sich ausschließlich damit beschäftigen und die machen einen guten Job. Also die werden schon wissen, was sie tun.“ (Felix Forsch, p. 70)
15. „Meine persönliche Geschichte dazu ist, ich hab natürlich dieses Projekt Gletscherehe verfolgt von Anfang an. Und hab zunächst einmal das gar nicht so kritisch gesehen, weil ja die Luftlinie relativ nahe beisammen liegen. Ich kenn die Gegend einigermaßen. Man siehst sogar, man hat Sichtverbindung. Und ich hab mir gedacht, ja das ist eigentlich jetzt nicht so schlimm.“ (Paul Popper, p. 72)
16. „Weil es gibt traditionellerweise eine sehr enge Verbindung in Tirol zwischen der Landesregierung einerseits und den Seilbahnbetreibern andererseits. [...] Und das wollen wir ändern.“ (Paul Popper, p. 74)
17. „Des is sehr leicht zu beantworten, man muss sich nur die Frage stellen, wer bezahlt diese Experten? Und des sind die Betreiber. Die sind schon Experten, die sich nach außen hin als unabhängig darstellen, aber natürlich, wer zahlt, schafft an. Und es ist halt so, dass ein Gutachten fast immer, wenn nicht immer, die Handschrift des Auftraggebers trägt. [...] Aber die Experten, wie gesagt, die sind natürlich im Sold der Betreiber, des muss man ganz offen sagen und man kann natürlich immer Dinge so oder so darstellen, den Maßstab ein bisschen verändern oder ein bisschen verharmlosen, [...]“ (Paul Popper, pp. 75)
18. „Ich habe ein paar Mal schon das Zitat verwendet, mir kommt das vor wie ein Totentanz. Man weiß zwar das es zu Ende geht, aber jetzt geben wir noch einmal richtig Gas. Und das wollen wir nicht. Das wollen wir auch den Jungen nicht antun. Ich

meine, ich bin jetzt in einer Altersklasse, wo mich das nur mehr marginal betrifft, aber wir haben Kinder.“ (Paul Popper, p. 75)

19. „Das Pitztal hätte aus meiner Sicht die Chance, einen anderen Tourismusweg zu gehen, und des Ötztal is schon in dieser Schiene drinnen, wie Ischgl auch, auf Partytourismus und halt hardcore Tourismus, auch baulich total aus dem Ruder gelaufen, es is furchtbar, was da an architektonischen Sünden in die Landschaft gesetzt wurde. Und da ist das Pitztal noch besser dran, die Pitztaler haben noch viel unverbaute Natur [...]“ (Paul Popper, p. 77)
20. „Ein qualitativ hochwertiger Tourismus gibt es auch, in Vent zum Beispiel, da ist man einen anderen Weg gegangen, da hat man nicht diese Probleme, hat ein bisschen anspruchsvollere Klientel auch, da hat man nicht diese Ballermann- Probleme wie in Sölden. Und in Sölden ist es halt so, jetzt wird man den Teufel nicht mehr los, den man gerufen hat. Die Einheimischen beklagen sich auch schon über Ruhestörungen in der Nacht und da ist die Lebensqualität kaputt gegangen und auch das Familiäre, das man sonst am Land hat und schätzt. Und das kriegen immer mehr Leute mit und deswegen glaub ich, dass auch das ein Grund ist, warum man da jetzt doch einmal anfängt nachzudenken.“ (Paul Popper, p. 77)
21. „Das war zwei Wochen, glaube ich, war die so im August und ähm, und da war ich das erste Mal vor Ort und habe wirklich diese Piste gesehen und dann versteht man dieses Projekt ganz anders.“ (Susanne Maier, p. 79)
22. „Und die, Die Bahn, die die fährt, die führt quasi auf diesen Link, auf dieses Grat rauf. Und die Stützen sollen nicht auf Gletscherflächen stehen. Das wurde von Seiten der Gletscher, also der Gletscherbahnbetreiber, betont und ähm und es handelt sich da um ein ganz ähm, also um die neueste Technik. Das heißt, statt vielen Stützen, wie sie es halt früher gebaut haben, bräuchte man nur zwei Glaube also man kann wirklich den Eingriff so argumentiert halt also diese Seite wirklich minimal halten. Aber was halt eher also aus der Sicht der der anderen Seite halt problematisch ist, ist, dass die Pisten. Man kann dann auf zwei Optionen quasi abfahren und das ist halt Gletscherfläche und wenn man, wenn man da davor steht, du weißt es ja irgendwann draufschauf, dann sieht man, es sind eigentlich also die sind einfach nur noch pistentauglich, da gibt es Spalten, da muss man, das muss man ebnen, diese Flächen. Man muss natürlich beschneien. Mhm. Und es ist dann es wird dann auf dieses Joch, diese geplante Bahn soll auf dieses Joch führen und es sind wirklich nur wenige 100

