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CLIMATE CHANGE AND DOG SLEDDING: RESILIENCE INSIGHTS FROM THE FINNMARKSLØPET

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Abstract

It is without doubt that the impacts of climate change on winter conditions are becoming increasingly visible, even in the Nordic countries. Events that rely on winter-specific features are being confronted more frequently to unstable weather, compromising the quality, safety, and consistency of these events, and even sometimes threatening their cancellation. Long-distance dog sledding races such as the Finnmarksløpet are no exception, as they rely heavily on stable snow and ice conditions, making them particularly vulnerable to the unpredictability of weather patterns. Previous research on the vulnerability of dog sledding to climate change is scarce but does exist, acknowledging that the threats towards this activity are real and that climate projections are not optimistic. For this reason, previous research has suggested the need to further explore adaptation strategies and resilience as key approaches to help dog sledding withstand upcoming environmental challenges.

Therefore, this research aims at diving into the ways that a long-distance sled dog race, the Finnmarksløpet, perceive and respond to upcoming climate-related challenges, as well as analyzing the factors influencing these responses. The main research question is the following: *How does the Finnmarksløpet community demonstrate resilience in the face of climate change?* To answer this question, a methodological approach is selected, and the empirical data collected through semi-structured interviews and observations.

The findings of the research showed that the Finnmarksløpet's resilience is currently mainly based on reactive and coping processes, which could become insufficient in the long run if climate change continues to intensify. While mid-term adaptive strategies are starting to be considered, deeper transformative changes are still largely absent from current planning, due to a combination of uncertainty about future climatic conditions, attachment to tradition, and the complex logistical and financial implications such changes would entail.

Keywords: climate change, dog sledding, resilience, *Finnmarksløpet*, event tourism, three dimensions resilience framework

Table of Contents

1. INTRODUCTION

As indicated by the title, this thesis centers on the dog sledding milieu, with a particular focus on long-distance racing. One specific event is at the heart of this study: the Finnmarksløpet, a key race in Norway that blends sport, nature, culture, and tradition. However, climatic projections for the coming decades show a rather pessimistic picture for the future of winters in Europe, including in the Nordic regions, raising concerns about its feasibility under increasingly unstable environmental conditions. Given that snow and cold weather seem to be essential for the race, it is relevant to explore how such an international, yet locally organized, event might respond, adapt, or transform in order to ensure its future.

In this first chapter, the overall layout of this master's thesis is presented, including the contextual background of the study and a review of relevant previous research. Following this, the research project itself is introduced, drawing both the research aim and the structure of the thesis.

1.1 Background of the study

Commonly known as "man's best friend," the relationship between dogs and human has been estimated to start about 18,000 to 32,000 years ago (Giemsch et al. 2013), or even far before that (Grimm 2015, p. 275). Over time, this bond has evolved significantly. Initially, dogs were domesticated for working purposes, assisting with tasks such as cattle guarding, transportation, draft or law enforcement. Today, many dogs are primarily valued as companions and pets. While their roles have diversified, some of them remain loyal to their origins (Hall et al. 2021).

This is the case for sled dogs. Dog sledding can be shortly defined as "a transport method or sport in which a dog or a team of dogs pulls a sled in snowy conditions, or a rig if there is no snow cover" (Äijälä, Jylkäs, Rajab, Vuorikari, 2020 p. 126). This practice can be dated from about 9 000 years ago thanks to evidence found in Siberia (Pitulko & Kasparov 2017, p. 491) but has witnessed some changes over the years.

Historically, dog sledding was seen as a mode of transportation for communities in remote Arctic regions. Sled dogs were valued for their reliability, endurance, and strength, which are essential qualities to operate in such climate. Their reputation spread, and sled dogs gained popularity in polar expeditions but also in more urban areas where they were used for “emergency services”. When sled dogs became less needed for practical tasks, the mushers, who are the sled drivers, started to compete and race their teams against each other’s, trying to find out who had the most endurant or powerful dogs (Knudsen, 2019). More recently, dog sledding has become part of the most famous winter tourism activity in Arctic destinations (Garcìa-Rosell & Tallberg 2021), enabling visitors to experience the feeling to be a musher for a few kilometers and exploring the unique landscapes.

Finnmark, one of Norway’s northernmost regions, has long been a central hub for dog sledding. This began with the legacy of Norwegian polar exploration and later evolved into a special role as the host of the longest sled dog race in Europe, the Finnmarksløpet. Building on those characteristics, Finnmark established for itself a niche as a recognized "dog sledding destination" (Granås, 2018; Jæger & Viken, 2014). Sled dogs lie at the heart of the region’s identity, from popular dog sledding tours for tourists to the annual race that attract both mushers and spectators alike (Jæger, 2020).

We know, however, that the world is globally facing a climate crisis and industries, including tourism and sports, are increasingly under scrutiny for their own environmental impacts but also for the impacts of climate change on the industry itself. As the effects of climate change are becoming more visible especially in the Arctic (Arctic Council n.d.), some winter-related sporting events have already shown their vulnerabilities. Indeed, numerous winter sports events, including various stages of the Ski World Cup, have faced cancellations in recent years due to insufficient snow and warm temperatures (Reuters, 2024). Some similar concerns have already been raised regarding the next Winter Olympics that will take place in Milan in 2026 (Pollina, Corvino & Greco, 2025).

The increasing visibility of climate change disruptions is undeniable. The frequency and intensity of climate-related events are expected to escalate, posing significant challenges. This

trend applies not only to fast-onset events, which are highly tangible and immediate, but also to more subtle slow-onset changes, which, though gradual, are becoming increasingly perceptible over time (Béné, Wood, Newsham & Davies, 2012, p. 25). According to the World Meteorological Organization (WMO), the impact of climate change is already more than visible on Greenland's and Antarctica's ice sheets, but also on the winters, with shortened snow seasons, reduced reliability of snowfall, melting of permafrost (WMO, 2024).

Similarly, dog sledding events like the Finnmarksløpet face challenges as warming winters make snowy conditions less predictable, and climate variability increases the difficulty of planning and executing such events. So far, the Finnmarksløpet did not face any cancellation due to weather disruptions, but other sled dog races have already been facing such issues this season. To give few examples, North American sled dog races such as the John Beargrease Marathon had to be cancelled in 2024 and was postponed in 2025 (Wisniewski, 2025), but other races such as the Yukon Quest in 2024 had to be shortened due to unsafe weather conditions (Pilkington, 2024). For the same reasons, this 2025 season in Europe has also seen few canceled races such as the Lapland Quest in Finland or the Gausdal Marathon in Norway (personal communication, March 2025).

1.2 Previous research

Research regarding the intersection between climate change and tourism events has faced increasing interest during the last decade, highlighting the vulnerability of this industry to a changing environment such as the Nordic region.

Indeed, extensive research has previously highlighted the vulnerability of the tourism industry to external factors such as economic fluctuations (Canh & Thanh 2020), political stability (Sönmez 1998), public health disruptions (Duro, Perez-Laborda, Turrion-Prats & Fernández-Fernández, 2021), impacts of travel restrictions on trends (Sohn et al. 2021). Among these factors, climate change has emerged as the most critical threat for the tourism industry.

Njoroge (2015) notes in his research that the transition towards increased concern for the effects of climate change on tourism started in the 1990's, when increasing global awareness of sustainability and environmental degradation underscored the susceptibility of tourism to the impact of climate change. Although there is an increasing body of literature on this subject in the 21st century, the dual role of tourism as both a "victim and a vector" of climate change can make research on this topic overwhelming (Njoroge 2015, p. 97). While tourism has the potential to contribute positively to the 2030 Agenda for Sustainable Development, its current trajectory highlights the urgency for targeted mitigation and adaptation strategies (UNWTO, n.d).

There is a now a considerable amount of academic research on tourism and climate change. Much of this literature concerns the vulnerability assessment of tourism destinations to the impacts of climate change (Gössling & Scott, 2008; Koenig & Abegg, 1997). A further interesting dimension of research, is the tourism dimension of emerging trends including "last-chance tourism" which paradoxically brings new visitation to threatened destinations leading to potential destruction (Eijgelaar et al., 2010). Additional challenges highlighted in the literature include issues related to accessibility and increased safety concerns for travelers in these changing environments (Njoroge, 2015, pp. 95-101).