Meter oder 100 Meter entfernt. Sieht man schon die Bergstation von, von Sölden vom Gletscher.“ (Susanne Maier, pp. 79-80)

23. „Was mich nämlich, was ich total interessant fand. Aber das ist jetzt nur meine Beobachtung. Ich habe eher das Gefühl, dass das Ötztal ähm eher dem Prolager zuzuordnen ist und dass es da eher dem Contra Lager und [...] ich glaube es es wir sind da irgendwie so zum Fazit gekommen, dass möglicherweise ein Grund ist, dass im Pitztal, wenn man in mit fährt, es gibt nur diese eine schmale Straße, es gibt, es ist alles sehr klein strukturiert.“ (Susanne Maier, p. 81)
24. „Also ich glaube man muss halt immer mitdenken, aus welcher, aus welcher Sicht, aus welcher Perspektive die Personen reden. Und die Geschäftsführung hat natürlich. Oder man muss sich natürlich fragen, welche Interessen verfolgt mein Gesprächspartner und logischerweise die Geschäftsführung der Pitztaler Gletscherbahnen. Für die bedeutet Nachhaltigkeit auch Profitabilität. Und wie kann ich mein Unternehmen nachhaltig in die Zukunft zu entwickeln, zu zu entwickeln oder zu führen? Muss [00:14:00] ich mir Gedanken machen über Auslastung? Was kann ich meinen Gästen bieten usw. Also von dem ich glaube Nachhaltigkeit für die Geschäftsführung der Pitztaler Gletscherbahnen ist, bedeutet etwas ganz anderes als für den Alpenverein und was ganz anderes als für den WWF. Ja, logischerweise.“ (Susanne Maier, p. 82)
25. „Und dementsprechend ähm waren bei uns immer eher die Umweltaspekte Thema an dem ganzen Projekt und aus der Perspektive hab ich das dann meistens a irgendwie halt mitkriegt, wenn eben zum Beispiel diese Sprengung dann Thema war von dem Gipfel. Ähm also von dem her, ich kann jetzt keinen klaren Zeitpunkt benennen, wann i von dem Projekt erfahren hab. Sondern des is was, des glab i irgendwie immer scho als Ansatz da war, seit ich des irgendwie seit i dort glebt hab beziehungsweise halt sowas a halt mitkriegt hab vom Alter her.“ (Magdalena Gruber, p. 85)
26. „C: Mhm mhm, jajajaja. Ähm du hast gesagt, der Eingriff in die Natur, dass ne Alm auch Eingriff in die Natur ist. Und da fänd ich sehr spannend zu hören, vielleicht wenn du das nochmal kurz erläutern könntest, wie wie man da differenziert also was sind denn gute Eingriffe in die Natur, die auch für die Natur vielleicht förderlich sind sogar oder für ein Gedeihen der Natur? Oder wie würdest du da differenzieren sozusagen? M: Ma i kanns vielleicht so sagen. Wir ham halt daham a an großen Garten mit ähm irgendwie Obstbäume und terrassiert ähm des is a Kulturlandschaft sag i mal. Aber da

ist halt irgendwie die Idee da, dass erstens wir hätten a nie einfach so an Rollrasen oder sowas auslegt, weil des is dann eigentlich tote Natur. Da kann kein Insekt mehr leben, da ist koa Biodiversität gegeben. Während, wenn ma a Trockensteinmauer baut, können da Insekten an Lebensraum finden. Und wenn ma an Obstbaum pflanzt, dann ähm können Bienen den bestäuben. Und dann kann der Nachbar, der halt irgendwie an Honig hat, dann ist des irgendwie a ähm da entsteht ein Mehrwert, wo irgendwie der Natur nid gschadet wird. Also irgendwie so dieser Aspekt, Kulturlandschaft kann durchaus a a gsunder Lebensraum sein, in dem halt Biodiversität gegeben ist.“ (Magdalena Gruber, pp. 85-86)

27. „Aber des muss halt a) immer reflektiert sein. So, schränk i dadurch irgendwie andere Arten ein, die Artenvielfalt? Und b) muss ma halt sagen, dass grad bei Skigebiete halt ganz klar die negativen Aspekte halt bekannt sind oder? Also die Bodenerosion, die dadurch halt a verstärkt wird. Ähm dass eben Tiere halt ganz stark in ihrem Lebensraum zurückgedrängt werden. Allein die Lärm- und Luftverschmutzung, die halt irgendwie dadurch auch zustande kommt, und Lichtverschmutzung. I hab halt irgendwie von meinem Kinderzimmer aus die Nachtskilauf-Strahler vom Berg runter gsehn. Wo i sag, da muss i jetzt irgendwie koa studierte Biologin sein, um zu wissen, dass des halt so dem Wild dort nid gut tun kann. Also klar, a Alm is a a Eingriff in die Natur, da hab i gmant, eben klar, Österreich ist dicht besiedelt, da gibts viel Kulturland. Aber in die Momente, wo halt der Mensch grundsätzlich a Interesse daran hat, dass die Natur bestehen bleibt, weil man mit ihr lebt, ist des halt irgendwie meistens a nachhaltigerer Umgang als wenn die Natur als Nutzfläche, also im Sinn von i will da halt auf zwa Bretter runterrutschen, Spaß haben und wieder hoamfahn, gsehn werd.“ (Magdalena Gruber, p. 87)