In this thesis context, what is particularly interesting is the relatively recent rise of the concept of resilience. Originally, the term "resilience" was primarily associated with medical, psychological, and behavioral studies, where it referred to an individual's or community's ability to recover from adversity (Luthar, Cicchetti & Becker, 2000; McCubbin, 2001). The concept has only recently gained extensive usage in the tourism field, particularly as a framework for understanding how tourism systems can rebound from external shocks. Its application has been especially important in the aftermath of the COVID-19 pandemic, where it has been used to examine the recovery processes of tourism organizations, as highlighted by Pocinho, Garcês, and De Jesus (2022). Resilience has increasingly been applied to the context of climate change, offering an interesting perspective into the ways that tourism systems can adapt and recover from environmental challenges (Dogru, Marchio, Bulut & Suess, 2019).

While the body of literature on tourism and climate change continues to grow, much of the focus has been on broader sectors such as skiing or cruise tourism, leaving behind more niche winter activities such as dog mushing. Dog mushing is an area of tourism academic research that has received previous attention through diverse perspectives and categories, such as “recreational mushing”, the “working position of sled-dogs” and “racing mushing” (Isacsson 1996).

Regarding the situation of sled-dog races, prior studies have looked into how dog sledding events contribute to a unique sense of place, transforming the region into a destination associated with adventure and cultural heritage (Granås, 2018; Jæger & Viken, 2014). Research has also highlighted the economic and cultural benefits these events bring to local communities, showing how races can increase tourism and local economies, therefore supporting the growth of the sled dog activities (Jæger, 2020; Jæger & Viken, 2014; Prebensen, 2007; 2010). However, very little academic research has looked into races and dog sledding in general from the climate change perspective, and how it will evolve in the following decades (Isacsson 1996, Nilsson & Demiroglu, 2024).

This highlights the research gap which is at the foundation of this thesis. Nilsson and Demiroglu (2024) have recently look into this topic and provided a solid starting point to fill this gap. Their study on the dog sledding future in Arctic Sweden truly contributed to get a first look into how this has been studied so far, and they contributed to understand mushers’ awareness to climate change and how it realistically could impact their activity. Previous research from Schrot, Christensen and Formayer (2019) has also contributed to understand the situation of dog sledding in other Arctic regions such as Finland, Greenland, or Norway, all of them highlighting the clear vulnerability of winter tourism and dog sledding activities to this climate crisis. Their study contributed to understand the impacts of climate change on dog sledding, regarding the predictions of snow cover, ice thickness, temperature thresholds, extreme events occurring. Both of these academic papers shed light on the need to invest more on the future of dog sledding within this changing environment, and Nilsson and Demiroglu (2024, p. 609) even mention “the need for more research to understand the climate vulnerability/resilience and adaption capacity of dogsledding recreation and tourism geographies”.

1.3 Research aim and design

As highlighted in the previous sections, dog sledding is a practice highly vulnerable to the effects of climate change (Schrot et al., 2019). Despite this vulnerability, research exploring how the community responds to these changes remains limited, with very little to no research on the future of this sport if environmental disruptions get worse. Therefore, this study aims to address this gap by focusing on one major and meaningful event: the Finnmarksløpet. Indeed, this focus is quite timely considering the increased frequency of race cancellations in the last years due to poor weather conditions.

By taking the Finnmarksløpet as a specific case study, this thesis explores how different members of the mushing community perceive and respond to climate-related challenges. This event not only represents a major sportive competition, being the longest sled dog race in Europe, it is also an event rooted in values of traditions, culture and nature. If this race had to be cancelled, it would not only be a loss for the sport, but also for the community as a whole.

The research looks at the responses and adaptation mechanisms of the event through the concept of resilience, and more specifically through the three-dimensional resilience framework developed by Béné et al. (2012). This framework divides resilience into the absorptive, adaptive, and transformative capacities, which is explained in further detail in the second chapter of this thesis. In this context, resilience is understood as "the capacity to persist in the face of change, and to continue developing in ever-changing environments" (Folke, 2016, p. 2). In other words, resilience is not only about how to cope with an environmental change, but about adjusting and potentially transforming a system in order to ensure its continuity.

Overall, through the lens of resilience, this study aims to explore how the Finnmarksløpet community perceives, copes with, adjusts to, or could potentially reshape the event in response to the pressures of climate change. Therefore, the main research question guiding this thesis is: *How does the Finnmarksløpet community demonstrate resilience in the face of climate change?*

This main question will be broken down into three sub-questions:

i) How do different stakeholders perceive the risks and challenges of climate change on the future of the Finnmarksløpet?

ii) What strategies are being used or proposed to maintain the race under changing climate conditions?

iii) What factors shape the community's decision to respond or not to climate change?

By using the Finnmarksløpet as a central focus, this research aims to establish a baseline understanding of how climate change impacts the race itself. It will explore the openness of various stakeholders to implementing changes, the challenges associated with these adaptations and develop potential scenarios for the future. Ultimately, the findings of this thesis will offer a clearer perspective on the upcoming challenges and opportunities for enhancing the race's resilience, which could also contribute to the broader dog sledding industry.

The research was conducted under a qualitative approach, focusing on gaining in-depth perspectives from few selected members of the mushing community, rather than relying on broader quantitative data. Therefore, the insights are not intended for generalization. Semi-structured interviews were conducted with five individuals, who all shared different experiences and perspectives regarding the climatic issues affecting the Finnmarksløpet and how they view its future. Additionally, my own participation to the Finnmarksløpet 2025 and to another long-distance race earlier in the season allowed me to observe by myself the attitudes towards climate change as well as engaging in few informal discussions.

1.4 Structure of the study

The structure of this thesis is divided into seven chapters, each aiming to contribute and build an understanding to address the research questions and supports the development of the overall analysis.

This first introduction chapter lays the foundation for the following chapters, gradually shaping the research approach and the main notions, grounding the study in a broader context. The second chapter is the contextual framework, with the explanation of the global context of this thesis. The third is the theoretical framework, where the most important aspects regarding the resilience theory are described. In this part will be defined the three-dimension framework from Béné et al. (2012) which forms the backbone of the results' interpretation. It will be followed by the chapter four, which describes the methodology and methods used for this study, as well as reminding the ethical considerations.

The fifth chapter delves into the results of the study, analyzing the outcomes of the interviews and how they relate or diverge from the theoretical framework. This leads to the discussion chapter, which interprets the findings under a more thematized approach, connecting them to the research questions and reflecting on the implication of this research. The seventh chapter is dedicated to the summary of the research and suggestions for further research.

2. CONTEXTUAL FRAMEWORK

The contextual framework chapter presents the relevant concepts to this research. The first section outlines the current situation and potential outcomes of climate change with a focus on the Arctic region. Then, the second section highlights the tourism situation in the Arctic, emphasizing on its current exponential growth. The third section connects the two precedents by analyzing the effects of climate change on tourism in this region, as well as the potential threats. The fourth part delves into the meaning and origins of long-distance racing, as well as a brief history of the Finnmarksløpet.

2.1 Climate change in the Arctic

If climate change is acknowledged as a global phenomenon, there is yet a place in the world that is witnessing it from the front row, due to a phenomenon called "Arctic amplification". The Intergovernmental Panel on Climate Change (IPCC) has published in 2023 the sixth assessment report on climate change, synthetizing the current situation and providing alarming numbers regarding the situation in the Arctic. This report assess that the polar regions are warming up "two to three times the rate of the global average", causing damages to the thawing of permafrost areas, the shrinking of snow- and ice- covered areas, the retreat of sea ice, the melting of glaciers and sea level rise, among a long list of other direct and indirect consequences (Constable et al. 2022; AMAP 2019). The predictions for the following decades are not much more positive and based on the information provided by the report, the average annual temperature will keep on rising.

Based on Kashiwase, Ohshima, Nihashi and Eicken's (2017) report, the Arctic amplification phenomenon is partly explained by what is called the "albedo feedback effect". To briefly explain it, the albedo effect refers to the reflectivity of a surface. Surfaces with high albedo are lighter such as sea ice and snow and reflect a larger proportion of incoming solar radiation. However, darker surfaces have lower albedo and absorb more solar energy, therefore creating more heat. This can be compared to how a dark surface like asphalt absorbs heat from the sun

and becomes hot, whereas lighter surfaces such as ice, snow, or glaciers reflect most of the sunlight, keeping temperatures lower.

The issue lies in the fact that the albedo effect is a cycle where, as the snow cover drops and the sea ice melts, the albedo decreases. Therefore, less solar radiation is reflected, more is absorbed by the darker ocean surface, which increases the water's temperature. And then starts some "vicious" cycle where the higher temperature will cause more snow and sea ice to melt, repeating the effect over and over (Kashiwase et al., 2017). Over time, researchers agree that this could lead to greater warming and further accelerate the effects of climate change both in the Arctic and around the world (National Snow and Ice Data Center, 2025).

According to the IPCC 6th report, a warmed Arctic can have various consequences such as increased risks to coastal communities from erosion or sea level rise; but it can also lead to growing health threats (food insecurity, disease), disruptions to transportation and infrastructure due to unstable ground and extreme weather, environmental and cultural impacts from expanding shipping and tourism industries, challenges to traditional livelihoods (reindeer herding, fishing), increased stress on marine and terrestrial ecosystems and intensified pressures on local economies to adapt (Constable et al. 2022, pp. 2347-2349). The impacts of a warmer Arctic Ocean will not only influence life locally in the region, it will also highly likely spread out on a bigger scale and affect other territories. Indeed, according to the National Snow and Ice Data Center, the Arctic Ocean plays a key role in the regulation of ocean and atmospheric circulation on a global scale. Disrupting this balance can trigger extreme weather events far beyond the Arctic, including heatwaves, intense storms, and shifts in precipitation patterns, which is something that can already be observed (Baines, 2024).

The current state of research on the climate change phenomenon is quite extensive and advanced, where the role of academic research is recognized as essential, considering the urgency of the situation that is stated by specialists. Research is highly supported by international organizations, but also by academic institutions which helps to address the issues from different angles and fosters collaboration across the nations and disciplines. The Arctic Council stands as one of the important intergovernmental cooperation structures, where eight Arctic states are reunited to

promote scientific research, establish protective environmental laws, and create a path for sustainable development. In addition to contributing to advance research and actions on climate change, the council has also played an important role in the creation of the University of Arctic. This university functions as a network of universities and encourages greatly the association of scholars and students across the UArctic members (UArctic, n.d.).

Plenty of other organizations are also actively engaged in supporting research in this part of the world, regarding tourism, climate change, or other fields of concerns. The United Nations World Tourism Organization can be cited for example as a fervent advocate for sustainable tourism practices through the One Planet Sustainable Tourism Program (UNWTO, n.d.). Overall, these collaborations underscore the importance of academic research in understanding and targeting the different challenges and opportunities.

2.2 Tourism in the Arctic

What is defined here as “tourism in the Arctic” refers to the different kind of tourism activities happening in the following regions: Alaska, Canada, Denmark (Greenland and Faroe Islands), Finland, Norway, Iceland, and Sweden, Russia (AMAP, 1998). While definitions of the Arctic zone vary depending on different criteria, this perspective is among the most widely accepted and will therefore be used throughout this study.

From a tourism point of view, the Arctic has triggered some discussions and debates. Catch-words like "see it before it’s gone" and "last-chance tourism" are frequently associated with this destination, illustrating the pressing desire and sense of “urgency” to visit these places before the no-return point. This perspective is quite controversial, as tourists who travel to the Arctic with the intention of witnessing threatened landscapes ironically contribute to its accelerated decline, as tourism-related activities increase carbon emissions and environmental pressure on an already fragile ecosystem (Maher, 2017, p. 214).

Tourism in this area is diverse, encompassing summer activities such as cruising, wild-life watching, nature-based activities, adventure tourism, but also winter activities such as

snowmobiling, dog sledding and skiing (Saarinen & Varnajot, 2019, pp. 9-11). These forms of tourism are tailored to the region's unique characteristics and atmosphere. Despite the differences in the types of tourism offered and the challenges faced by destinations across the Arctic, tourism has seen significant growth in most parts of the region (Saarinen & Varnajot, 2019). The Greenland Tourism Office has reported a significant increase in the number of cruise ship passengers for 2023, with nearly double the number of visitors compared to pre-COVID levels (Visit Greenland, 2024). Similarly, Finland, and especially Lapland, has experienced a growth of almost 20% in the number of passengers traveling to the region via Finavia's airports (Finavia, 2025). This increased demand was also observed among other Nordic countries (Maher, 2017).

Academic discussions about Arctic tourism often delve into themes such as the opportunities it presents, community involvement, international collaboration, and the balance between authenticity and staged experiences (Maher 2017, pp. 214-217). At the same time, the geopolitical stands of the Arctic fosters concerns and territorial disputes, which further complicate the region's tourism dynamics (Bennett & Iaquinto, 2023; Zelenskaya, 2018).

Nevertheless, the most timely and critical challenge associated with Arctic tourism remains climate change. Most specifically, the interplay between climate change and winter tourism in this region has significantly increased in academic research.

2.3 Climate change and Arctic winter tourism

The effects of climate change on winter activities have already been witnessed and well-documented, especially from the European Alps. Research in this region has showed warmer ski seasons than in the past, with impacts on ski competitions but also on the number of tourists. To cope with these effects, resorts with sufficient financial resources have turned to artificial snowmaking as an adaptation strategy. Other resorts with less resources have try other strategies such as diversifying their offerings and focusing on a “all-year-round” strategy (Bürki, Elsasser, Abegg & Koenig, 2005; Saarinen & Tervo 2010, p. 150). Research has also pointed out a potential shift in skiing tourism patterns, as declining snow conditions in the Alps pushing

visitors to seek alternative destinations up-north (Demiroglu, Lundmark, Saarinen & Müller, 2019).

The increased vulnerability of European Alpine ski resorts is not the only factor that is contributing to the rise of the Arctic as a winter tourism destination. On one hand, more important financial resources for leisure travel have been observed among tourists, allowing more people to travel and explore new and less conventional destinations (Maher 2017, p. 213). As a result, Nordic countries have attracted a new wave of travelers seeking novel experiences. This observation is consistent with the growing phenomenon of "commodification". Indeed, it has been noted that the region is increasingly marketed and packaged through stages experiences, relying on themes such as Christmas, winter landscapes, and nature (Saarinen & Varnajot 2019; Saarinen & Tervo 2010), also reflecting on the concept of the Experience Economy by Pine and Gilmore (1999).

In a context where the unpredictability of winter conditions is increasing, even in the North, one might question whether the competitive advantage tied to a snowy environment will resist. In addition to the evident major catastrophic environmental consequences, this shift could also affect winter-related activities in these regions, as snow is often a defining element of their identity, closely associated with cold, icy, and remote landscapes. Scholars have looked into how the most popular activities such as skiing, snowmobiling. Northern lights hunting or dog sledding could be impacted in the future (Schrot et al. 2019, Saarinen & Varnajot 2019), but more research is still needed.

Dog sledding is without any doubt one of top-activity. Although studies specifically focusing on dog sledding and global warming are limited, existing research has emphasized the high sensitivity of this activity to climate change. For instance, Schrot et al. (2019) have looked into how the environment changes in Greenland, causing negative effects on ice and snow covers have made the activity less safe and how it has led to a change in the organization of multi-day tours in the last few years. Their study has also reported shortened dog sledding seasons (Schrot et al., 2019, p. 8).

2.4 Sled dog racing and the Finnmarksløpet

As this thesis focuses on the specific event of the Finnmarksløpet, it is important to briefly introduce it**.** To fully understand what is at stake if sled dog racing is threatened by climate change, it seems essential to understand the basics of this sport, but also what this event represents for the dog mushing community, but also for Finnmark and Norway.

2.4.1 Sled dog races

Prior to races, sled dogs were used in other contexts such as transportation in extremely remote territories in Alaska or Greenland for example, but also in Norway for polar explorations. In such contexts, sled dogs were essential to guarantee the survival and transportation of the population. As societies kept evolving, sled dogs were no longer essential for practical tasks and dog sledding slowly took a competitive turn with the emergence of long-distance races early 20th century (Knudsen, 2019). They were especially popular in Alaska with the All-Alaska Sweepstakes and later on the renowned Iditarod. These competitions aimed at celebrating the rich history bonding humans and sled dogs together, contributing to the legacy of this practice (Reinhart, 1996). In 1981, this idea of competitive racing across long distances spread across the Atlantic Ocean and reached Northern Norway, marking the beginnings of the Finnmarksløpet, “the race of Finnmark” (Knudsen, 2019).