28. „Wobei i eben gmerkt hab, dass es da dann irgendwann einen Kipppunkt geben hat a bissl, weil einfach mehr und mehr klar worden ist, welche, ich sag amal, Schattenseiten dieser Massentourismus hat. Und irgendwie a viele bewusst worden ist, dass des mit dieser regionalen Entwicklung halt weniger Vorteile für die heimische Bevölkerung hat als man aufn ersten Blick oft moant. Und als einem halt von vielen Touristiker speziell a, des gender i jetzt bewusst ned (lacht), vermittelt wird. Da hab i halt des Gfühl ghabt, dass so speziell so ab die 2010er Jahre der Großteil der Leute, a die, die vielleicht selber a Ferienwohnung haben, gsagt haben, eigentlich reicht uns des, was wir an Tourismus haben, und des muss ned unbedingt mehr werden.“ (Magdalena Gruber, p. 88)

29. „C: Mhm mhm mhm, ja ja ja aber des hast du jetzt ganz schön beschrieben auch sozusagen die Perspektive aus Sicht des Projekts, inwiefern des Sinne machen könnte für bestimmte Personen. Was würdest du denn oder vielleicht ganz platt gefragt - wie stellst du dir denn die Zukunft des äh oder was sind deine Vorstellungen von der Zukunft des Skitourismus oder des Tourismus allgemein? Jetzt im Pitztal zum Beispiel. M: Boah des is echt was, des kann ma halt einfach nid ohne die ähm ohne unseren Umgang mit der Klimakrise denken. Also da ist halt da ist einfach halt a massiver Unterschied, ob ma die 1,5 Grad (lacht) schaffen. Oder nid. Also i würd ma scho fest wünschen, dass ma halt Winter, wie man sie halt kennt, nid komplett sag i jetzt amal halt Geschichte sind in 50 bis 100 Jahr. Ähm und dann also für mi spricht nix dagegen, dass ma versucht, an nachhaltigeren Skitourismus am Leben zu halten. Da is halt irgendwie, also i denk da a an technische Entwicklung. I denk, warum soll ma ned sich an umweltverträglicheren Skitourismus sich überlegen? Warum also i denk einfach so in die Richtung - ja, aber nachhaltiger und weiterentwickeln. Und wenn ma quasi Skigebiete neu denkt, dann nid größer und irgendwie mit no aner Gondel. Sondern dann überleg i ma, kann ma da mit erneuerbare Energien arbeiten? Ist vielleicht generell, wolln die Leut eh nid ewig mitm Lift auffefahrn? Sondern i denk da an Skitouren gehen wird immer attraktiver. Und generell halt, ich glaub einfach, dass der Winter-Tourismus sich irgendwie nomal radikal neu erfinden muss so. Und was i aber wirklich ned seh, sind neue große Eingriffe, die nid an dezidierten Mehrwert für den Klimaschutz haben. Blöd gesagt, falls irgendwer auf die Idee kommt, wie ma Liftbauten und Windräder kombinieren kann, I'm up for that so (lacht).“ (Magdalena Gruber, p. 89)
30. „C: Ähm, und was würdest du denn sagen, wo siehst du da denn Parallelen zu Pitztal oder vor allem auch Ötztal, nehme ich an? Und wo sind Unterschiede in der Herangehensweise an Skitourismus? M: Ma also was halt ganz ganz massiv auffällt, ist dass halt niemand in der Branche sich ehrlich damit auseinandersetzen will, dass halt der Skitourismus in Tirol vorm Hintergrund des Klimawandels, der Klimakrise, halt einfach ein Ablaufdatum hat. Und dass es halt eigentlich massiv unverantwortlich ist, auf die Art und Weise in die Natur einzugreifen, wenn diese Projekte in 50 Jahren vielleicht einfach nur noch Industrie-Ruinen einer anderen Art sind. Weil einfach keine Schneesicherheit mehr gegeben ist. Weil der Schnee nicht mehr liegen bleibt. Weil ma, ja, vielleicht einfach a, wir ham halt multiple Krisen. Es ist einfach nicht abschätzbar, wie sich da irgendwie die situation entwickeln wird. Und ich sag nid, dass deswegen jetzt alle Skigebiete zusperren und

man aktiv mitm Rückbau beginnen sollt. Aber irgendwie in manche Punkte halt vielleicht scho eher, als dass ma neue Skigebiete baut.“ (Magdalena Gruber, p. 90)

31. „Mhm, ja die Idee ist schon ziemlich alt eigentlich. Also es war ja in den 70er und 80er Jahren die Phase in der in Österreich die Gletscherskigebiete erschlossen wurden. Es gibt ja 8 Gletscherskigebiete, eigentlich nur noch 7, weil letztes Jahr das Gletscherskigebiet am Dachstein letztes Jahr geschlossen hat. Und in diese Phase fällt eben auch die Eröffnung des Pitztaler Gletscherskigebietes und etwas früher auch noch das Öztaler Gletscherskigebiet und zugleich hats speziell in den 80er Jahren eine politische Phase gegeben, wo ma festgestellt hat, hopala in dieser Geschwindigkeit kanns in Zukunft nicht mehr weitergehen mit den Skigebietserschließungen.“ (Jakob Jauker, p. 91)

32. C: Ja das is sehr spannend. Da haben Sie jetzt auch schon so auf die weitere gesellschaftliche Diskussion auch angesprochen, also zum Beispiel in den Medien und so. Wie, was würden Sie denn sagen, wie würden Sie denn des beschreiben? Jetzt abgesehen von der von der von der Umweltverträglichkeitsprüfung sondern eher was so von den Medien gekommen ist oder in der gesellschaftlichen Diskurs , wie würden Sie des beschreiben?

J: ja also wir waren dann schon erstaunt, dass des Medienecho speziell da 2019 rum, so groß ausfällt. Also es gibt ja des berühmte Bild vom WWF mit mittlerweile muss ma sagen wirklich berühmtes Baggerbild am eh am Pitztaler Gletscher aufgenommen, des komplett um die ganze Welt gangen isch. Also und le Monde bis was weiß ich welche Medien des alles aufgegriffen haben. Und a dann is bei uns interessant gewesen, amal zu beobachten wie auch Bullevard medien funktionieren, und wie schäbig da teilweise gearbeitet wird (lacht), i man der Effekt war dann jetzt für uns vielleicht ned so schlecht rückblickend, aber da wars so, im ursprünglichen Projekt, also bei dieser Gletscherehe, hätte für der Errichtung dieser Bergstation, eine Gratspitze am linken Fernerkogel abgetragen werden müssen, gesprengt werden, auf gut deutsch, haben sie zwar immer abgestritten, dass des gesprengt wird, aber anders gehts ned, Circa 40 Meter abtragen und halt dann des so einebnen, dass ma da de Station dann errichten kann, und so haben wirs a immer kommuniziert, es geht um diese Gratspitze, am linken Fernerkogel, die da gesprengt wird, dann war zuerst irgendwie die kleine Zeitung, die des halt aufgegriffen hat und dann is die Bild Zeitung plötzlich gekommen und getitelt, wie habens sie gschrieben, sie haben jedenfalls a Bild gebracht vom linken Fernerkogel, der linke Fernerkogel und seine drei Gletscher müssen weg, Tirol sprengt oder will Gipfel sprengen also es hat sich wirklich so glesen

als dad ma hätt ma vor, als hätten die Skigebietsbetreiber vor den ganzen Berg in die Luft jagen. Und des war teilweise tatsächlich a Falschmeldung, die von uns nie so kommuniziert wurde, also wir waren da immer korrekt, aber du hast teilweise gar ned in der Hand, was die Medien nachher anfangen mit den Informationen, und in dem Fall haben die des so formuliert, und dann war des a schon draußen, da ist dann nie a Richtigstellung gekommen, jetzt von der Bild Zeitung, die hat das nie richtig interessiert. Die haben da kurz für Empörung gesorgt und der Fall laft schon. Ja, des war wohl irgendwie interessant. Also da war sicher die Empörung in der Gesellschaft groß über solche Projekte, in dem Fall verstärkt durch a Falschmeldung, aber ich bin überzeugt, auch ohne dieser Falschmeldung wäre die Empörung da gewesen, groß gewesen. Es is ja immer no so, also wir merkens jetzt, muss i schauen, weil i ja anonymisiert bin, wenn man da die sozialen Medien verfolgt, und es wird was gepostet, speziell über Baumaßnahmen am Gletscher und so weiter also da sieht man schon, dass sich die Leute sehr stark drüber aufregen sogar über solche Maßnahmen.“ (Jakob Jauker, pp. 92-93)