To understand the mechanics of long-distance dogsledding, it is quite important to first look into how these races are structured and what they involve. In long-distance racing, the musher, who drives the sled, leads a team of dogs across a pre-defined distance and track. The route is pre-planned into their GPS and also marked with poles. The number of dogs a musher can have depends on the race category. If any dogs are deemed unfit to continue, either by the musher or the veterinary team, they must be left with the handler and cannot be replaced. The handlers play a crucial role, following the musher throughout the race to deliver provisions at checkpoints or pick up dogs that can’t continue. However, only veterinarians and mushers are allowed to handle the dogs directly. The musher is responsible for everything else, from feeding and caring for the dogs to providing massages and overall maintenance (Finnmarksløpet 2025a; 2025b).

At each checkpoint, dogs' health is checked, and mushers must take care of both their dogs and themselves to ensure the team can continue the race in the best possible condition. Key tasks include everything related to the dog care such as removing the dogs' booties, checking their paws for injuries, massaging them, and ensuring they receive proper hydration, nutrition, and rest. Making sure to recover effectively is crucial for their performance in the next stage of the race. It is also essential in determining the best race strategy. Dropping a tired dog may help increase the team's average speed, but it also means the remaining dogs have to pull more weight. Strategic planning is often underestimated in the context of dog sledding, but choosing the right timing to take a break or deciding when it is time to push forward can change many things (Finnmarksløpet 2025a; 2025b).

Ultimately, what draws mushers to long-distance racing is the intimate bond they share with their dogs especially during the time of the race. These animals are more than just teammates; there is something special about the relation between a musher and their dogs where mutual trust and thrill for racing is mandatory (Personal communication, March 2025).

2.4.2 The Finnmarksløpet

Well-known as Europe's longest sled dog race, the first edition in 1981 simply consisted of a "friendly" competition between three mushers, few rules, and the objective to find out which musher-dog team was the fastest. Literally translating into English as "the Finnmark race", the Finnmarksløpet takes place in March every year in Finnmark, Northern Norway, and gathers nowadays approximately 100 mushers every year (Knudsen 2019, p.34).

Since then, the Finnmarksløpet evolved from an intimate moment to an international event. From its beginnings until 2001, the race steadily evolved as a small, local event, entertained by volunteers and few residents sharing a passion for dogs and outdoors. The early 2000s marked a shift as discussions started regarding the commercialization of the race, as suggested by mushers involved in the Iditarod, the Alaskan sibling of the Finnmarksløpet. In 2001, Finnmarksløpet AS was established to develop an independent legal structure for the race, allowing partners to join

the adventure. This change brought new opportunities and enabled the organization to secure funding and partnerships (Jæger & Viken, 2014).

Indeed, this change allowed a renewal for the race, with larger mediatization and national recognition (Jæger & Viken, 2014). Since then, the race has gained national and even international attention, with daily evening broadcasts on the national TV channel NRK during the event, and GPS tracking on each musher's sled, allowing fans to follow the race's progress on the Finnmarksløpet website (Finnmarksløpet, 2024a). The race's communication approach has also take a modern turn, following social media trends, publishing real-time updates, photos, videos, and even live broadcasts on platforms like Facebook.

Nowadays, the Finnmarksløpet is divided into three categories. The Finnmarksløpet 1200 (FL-1200) is the longest format, where mushers' journey begins with 14 dogs. The distance to be covered is 1200km, which usually takes around 6 days to complete for the experienced mushers. Finnmarksløpet 600 (FL-600) is the second category was extended to 600km in 2020 and mushers race with 8 dogs. An additional category was established for the first time in 2014, the Finnmarksløpet Junior. In this race, young mushers aged 14 to 18 compete over a distance of 200 km with their 6 loyal partners, completing their journey in slightly over 24 hours. In terms of participants, the FL-600 is the most popular one and gather approximately 60 mushers. The skills, experience and financial means required to compete in the FL-1200 make it a less crowded class with less than 30 mushers on the starting line. The participants of the Junior class vary nowadays around 15-20 young mushers (Finnmarksløpet 2024a) and is a great opportunity for them to get some early experience in.

As illustrated in the 2025 itinerary (Figure 1), the race trail varies based on the class category. The shortest class remains within the Finnmark plateau, while the FL-600 extends to the Finnish border, and the FL-1200 reaches as far as Kirkenes near the Russian border. There are 12

checkpoints along the FL-1200 trail.

Figure 1: Map of the Finnmarksløpet 2025

Source: Finnmarksløpet (2025c)

The Finnmarksløpet is often described as “more than just a race” (Chukhanova 2018, p. 31). Beyond its competitive aspect, the event brings light on the different aspects of the Norwegian culture, some checkpoints celebrating the Sami culture with gatherings and concerts, providing an opportunity for participants and visitors to know more about the traditions and background of the place (Jæger & Olsen, 2017). Additionally, the Finnmarksløpet is not only about individual achievement; it is about the collaboration and mutual trust with the dogs, but also about the moments between mushers, as they come together to share their experiences and knowledge, strengthening bonds within the mushing community (Granås 2018, p. 50). There is a strong feeling of community during the race, at the starting line, across the checkpoints. Some feeling that cannot be put into words and where you can feel a combination of cooperation, competition, unity, strength (Personal communication, 2025). The race has also contributed to shed light to the country’s northernmost county. By creating an attraction for both business and tourism, the Finnmarksløpet strengthens Finnmark’s ability to be developed as a unique tourism destination. The race features the most outstanding and attractive characters of Finnmark: dog sledding, breathtaking snowy landscapes, northern lights, cold temperatures (Granås, 2018).

3. THEORETICAL FRAMEWORK

The theoretical framework of this thesis delves further into the main theory framing this thesis: the resilience theory. Therefore, this chapter provides a more detailed description of resilience theory, the central focus of this thesis, to clarify its meaning and application. It also introduces Béné et al. (2012) three dimensions resilience framework, which will be used to frame and describe the data analysis.

The idea of exploring the resilience of dog sledding in the face of climate change emerged from Nilsson and Demiroglu's study (2024), but it will be adapted to the Finnmarksløpet context, a long-distance sled dog race.

When talking about resilience, it is important to define what this notion is about, especially as many meanings can be associated with it. As a research concept, resilience can be dated from the 1960s (Hall, 2018, p. 34), but the escalation of its use is more recent than that. According to the ISI Web of Science, the number of citations per year increased from fewer than 100 in 1995 to over 20,000 by 2015 (Folke, 2016, p. 1). In the tourism research community, this growth has sparked some concerns, worrying that it may follow the path of "sustainability", not in definition, but in becoming an “overused buzzword”, especially following the Covid-19 pandemic where this term has been widely used (Cai, 2020; Hall, 2018).

The challenge of agreeing on a universal definition of resilience comes partly from the concept’s use across multiple disciplines, each contributing its own perspective and interpretation. Derived from the Latin word *resilio*, meaning "to spring back" (Hall, 2018, p. 34), resilience will be understood in this thesis as "the capacity to persist in the face of change, and to continue developing in ever-changing environments" (Folke, 2016, p. 2). This definition suggests that resilience is not merely about returning to a previous state after disruption, but rather about using external challenges as opportunities to evolve.

3.1 Fields of study

The concept of resilience initially comes from the fields of psychology and medicine, where it is applied to study how individuals cope with and recover from adverse circumstances such as abuse, neglect, or challenging life situations, and how these experiences shape their development and mental health (Luthar et al. 2000; Herrman et al. 2011). However, it quickly extended to environmental studies and gained weight in the field of environmental research and climate change mitigation and adaptation (Simpson et al. 2008). This shift was largely influenced by the work of Holling (1973), who applied resilience thinking to socio-ecological systems.