33. „Also man kann ned zu schauen, wie uns da Gletscher unter den Füßen davonschwimmt und da dann trotzdem noch versuchen wollen des letzte rauszupressen und a no in unberührte Bereiche vorzudringen und dort no a BAustelle aufzustellen. Also des sehen wir afoch ned, dass des der Weg sein kann, in Anbetracht der globalen Krisen, mit denen wirs zu tun haben, a Klimakrise, a Biodiversitätskrise, da sind genau des die falschen Antworten.“ (Jakob Jauker, p. 93)
34. „Es hat dann illegalen Beginn der Bauarbeiten gegeben, bevor eine Genehmigung vorgelegen ist. Also es war ein sehr intensives Thema und ich finde, für mich hat es schon einen gewissen Zusammenhang mit dem, was dann später passiert ist. Also damals habe ich auch das Gebiet kennengelernt, sehr gut, weil ich ein paar Mal dort dann eben oben war und den Bau des Notwegs dann gesehen habe und erlebt habe, war wie es vorher nachher war. Und ja, dann, irgendwann sind dann die konkreten Projektpläne gekommen, durch das, dass eine Umweltverträglichkeitsprüfung notwendig war.“ (Noah Nadel, p. 95)
35. „Ja, danach hats dann, hab i noch wieder als eher interessierter Beobachter die Volksbefragung oder Abstimmung mitbekommen zum Projekt, das er dann auch gegeben hat, der dann knapp negativ ausgefallen ist und jetzt kriege ich am Rande wieder mit, mit meinem alten Freund habe ich einige Verbindungen weiterhin, dass ja wieder ein verändertes Projekt in Planung ist. Wie genau, weiß ich jetzt nicht, aber ja,

das ist jetzt so meine Geschichte dazu, zum Teil recht direkt involviert, dann wieder als interessierter Beobachter über die Jahre.“ (Noah Nadel, p. 95)

36. „Ja, die Wissenschaft hätte oder hat aus meiner Sicht die Aufgabe, Emotionen zu verstehen und sie nicht zu verteufeln. Das ist ganz klar, wir haben ja selber auch Emotionen. Und gleichzeitig zu versuchen, um auch die Emotionen in eine positive Richtung zu lenken, also weniger Polarisierung und mehr im gemeinschaftlichen Kontext Fakten auf den Tisch zu legen.“ (Noah Nadel, p. 96)
37. „Das heißt, wenn die Wissenschaft eben da in der Lage ist, diese Fakten aus verschiedenen Perspektiven aufzubereiten und dann eine Information liefert, die als Entscheidungsgrundlage für die Abwägung der Interessen zur Verfügung steht, dann würde ich sagen, hat sie ihre Rolle getroffen. Und das wäre meine persönliche Meinung, welche Rolle da die Wissenschaft spielen kann.“ (Noah Nadel, p. 96)
38. „Geht natürlich auch nicht für die gesamte Masse, die wieder auf auf auf Kapazitäten abhängt, aber so verschieden als eine Diversifizierung des Angebots, wo man vielleicht nicht mehr sagt, nur das schneller, größer, weiter, ist am Ende das allererfolgreichste, sondern es gibt auch verschiedene Formen, wo der Konsument dann sagt, mir ist das, mir ist diese Nachhaltigkeitskomponente besonders wichtig, mir ist diese Familienfreundlichkeit besonders wichtig, es gibts ja, es gibt diese Tendenzen jetzt schon, aber vielleicht könnte die Ausdifferenzierung noch größer werden, dass man da wirklich die Unterschiede, auch was das Ökonomische anbelangt, die Leistbarkeit, weil das ist ein Riesenthema oder.“ (Noah Nadel, pp. 97-98)
39. „Ötz und Piztal ist ganz speziell, da muss man sich die Grundsatzfrage stellen. Gibts jetzt eben einen Zusammenschluss gibt es jetzt eher keinen, Piztal will jetzt ausbauen, weil sie sich für zu klein halten. Es hat einmal den Plan gegeben, einfach nur zu überspannen, also mit dieser Gondelfahrt von A nach B, weil man da eh schon nahe beieinander ist, kann auch das was wäre, also heute diese Panorama-Fahrt durch das Hochgebirge, dass das was Reizvolles wird. Also des finde ich eben weils schon so konkret find i sehr speziell oder.“ (Noah Nadel, p. 99)
40. „I: okay, okay, des wär eh schon eine Frage die ich mir gestellt hab und zu der ich auch ein bisschen was lese zurzeit. Was heißt denn für Sie nachhaltige Entwicklung in dem in Tour- im Bezug auf Tourismus?