As described by Folke, Colding and Berkes (2002), Holling (1973) introduced resilience into the ecological and social research through the concept of "ecological resilience", which emphasized that resilience was not merely about bouncing back to a previous state of things. His perspective was more dynamic, highlighting that a resilient "socio-ecological system" has the capacity to absorb disturbances and reorganize while aiming at getting better. This view goes away from what is traditionally called "engineering resilience", where the focus is on returning to the exact original system state after a disturbance, reaching a previous stable state (Hall, 2018). The engineering resilience concept does not fit the context of climate change. Indeed, contemporary (ecological) resilience thinking acknowledges that in the face of unprecedented and accelerating environmental changes, returning to a previous state is often neither possible nor desirable (Espiner et al. 2017).

Resilience offers interesting insights to apply to other social fields such as tourism, where destinations, communities, and systems must also recover and adapt when disruptions happen. In the context of tourism research, resilience is often stated in relation to the concepts of "disaster resilience", "risk management", and "crisis management" (Jiang, Ritchie & Verreynne, 2021; Cochrane, 2010). It also seems interesting to look at the resilience of various entities such as individuals, companies, airlines, destinations, or events, as their capacities and willingness to cope with change often differ.

Additionally, it is important to note that resilience can be tested on multiple dimensions. Based on Cochrane (2010) and Butler (2017) examples, the economic, social and environmental resilience can be triggered by different factors. The environmental resilience addresses challenges related to environmental change that can put the tourism-related operations in complex situations, with rapid disruptions like natural disasters to slow-shifts such as climate change. Furthermore, tourism has been shaken up by the Covid-19 in recent years, with some destinations and companies still recovering from their losses. This event has shed even more light on the vulnerabilities within the tourism industry, highlighting the importance of improving and understanding resilience in the face of global crises, no matter if they are health- or climate-related (Pocinho et al. 2022).

3.2 Outcome or process

There is often one question that arises in the resilience literature: should resilience be seen as an outcome in itself or as an ongoing process (McCubbin 2001; Luthar et al. 2000). In many discussions based on tourism but also organizational research such as the ones conducted by Cochrane (2010), Hall (2018) or Duchek (2020), it seems like viewing resilience as an outcome can be limiting as it reduces resilience merely as the end result of a process and as the measure of how well a system return to its original state after a disturbance. As stated by McCubbin (2001, p. 6), “outcomes are viewed as dichotomies when the reality is a matter of degree”, which emphasizes that looking at resilience as a result fails to capture the nuances of the system's adaptation. This perspective seems to overlook the more complex mechanism behind resilience and the capacities that enable systems or organizations to effectively respond to, adapt to, and even transform in the face of disruption (Béné et al. 2012). It seems more common to view resilience as a continuous process or even as a cycle with different phases.

In fact, a well-known cycle illustrates this principle of resilience as a cycle, also known as the “Holling Loop”, which aims at explaining how systems process and adapt to changes through various stages. It is represented by a double loop illustration with four phases, which all interact dynamically: exploitation, conservation, release, reorganization (Cochrane, 2010). The Holling cycle has contributed to various fields of studies in order to understand how systems experience

changes. This cycle can also be seen as a cycle of growth, stability, decline, and renewal, with a reoccurring pattern but different outcomes.

3.3 Three-dimension resilience framework

As explained previously, the research findings will me framed in the fourth chapter through the lens of the "three-dimension resilience framework" developed by Béné et al. (2012), which requires to develop in this section how this framework is built. First of all, they define resilience as the "ability to deal with the impacts of adverse changes and shocks" (Béné et al., 2012, p. 20). This ability is then divided into three capacities: the absorptive coping capacity, the adaptation capacity, and the transformative capacity. Each of these capacities is associated with different degrees of intensity of change and different transaction costs. Overall, the framework's key finding is that resilience results from not just one but all three of these capacities.

3.3.1 Absorptive coping capacity

The first capacity is the absorptive coping capacity. Béné et al. (2012) connect this capacity to the pursuit of stability, a capacity of "bouncing back", absorbing the shock and returning to an equilibrium state. Coping is then closely linked to highly unexpected and sudden events, with a reactive form of resilience to something happening unexpectedly, that was not prepared to be handled. Instead of focusing on significant organizational changes, this type of resilience emphasizes the ability to continue its basic operations thanks to quick and immediate response to the threat. In this situation, the focus is on continuity of the operations, which shows some kind of survival mode. Indeed, absorbing unexpected situations does not seem like a viable solution in the long term, as repeated or prolonged exposure to disruption may exceed the organization's threshold for shock absorption.

To enhance an organization's coping competencies, it is essential to focus on three key factors: anticipating potential crises (Jeans, Castillo & Thomas, 2017, p. 3), accepting the emergence of a problem, and having the capacity to take immediate actions on it (Duchek, 2020, p. 227). Duchek (2020) suggests that the anticipation capacity refers to the ability to identify potential threats or signs of changes that could hurt the organization, before it actually happens.

Anticipating what might happen does not allow to avoid a crisis, but it is a way to prepare in advance, anticipate the future challenges, and react more quickly when unexpected events happen. Anticipation is a key first step for building resilience (Duchek, 2020). The second element contributing to the coping capacity is the acceptance of the reality, which implies to actually acknowledge what is happening. Indeed, the denial of an issue impacts the organization's ability to be resilient, by postponing the reaction to challenges. Organizations increase their risk of harm by avoiding the reality, which makes it more difficult to recover from (Duchek, 2020). The third element influencing the absorptive capacity is the aptitude to quickly develop solutions. This allows organizations to act faster, therefore reducing the scope of the impacts of the disruption and resolving the situation. Two different aspects have to be taken into consideration to act effectively: the "acting," which is the actual implementation and coordination of the solution, and the "sensemaking," which is the ongoing process of comprehending the problem (Weick, Sutcliffe & Obstfeld, 2005). In this context, solutions have to be thought "out of the box" and more creative, since they frequently have to deal with issues or circumstances that the organization was not equipped to handle (Kendra and Wachtendorf 2003). To do so, finding solutions require a mix of extraordinary measure, a combination of knowledge, and the flexibility to adapt quickly to the unexpected (Duchek, 2020).

3.3.2 Adaptive capacity

The second dimension of the framework is adaptive capacity. In contrast to the absorptive coping capacity, adaptive capacity requires greater flexibility and the ability to implement "incremental" changes. According to the IPCC (2001) definition, the adaptive capacity relates to the "ability of a system to adjust to climate change, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences" (Béné et al. 2012, p. 21). In this context, the word "adjust" is significant, as it underlines the fact that the aim is not to radically change the structure of the organization, but rather to make small changes based on previous experience and upcoming challenges (Jeans et al., 2017, p. 4; Duchek 2020).

The adaptive capacity differs from the immediate reactive processes of coping capacity in the sense that it involves a more thoughtful and reflective approach, allowing ideas to mature over

time before being acted upon. This idea of “reflection process” was articulated in Daudelin’s (1997) approach of experiential learning, which she divided into four points: identifying and articulating the problem, analyzing the problem, developing a theory to explain the issue, and taking action. Each of those steps contributes to learning from passed experiences and helps to identify the challenges, as well as the possible solutions. The learning process does not occur automatically after an incident or disturbance; acquiring knowledge is a deliberate and conscious process that can be improved by reflecting on each of these stages (Duchek, 2020). Through this structured reflective approach, individuals and organizations can integrate those learnings into future actions.

Furthermore, Gressgård, Hansen (2015), and Duchek (2020) highlighted is the role of collaboration on the adaptive capacity. Collaboration both inside and outside the organization enhances the learning process by facilitating the sharing of knowledge and experiences, ultimately contributing to a broader "knowledge base" and avoiding what is called “isomorphism”. Isomorphism refers to the concept where a failure in one particular area is likely to occur again in another similar system, if affected by identical factors (Toft and Reynolds 1994, from Duchek 2020). Engaging with others is essential to develop new ideas and solutions. Within the example of climate change, adaptations are rarely the result of isolated actions and often emerge from complex interactions among multiple stakeholders.

3.3.3 Transformative capacity

The final dimension is the transformative capacity, which involves more significant changes and represents a fundamental shift in how an organization adapts to and handles changes. According to Walker, Holling, Carpenter, and Kinzig (2004), transformation happens when the existing system can no longer function “as it was” due to ecological, economic, or social changes, and a completely new approach is required (Béné et al., 2012, p. 21).

Transformations of a system can be intentional and driven by deliberate decisions, or they can be forced upon organizations due to external pressures. The difference between adaptations and transformations lies in the fact that transformations are more radical changes in how the system

operates, rather than adjusting or improving the existing structures. Adaptation relates more to “fine-tuning” while transformation requires thinking beyond the existing system. The more significant the transformation required, the more challenges the system will face. These challenges can be societal, cultural, or financial. For example, "transactional costs" tend to increase with the scale of transformation, creating real barriers to deeper changes. This is one reason why organizations may prefer to absorb or adapt rather than entirely rethink their systems. Such transformative changes are often costly and time-consuming, which can explain why an organization may hesitate to embrace them immediately (Béné et al., 2012).

However, the resistance towards the transformative capacity is more frequently grounded in emotional and cultural roots rather than by actual technological or financial issues. Deep changes can be challenging because people and organizations tend to hold onto familiar values, beliefs, and habits. Therefore, rather than being technological, the obstacles to change are frequently psychological or cultural. Major changes may also be impeded by policies and regulations. But these revolutionary changes also offer chances for creativity and fresh methods that can result in improvements (Béné et al., 2012).

The theoretical framework presented in this third chapter provided the foundation for this research, explaining the concept of resilience concept through academic literature and situating it within the context of the Finnmarksløpet. The resilience frame echoes the issues that could be faced by the Finnmarksløpet and provides a different perspective on the question, reflecting on how those changes are currently being handled and how they could be addressed in the future if conditions worsen. Overall, the Finnmarksløpet is a compelling case through which to study the resilience of events in a climate change context, helping to understand what shapes resilience in practice.

4 METHODOLOGY AND DATA

The third chapter of this thesis will delve into the methodological approach applied throughout the various phases of the research. Establishing a clear and coherent methodology is essential to ensure the study's validity, reliability, and overall academic rigor (Jennings, 2010).

4.1 Philosophical underpinning

A first step in the methodological process is to identify an appropriate philosophical paradigm to guide the research approach. As Guba and Lincoln (1994) state, "questions of method are secondary to questions of paradigm, which we define as the basic belief system or worldview that guides the investigator" (Guba & Lincoln, 1994, p. 105). Therefore, identifying the paradigm in the first place is essential as it sets the foundations of the study, influence the choice of methodology and consequently the choice of methods.

A widely used way to structure paradigms is based out of three fundamental principles. The ontology, which questions the nature of reality and the assumptions made about what exists in the world. The epistemology, which explores how we know what we know and therefore the ways that knowledge is acquired, perceived, communicated, and interpreted both by the researcher and the participants. Then the methodology, which refers to the ways to investigate the reality (Guba, 1990 retrieved from Jennings 2010).

Given the objectives of this research, the interpretivist paradigm emerged naturally as the most appropriate approach. Indeed, this study seeks to develop a theoretical understanding based on the interpretation of empirical phenomena rather than the pursuit of a universal truth. In this context, the reality (ontology) is seen as subjective and shaped by individual experiences and perceptions (Jennings 2010, p.40). To capture these diverse perspectives, multiple stakeholders in the dog sledding industry will be interviewed. Their insights will collectively contribute to a nuanced understanding of how climate change impacts this sector.

In line with the interpretivist paradigm, the researcher is not expected to maintain a purely objective stance but instead becomes immersed in the research setting. The relationship between the researcher and participants (epistemology) is interactive, recognizing that knowledge is co-constructed rather than discovered from a disconnected position. Under this philosophical approach, the researcher must take on the role of an "insider" in order to gain a better understanding of the environment, which implies close bounds to the community and topic (Jennings 2010, p. 41). This is particularly relevant for this study, as the dog sledding industry is a familiar field for me. Having previous experience working at a sled dog kennel, owning a sled dog, and attending key races such as the Gold Rush Run and Finnmarksløpet, I have gained prior knowledge and an insider perspective that facilitates access to key participants and enhances my perception of the issues. While this familiarity provides a strong starting point, it will not compromise the objectivity. Rather, it serves as a foundation for informed engagement, allowing for a more authentic and meaningful exploration of the subject.

4.2 Research design

Another important methodological consideration is to define the appropriate research design. Various factors can influence the research design choice, with a distinction between qualitative and quantitative approaches, or even mixed-method approach. As I worked through the initial thesis thinking process, the qualitative approach instantly felt like the best choice for several reasons. On a personal level, this approach felt more suited to my personality and strengths. From a research level, it was also the most optimal choice, as qualitative research allows for deeper insights from a smaller group of individuals, which aligns with the goals of my project. I was not aiming to generate results that could be generalized, but rather to gather personal insights from specific people. To me, reducing these insights to numbers would not have allow me to actually understand the issues and challenges behind my thesis topic, as it remains niche and under-explored.

As highlighted by Decrop (1999) but also by Plakoyiannakia and Stavraki (2022), although qualitative research was long dismissed by positivists due to concerns over reliability, it has gained increasing recognition in tourism research. This shift reflects a growing acknowledgment

that qualitative methods provide valuable context and depth, enriching our understanding of complex social phenomena within the tourism sector.

The qualitative approach also aligns with interpretivist research, which prioritizes the exploration of subjective experiences, meanings, and social contexts. Unlike quantitative methods, which focus on numerical patterns and generalizability, qualitative research enables a more nuanced and in-depth exploration of individual perspectives (Walle, 1997). Aligning with the interpretivist paradigm (Jennings 2010, p. 41), qualitative methodology prioritizes understanding meaning and context over statistical measurement, emphasizing the complexity and fluidity of human experiences rather than fixed variables.

As said previously, a quantitative approach would have limited my ability to engage directly with participants in a way that would be significant for my research. The opportunity to explore their emotions, perceptions, and lived experiences through open-ended discussions would have been significantly reduced. While I acknowledge the benefits of quantitative research in certain contexts, I firmly believe that a qualitative approach was the most suitable for this study, as it allowed for a more flexible approach of the dog sledding industry's responses to climate change.

4.3 Data collection

To align with the methodology but also with the objective of this research, it was important to select a way to achieve them: the methods. Methods can be defined as the techniques to collect and analyze data; they are often influenced by whether it is a qualitative or quantitative analysis (Jennings, 2010).

The primary method chosen for the data collection was semi-structured interviews. The semi-structured approach is an effective way to explore individual understandings on a pre-defined topic while giving room for participants to freely express their own experiences in their own words (Brinkmann, 2014). This method allows for a better balance between research objective and flexibility, as the interviewer may guide the conversation towards the key themes that need to be addressed while leaving freedom to the participants to share their opinions. On another

level, it also helps create a more comfortable and open atmosphere compared to asking only direct, closed-ended questions. This sense of ease likely allows both the interviewee and the interviewer to feel safer, better understood, and more willing to engage in an honest and meaningful conversation (Mack, 2005). It is with this understanding in mind that semi-structured interviews were chosen as a main way to gather the data.

Some additional data have also been gathered through observations, as I had the opportunity to be involved in two long-distance sled dog races, including the Finnmarksløpet 2025. Indeed, my own personal engagement and experience in dog sledding will inevitably influence the way I approach this study, which is why I chose to embrace it rather than refrain it. It was also important for me to partake in the event itself as a volunteer. This experience helped me further in engaging in small talks about my research topic with different people, developing my own understanding of long-distance racing, but also to get in contact with some individuals to conduct the interviews later on.

The selection of participants was an important consideration before starting the process. Initially, the study aimed at focusing on mushers, but through discussions with various people involved in the race, I realized that the event's existence relies on the efforts and interactions of many more individuals. Therefore, I adjusted my approach, widened the scope of participants and decided to categorize them into three groups: mushers, race organizers, and a representative of the Norwegian Sled Dog Association. From this point, selecting specific participants was influenced by many factors such as their availability, the possible personal connections to them, their experience and their positions within the dog racing milieu.

Approximately half of the participants were approached in person during the race and recontacted afterwards to conduct the interviews. The other half was contacted either via social media or via phone calls. They were either recommended to me by other interviewee or based on my own research. Making the interviews actually happen was more challenging than I would have expected, as many potential participants were either unavailable or stopped engaging in the conversation despite showing me clear interest for the topic. These obstacles made the process of scheduling and conducting interviews a bit more time-consuming than anticipated.