E: ähm, ja dass das die Entwicklung so von statten geht, dass ich mein es, der Tourismus muss sich immer wieder umorientieren, am Markt orientieren um sozusagen weiterentwickeln in welche Richtung auch immer und des sollte halt bestmöglich so gemacht werden, dass es möglichst ressourcenschonend abläuft, weil also des mit dem natürlich klassisch man darf die Ressourcen der künftigen Generationen nicht verbrauchen und so weiter, des is klar. Aber in dem Wissen, dass sich der Tourismus immer wieder ein Stück weit neu erfindet, muss ma einfach schon bedenken, die Ressourcen, die wir heute noch gar nicht nutzen im Tourismus sind auch wertvoll fürn Tourismus weil sie leicht unsere zukünftigen Ressourcen sein werden im Tourismus, ja, also ma soll nicht nur auf die Ressourcen schauen, die der Tourismus heute brauchst, und ma bei denen sagt, ma muss mit denen pfleglich umgehen, sondern dass ma potentielle Ressourcen, die noch gar nicht genutzt werden, auch erhält, weil wirs eben des des eben a Potential für die Zukunft des Tourismus, weil wir wissen dass der sich doch immer wieder verändert“ (Elias Eglhofer, p. 101)

- 41: „C: ja, jetzt beschäftigen Sie sich auch mit äh wie Sie vorher gesagt haben, mit den Auswirkungen des Klimawandels und auch den, ja sie haben gesagt beidseitig richtig? Also sowohl die Auswirkung des Klimawandels auf den Tourismus, als auch die Auswirkung des Tourismus auf den Klimawandel, wenn ichs richtig verstanden hab. Könnten Sie vielleicht kurz da drauf eingehen, wie die Situation da in Tirol aussieht? Ich weiß jetzt nicht ob sie genau im Ötztal, Pitztal, ob Sie da genaue Daten haben oder wie Sie des einschätzen

E: ich glaub jein, ich hab mal so eine Schneesicherheitsmodellierung für ganz Österreich, für jedes Skigebiet gemacht, also so die Frage, kann ich künftig noch beschneien, bin ich noch in der Lage eine gewisse Saisonlänge anzubieten und da sehn ma halt je weiter wir in die Zukunft schauen und je je je schärfer je negativer des Klimaszenario is, des Emissionsszenario is, je mehr Emissionen wir haben, desto weniger Skigebiete werden schneesicher. Also da sind ma Mitte des Jahrhundert bei ungefähr 80 Prozent der österreichischen Skigebiete, des is noch relativ viel, mit der Beschneigung aber und mit der Annahme, jedes Skigebiet kann so viel beschneien wies im Modell vorgesehen is, also ich hab unlimitiert Wasser zu Verfügung, finanzielle Ressourcen, Strom etc.

C: Okay

E: also schon ne recht optimistische Sichtweise, aber rein technisch gesehen kann man sagen könnte man noch 80 Prozent der Skigebiete noch schneesicher halten, des würd sich dann gegen Ende des Jahrhunderts auf ein Drittel bis zwei Drittel der

Skigebiete reduzieren je nachdem welches Klimaszenario ich jetzt anschau. Und du meinst jetzt generelle Entwicklung, wenn man aufs Ötztal-Pitztal schaut, muss man sagen, je höher ich hinaufgehe, desto weniger wird einen der Klimawandel betreffen, zumindest wenns um die Frage geht, bin ich in der Lage eine vernünftige Skisaison anzubieten. Des wird auch Ende des Jahrhundert dort noch möglich sein. ? muss man sagen, die sehr hochgelegenen, die hochalpinen, die Gletschergebiete, sind die am besten geeignet Rückzugsorte angesehen für den Skitourismus Richtung Ende des Jahrhunderts. Was da allerdings noch nicht mitgedacht ist bei dieser Frage ist die Thematik von auftauenden Permafrost, von sich zurückziehenden Gletscherflächen, weil sich dort die Landschaft in den letzten Jahren und in den nächsten sehr stark verändert hat und verändern wird. Des ist dann eine andere Fragestellung, die jetzt in meiner Vorstellung keine Rolle spielt, die aber bei der Frage, ist es wirklich geeignet dort auszubauen, dann wiederum schon eine Rolle spielt.“ (Elias Eglhofer, pp. 102-103)

42: „E: und aus heutiger Sicht vom Aufwand her schwer in großen Stile denkbar, wobei wir genau das Argument hatten auch vor 30 Jahren bei der Beschneidung. Da hat es auch gheißt, wir werden nur die Talabfahrt, nur die neuralgischen Stellen beschneiden. Man wird nur die Fläche beschneiden, viel zu teuer. Und das ist genau das, was wir heute machen. Wir beschneiden nur noch Fläche und nicht einzelne Punkte. Und abgesehen davon wären halt nötige Entwicklungen, dass man versucht, sich ein ein ein stabiles Sommerstandbein zu schaffen. Wenn ich jetzt auf die Destination schaue, dann versuchen das eigentlich eh schon alle Destinationen, behaupte ich jetzt mal in Österreich, manche erfolgreicher als andere.“ (Elias Eglhofer, p. 104)

43: „E: aber von dem her gesehen, auch was das Projekt jetzt betrifft. Ich bin ähm auch von [name] gefragt worden, ob ich ned Zeit da einen Vortrag zu machen in der Thematik und ich hatte keine Zeit an dem Termin, und hab ihm aber auch gleich gsagt, ich muss dir gleich sagen, wenn du mich einlädst dann präsentier ich meine Ergebnisse, und des heißt aus klimatologischer Sicht sind das genau Gebiete wo man noch Skitourismus machen kann, also wenns irgendwo noch Sinn macht, dann dort. Du musst dir überlegen, ob du diese Aussage bei deiner Veranstaltung haben willst. So, des so eine bissl, also rein aus Klimasicht musst ma sagen, wenn ausbauen, dann genau dort.