It was initially planned to conduct the interviews during the race period, but the intensity of the atmosphere and the feeling of rush made it uncomfortable to approach and interview participants during this time. As a result, interviews were all conducted online, expect one as we met at his dog kennel. Before the start of each interview, participants were informed about the study's topic and their rights. In accordance with the University of Lapland's research guidelines, a consent form was signed and provided to me. All procedures followed the ethical standards outlined by the Finnish National Board on Research Integrity (TENK) and the consent form that was used is attached in Appendix 1.

Table 1: Participants characteristics

Source: Own representation

Participant	**Age Group**	**Gender**	**Category**	**Nationality**	**Platform**	**Interview Duration (min)**
Participant 1	30-50	Male	Finnmarksløpet Organization	Norwegian	WhatsApp	60
Participant 2	30-50	Female	Member of the NHS	Norwegian	Teams	45
Participant 3	20-30	Female	Musher (FL-600)	Norwegian	WhatsApp	90
Participant 4	30-50	Male	Musher (FL-600)	Finnish	WhatsApp	80
Participant 5	30-50	Male	Musher (FL-1200)	Finnish	Reality	70

The table 1 above shows an overview of the participants' characteristics such as their age group, gender, the way that they are involved in the Finnmarksløpet, their nationality. Two more boxes were added regarding how the interviews were conducted and their duration. In total, five interviews were conducted: three mushers, one representant from the Finnmarksløpet organization, one representant from the Norwegian Sled Dog Association (NHS). To protect confidentiality, participants' names have been removed and they have been anonymized.

Throughout the rest of this research, they will be referred to as Participant 1 through Participant 5.

As the interviews were semi-structured, a set of guidelines tailored to each participant group was prepared to account for the differences in their perspectives, which can be found in the Appendix 2. The preformulated questions helped steer the discussion when necessary but were not systematically used. However, the main themes of each interview remained similar. The interviews began with a general introduction in which participants described their backgrounds and their relationship to sled dog racing. The second part focused on their perceptions of climate change, how they understand it and what their thoughts are on the issue, before narrowing the discussion to its specific impact on long-distance sled dog racing and their personal connection to it. The third and final part of the interviews explored participants' views on the future of the Finnmarksløpet: whether they anticipate changes due to climate change, what actions should be taken to sustain the race, and which adaptations they consider possible and acceptable. Overall, the conversations were open and flexible, allowing space for participants to express their thoughts freely.

4.4 Data analysis

Before analyzing the data in itself, the first phase consists of transcribing the interview from its audio form to a written form (Braun & Clarke, 2006, p. 87). From the beginning of the transcription stage I realized that it would not be time-efficient to transcribe manually each of the interviews, which is when it was decided to utilize an artificial intelligence (AI) tool: TurboScribe. Mojadeddi and Rosenberg (2024) reflected on the topic of using AI software in the context of qualitative research, highlighting the high accuracy as well as efficiency gains that can be done when used properly. The anonymity was also not at risk as no names were mentioned during the recording of the interviews itself (Mojadeddi & Rosenberg, 2024). Despite the high accuracy of the software, each transcript was carefully checked and corrected when needed manually, to ensure a perfect conformity between the audio and written version. The transcription phase is important for the researcher as it is an excellent moment to get familiar

with the data (Braun & Clarke, 2006, p.87). Once the transcript was verified, the audio was deleted, and the transcript was securely stored.

After that started the actual data analysis. The chosen method for this research was the thematic analysis, which is a common way to analyze data in qualitative research (Lochmiller, 2021). As described by Braun and Clarke (2006, p. 79), thematic analysis is a "method for identifying, analysing and reporting patterns (themes) within data". Several reasons motivated this choice of method, one of them being its suitability for beginners in qualitative research. Another reason is that it acknowledges the role and influence of the researcher over the analytic process, who can lead to different insights and a more unique understanding (Braun & Clarke, 2006).

According to the thematic analysis process developed by Braun and Clarke (2006), the second step after being familiar with the data was to generate initial codes. The coding phase was done through the software Atlas.ti. Indeed, computer software can be of great help in qualitative analysis to deal with large data sets, as it allows the researcher to organize, retrieve, and compare codes systematically. While the software supported the process, the interpretation and meaning making remain in the hands of the researcher (Smit, 2002).

Furthermore, a deductive coding approach was used in order to reflect on the pre-existing three-dimension framework, which forms the backbone of this analysis. As noted by Lochmiller (2021), this approach is relevant when the study aims at exploring how the data reflects the theoretical concepts. In practice, it means that the initial coding phase was guided by the resilience framework. Throughout the analysis phase, more codes and sub-themes were added to the software as they were found from the data, which resulted in creating more subcategories under each main theme. After a phase of reflection, the codes were dispatched into the appropriate subcategories, with a lot of back-and-forth phases. This iterative process is emphasized by Braun and Clarke (2006), highlighting that thematic analysis is not a linear method and requires multiple readjustments. Overall, the deductive coding approach allows for a more structured approach of the data, all while maintaining a certain flexibility regarding the analysis itself (Lochmiller, 2021).

4.5 Ethical considerations

As this thesis was conducted as part of a Master's degree at the University of Lapland, following and adhering to the ethical principles of research established by the Finnish National Board on Research Integrity (TENK) was no option and got considered from the beginning of the research.

In fact, conducting research requires to follow a certain set of standards and principles in order to contribute effectively to scientific knowledge and without hindering anyone's rights. Throughout the whole research process, three main principles prevail to conduct responsible research: "integrity, meticulousness, and accuracy" (TENK, 2023). It is extremely important to guarantee those during each phase, from the planning of the research project itself, to the data gathering and publishing of the report. Following such guidelines provides an ethical and legal frame to conduct research, ensuring that the results are valid, meaningful and harmless for participants, but also for the research community as a whole (Resnik, 2011).

The following paragraph is based on the guidelines provided by the Finnish National Board on Research Integrity (TENK, 2023). Informing the participants about their rights is essential, as they were most likely not aware of those before being involved in the research. The first aspect to be highlighted is the voluntary characteristic of their participation to the study. There was no pressure, incitation or constraints for the participants, and it was reminded to them that they could refuse to participate, and they were able to withdraw at any time from the project. Secondly, the informed consent is important to consider when conducting the research. This means that participants should be aware of the research that they are contributing to, the goals, the way that their participation will be used. The informed consent also implies that participants should feel free to ask questions regarding the research form or content. The third aspect involves the principle of "no harm". This aspect is less obvious in tourism research compared to other fields such as medical studies, but considering the integrity of participants is paramount. This concept is closely tied to the principle of confidentiality. Indeed, the importance of anonymity is highlighted as something essential to protect participants' privacy and maintain their trust. This includes not only anticipating and addressing potential threats to participants' anonymity, even those that may initially seem insignificant, but also ensuring that all data is

stored securely, in locations where unauthorized access is not possible (TENK, 2019). For this reason, the data was recorded on my personal phone and then immediately deleted after the transcription process. The transcriptions were stored in password-protected folders until they were fully anonymized, at which point I ensured that all names and personal information were erased.

In the context of this thesis, all participants were reminded of the information stated above through a consent letter (Appendix 1), which they were required to read and sign prior to participating. The consent letter included information such as the aim of the research, their rights, my own contact information, as well as the ones of my supervisor, Markku Vieru, in case participants had any questions or concerns.

When conducting research, it is not only important to respect the participants, but also the research community as a whole. It implies the basic considerations of citations and plagiarism in order to respect and acknowledge the work of others (TENK, 2019). This aspect was taken into consideration thanks to the technical guidelines for academic texts provided by the tourism research department of the University of Lapland. All the authors and researchers were appropriately referenced throughout this thesis for their own work, views, and knowledges.

The use of artificial intelligence is a newcoming consideration into the ethical perspective. In this master thesis setting, artificial intelligence was used occasionally and reasonably as a tool to improve and check language, as it is cited as suitable by the University of Lapland guidelines (University of Lapland, 2023). In regard to those language improvements, the AI-tool used was ChatGPT. The artificial intelligence tool was also utilized during the transcription process as mentioned earlier, through to the TurboScribe software. However, each transcript was checked cautiously afterwards to check for inconsistencies. Artificial intelligence was at no point responsible of producing content and was used only in a responsible, safe and limited manner.