C: Okay

E: dann immer wo anders rückbauen und des quasi, daraus ein Schutzgebiet machen zum Beispiel oder halt Renaturierung

C: Verstehe verstehe. Des find ich auch einen sehr spannend Aspekt, weil da kommen ja dann schon so Tensions, oder so leichte Differenzen oder Ambivalenzen eigentlich hoch , wenn praktisch ihre Ergebnisse eigentlich suggerieren oder nahelegen dass man eben genau in solchen Gebieten noch Skifahren möglich machen kann und dafür in anderen Gebieten nicht. Genau, jetzt hab ich keine Frage dazu, aber ich find das einen sehr spannenden Punkt auf jeden Fall. Genau

E: deswegen, Ich hab aber bissl, ich hab aber bissl, was heißt Schwierigkeiten,ich zuck immer a bissl wenn des Argument kommt, wir dürfen Skilauf am Gletscher nicht ausbauen wegen dem Klima. Also man kann jetzt die Meinung haben des da oben is eben hochsensibel und man sollte nicht ausbauen, des für sich is a triftiges Argument, aber aus meiner Sicht hat des nichts mim Klima zu tun. Ja, also ich schade dem Klima nicht mehr, als wenn ich in Kitzbühl ausbau und

C: Ja

E: der Klimawandel schlägt deswegen auch nicht stärker, wirkt deswegen auch nicht stärker auf den Gletscher, weil jetzt da noch zusätzlich a Piste drüber geht, in der Regel. Also des zeigt ja auch die Forschung, dass des jetzt ka große Rolle spielt ob da jetzt a Piste drüber geht oder nicht

C: okay

E: deswegen hab ich mit der Argumentation a bissl meine Schwierigkeiten“ (Elias Eglhofer, p. 105)

- 44: „Und eine Frage, die ich mir schon immer wieder stelle, ist, ob es irgendeine Instanz oben drüber gehen müsste, die da regulierend wirkt. Und da bin ich selber zu Zwiegespalten. Ich komme aus der Geografie eigentlich, aus dem Berufsbereich her, und da hat man schon ein bisschen die Obendraufsicht auf überörtliche Raumplanung und so. Mit dem Gedanken, man sollte Dinge dort machen, wo sie halt am besten funktionieren. Was würde jetzt bedeuten, dass ich für einen Raum, zum Beispiel für Tirol, im Grunde mir anschau, wo kann, wo sind die bestgeeigneten Gebiete für den Tourismus und dass man dort eine andere Entwicklung zulässt, als in den Gebieten, die eben weniger gut geeignet sind.“ (Elias Eglhofer, p. 108)

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Abstract (English)

Extensive news coverage has raised public awareness in Austria and beyond of the controversy around the planned merging project of two glacier ski resorts in the Ötztal and Pitztal valleys in Tyrol, often referred to as the “glacier marriage”. At the same time, debates concerned with overtourism and big ski conglomerates are accompanied by scientific insights from research in and on the Alps, including glacial retreat as well as biodiversity and climate crisis. These considerations are contextualized by Science and Technology Studies (STS) approaches, which highlight, among other things, the importance of expertise and visions of the future in technoscientific and environmental controversies. Hence, I take a closer look at how different actors imagine the future of ski tourism in the Ötztal and Pitztal valleys in light of the controversy around the glacier marriage project. As a theoretical lens, I use the concepts of 1) sociotechnical imaginaries, 2) envirotechnical regimes and 3) technopolitical cultures to foster my perspectives on possible futures, respectively on historical trajectories and multiple presents. The empirical methods of controversy mapping and short-term ethnography, including semi-structured interviews, serve as the methodological basis for gathering data from human and non-human actors. Combining grounded theory approaches with vignettes into a fluid methodological approach for data analysis and interpretation led me to a meandering investigation of the controversy around the glacier marriage project. Thus, this approach to my research also mirrors the emergence and complexity of the controversy itself. Resulting from this empirically grounded approach, my thesis points to the fact 1) that the future of ski tourism in the Ötztal and Pitztal valleys is imagined very differently across actors. This insight is grounded in my observation that 2) arguments and imaginaries by different actors are rarely simplistic or in a pro/contra dichotomy, but rather nuanced, context-sensitive and shaped by personal positions. When it comes to knowledge and power issues, I argue that 3) expertise is strategically and selectively mobilized, however sometimes with ambivalence or caution. This is also due to the actors’ 4) different understandings of temporalities which range from historical continuity over a focus on present-day challenges to intergenerational issues, all with more or less attentiveness to uncertainties. This hints to my overall argument that 5) the controversy around the glacier marriage project in the Ötztal and Pitztal valleys thus becomes a symbolic and material site where broader questions about the future of Alpine tourism, environmental responsibility as well as regional identity and economy are negotiated, contested and enacted. My results contribute to debates in STS and beyond by fostering scientific understanding of such a contemporary technoscientific and environmental controversy. Furthermore, my thesis is an example of exploring the applicability of STS concepts in the exceptional case of the future imaginaries around ski tourism in Austria.

Abstract (Deutsch)

Umfangreiche Berichterstattung in den Medien hat das öffentliche Bewusstsein in Österreich und darüber hinaus für die Kontroverse um das geplante Fusionsprojekt zweier Gletscherskigebiete im Ötztal und Pitztal in Tirol geschärft. Dieses Projekt wird oft als „Gletscherehe“ bezeichnet. Gleichzeitig werden gesellschaftliche Debatten zu „Overtourism“ und großen Skigebiete durch wissenschaftliche Erkenntnisse aus der Forschung in den und über die Alpen ergänzt. Dazu zählt vor allem der Gletscherschwund sowie die Biodiversitäts- und Klimakrise. Diese Überlegungen werden durch Ansätze der Wissenschafts- und Technikforschung (Science and Technology Studies; im Folgenden: STS) kontextualisiert, die unter anderem die Bedeutung von Wissen und Expertise sowie Zukunftsvisionen in technowissenschaftlichen und ökologischen Kontroversen hervorheben. Daher untersuche ich in dieser wissenschaftlichen Arbeit genauer, wie verschiedene Akteure sich die Zukunft des Skitourismus im Ötztal und Pitztal angesichts der Kontroverse um das Gletscherehe-Projekt vorstellen. Aus theoretischer Sicht verwende ich die drei Konzepte 1) soziotechnische Vorstellungswelten 2) umwelttechnische Regime und 3) technopolitische Kulturen. Dies hat den Hintergrund, meine Perspektive auf mögliche Zukunftsvorstellungen beziehungsweise auch auf die Geschichte und auf multiple Gegenwarten zu schärfen. Die empirischen Methoden der Kartierung von Kontroversen und der Ethnografie, einschließlich semi-strukturierter Interviews, dienen mir hierbei als methodische Grundlage für die Datenerhebung. Durch die Kombination von Grounded-Theory-Ansätzen mit Vignetten zu einem methodisch fluiden Ansatz für die Datenanalyse und -interpretation setzte ich mich mäandernd mit der Kontroverse um die „Gletscherehe“ auseinander. Dieser Forschungsansatz spiegelt die Emergenz und Komplexität der Kontroverse selbst wider. Als Ergebnis dieses empirisch fundierten Ansatzes weist meine Arbeit darauf hin, dass 1) die verschiedenen untersuchten Akteure sich die Zukunft des Skitourismus im Ötztal und Pitztal sehr unterschiedlich vorstellen. Diese Erkenntnis basiert auf meiner Beobachtung, dass 2) die Argumente und Vorstellungen selten vereinfacht oder in einer einfachen Pro-Kontra-Dichotomie existieren, sondern vielmehr nuanciert, den Kontexten über sensitiv und von persönlichen Positionen geprägt auftreten. In Bezug auf Fragen um Wissen und Macht argumentiere ich, dass 3) Expertise strategisch und selektiv mobilisiert wird, jedoch manchmal mit Ambivalenz oder Vorsicht. Dies ist auch auf das 4) unterschiedliche Verständnis von Zeitlichkeiten zurückzuführen, das von historischer Kontinuität über eine Fokussierung auf aktuelle Herausforderungen bis hin zu generationsübergreifenden Fragen reicht. Unsicherheiten spielen jedoch in jedem Fall eine Rolle. Dies deutet auf meine Gesamtargumentation hin, dass 5) die Kontroverse um die „Gletscherehe“ im Ötztal und Pitztal zu einem symbolischen und auch materiellen Ort wird, an dem umfassende Fragen zur

Zukunft des Alpentourismus, zur Umweltverantwortung sowie zu regionaler Identität und Wirtschaft verhandelt, diskutiert und umgesetzt werden. Meine Ergebnisse tragen zu Debatten in STS und darüber hinaus bei, indem sie das wissenschaftliche Verständnis einer derart aktuellen technowissenschaftlichen und ökologischen Kontroverse fördern. Darüber hinaus ist meine Arbeit ein Beispiel für die Untersuchung der Anwendbarkeit von STS-Konzepten im spezifischen Fall der Zukunftsvorstellungen rund um den Skitourismus in Österreich.