Overall, this third methodological chapter aimed at explaining the data collection and analysis process, while reflecting on the methods employed. It outlined the different stages, from the initial construction of the methodological approach to the practical process of data gathering and

analysis. This chapter also emphasized the importance of ethical considerations in qualitative research, particularly in ensuring the integrity, confidentiality, and respect for participants.

5 RESULTS

As explained in the theoretical and methodological chapters, the results of this research will be structured by Béné et al. (2012) framework, which divides the process of resilience into three different components: the absorptive and coping capacity, the adaptive capacity, and the transformative capacity. Despite seeming close to each other, there are definitely differences between them in terms of time scale, depth of change, and the level of structural transformation required (Béné et al., 2012). This analysis chapter will aim at exploring the interviews content in this specific frame, looking into how the Finnmarksløpet community envisions a future in the context of climate change and how are they able to react to such changes, in order to better grasp the dynamics, decisions, and mindsets shaping their resilience ability to environmental challenges affecting the Finnmarksløpet.

5.1 Absorptive and coping capacity

The absorptive capacity of an organization refers to how individuals or a system behave when unexpected disturbances happen and have a very sudden impact; it is the ability to "act immediately after shock to absorb(ing) the impacts of system disturbance with little effort" (Proag, 2014, p. 374). In the context of long-distance sled dog racing, and more specifically the Finnmarksløpet, the absorptive capacity translates into an ability to cope with the direct and immediate repercussions of the shock, without changing the race structure itself or having proactively planned solutions beforehand. It is more about coping with the changes rather than actively planning a certain way to react to them. It is important to note that the absorptive capacity may involve some slight modifications, but actions are taken and decided at a last-minute time scale (Duchek, 2020). Overall, this capacity relies on a reactive and accepting process, where the focus is on responding to the problems in real-time rather than preventing it from happening in the first place.

5.1.1 Awareness of change

When starting the interviews, it seemed necessary to begin by assessing each participants perception of climate change and their stance towards it, as it also reflects on the first research question. Indeed, the perception that climate is changing can be highly subjective and shaped by a variety of factors, despite the fact that climate change itself is a measurable scientific phenomenon (Weber, 2010). This section helped to reflect on how climate change concretely impacts the practice of dog mushing.

Each participant expressed a clear awareness of changing climatic conditions, both in Norway and in Finland, as two of the interviewees were Finnish. When they were asked about their perception of climate change in their region, Participants 3 and 4 immediately said that they can feel directly that "*things are changing*". While some participants showed some skepticism toward the exact term of climate change, making a distinction between long-term climate shifts and normal weather variability, there was a common acknowledgement that weather patterns are becoming more unpredictable, with more frequent switch and quite uncertain forecasts.

Participants did not necessarily point out a constant rise in the temperatures but emphasized an increase in the intensity and frequency of extreme weather events such as the so-called "polar low pressures" (Participant 3). To simply describe the phenomenon of a polar low, the weather institute BarentsWatch defines it as an intense weather system that forms over cold ocean areas, typically in winter, when cold air moves over warmer water. These "cyclones" bring strong winds, heavy snow, and extremely rapid changes in weather patterns (BarentsWatch, 2013).

Another point highlighted by most participants as a threat to both the Finnmarksløpet event in itself and the sport more generally is a certain sense of "climatic instability" (Participant 3), with sudden changes in weather conditions. These shifts were frequently mentioned as more disruptive than temperature alone. As participant 1 explained:

> There will be cold races. There will be races with like - 35 degrees. Of course, it will be cold. The problem is not that it's going to be cold. The problem is that it's suddenly very cold and we can handle it. And then it's very warm. And then it's very windy. And then

> there's lots of rain. And then there it becomes very icy. And that is the reason why the long distance is a little bit threatened. (Participant 1)

Other participants shared the same concerns, as such changes bring on different challenges like slushy conditions, overflow on the lakes and rivers, icy trails. Participant 3 noted that *"fast temperature changes have caused the rivers to open up in some parts"*, affecting both her training conditions and feeling of safety on the track. Similarly, Participant 4 shared that during this winter, the weather had shifted several times *"from one extreme to another in a few days, from minus 35 to plus five in just two days*". This kind of situations are not uncommon in Norway or Finland, but they are becoming increasingly intense, lasting for longer times, and reoccurring more often. These fluctuations carry significant consequences for the race organization, for the logistics, for the training season, but also for the well-being and training of both human and four-legged athletes.

While all participants shared the same awareness of the unpredictability of current weather conditions and how they are, or could be, threatening the future of long-distance races, there seemed to be personal distinctions in how they interpret it. Some of them viewed this issue as a long-term but not imminent concern, while others felt a more immediate sense of urgency. This divergence could be explained by a difference of emotional engagement, which could be itself linked to the geographical location of participants. Indeed, two participants from Norway (Participants 1 and 3) appeared more alert to the threats of climate change to the Finnmarksløpet than the participants from Finland. This could be connected to the more volatile coastal weather patterns influenced by the Gulf Stream, as pointed out by Participant 3:

> We know that the weather is quite unreasonable with us because of the Gulf Stream (...). It will rain one day and it will snow the next. And then again. You don't know what you will get because of the coast. But I really don't hope it will be like this forever, because it will be difficult if this is the new normal weather. (Participant 3)

The testimony of Participant 4 resonated with the previous one, stating that the Finnish weather conditions are usually more stable thanks to their position between Russia and Norway and the absence of coastal region in the northern part of the country. This variation in terms of perception of climate change is supported by Weber (2010) study. He argues that the perception of climate change can be shaped by personal experiences and cultural values through a cognitive

bias. In this kind of situation, individuals may be either overemphasizing or underestimating risk depending on recent events in their own upbringing and situation.

This awareness of change connects to an important step toward resilience: anticipative capacity. Although not included in Béné et al.'s (2012) resilience framework, Duchek (2020, pp. 225-227) emphasized the role of anticipation as a precursor to both resilience and absorptive capacity. The anticipative capacity, which can be defined as the ability to proactively identify and prepare for potential future challenges, can be seen as the first step towards resilience. Concepts of awareness and anticipation function in a reciprocal loop: without an anticipation capacity, awareness is simply a passive state disconnected to any concrete action. While most participants showed a strong awareness of environmental changes, fewer expressed concrete anticipatory strategies, indicating a potential rigidity between knowing that change is happening and acting on that knowledge.

5.1.2 Acceptance of the conditions

In addition to acknowledging that things are changing, as discussed in the previous section, accepting the current conditions offers a slightly different perspective on the coping capacity. While awareness is about recognizing that change is occurring, acceptance is about adopting those changes as part of the reality. It is about accepting the changes more concretely and integrating them into reel expectations and decision-making process (Duchek, 2020).

Indeed, a clear acceptance of the current climatic situation emerged throughout the interviews. This acceptance was showcased through different ways, but what was the most recurrent was that uncertain and rough conditions are simply "*part of the game*", as it was repeated multiple times by the mushers (Participants 3, 4 and 5). Indeed, mushers are the one confronted directly to the changing conditions when they are out on the trail and show a high degree of mental and individual resilience in times of difficulties, often "*seeing the glass half full rather than half empty*" as Participant 4 said.

Participant 3 even reflected on the bright side of facing difficult conditions during her training season. She explained that this year had been particularly challenging to find places to train her dogs, requiring to travel long distances from home in search of snow and to be more "innovative" to find solutions. However, rather than seeing these training issues as a setback, she recognized their value in preparing her and the dogs mentally for the difficult conditions on the Finnmarksløpet 2025, which was marked by intense polar low pressures. These training experiences strengthened the bond with her dogs and reinforced her confidence as a young musher:

> I think the only advantage of this winter is that we have only been training in bad weather. Only storms, polar low pressures, it has just been really shitty weather. And I think for us this year, Finnmarksløpet was also really a struggle, we had bad weather and so much snow. (…) I think that somehow with all the bad weather we have encountered this season, the dogs have been really calm. They have been really secure, and they have lots of self-confidence. (…) And my dogs were like, okay, we can do it (…) But I think with all of the bad weather I somehow trained the dogs on another way this year. (Participant 3)

Beyond Participant 3's experience, this perspective was reflected more broadly by other participants who described that harsh and unpredictable weather conditions were simply "part of the game" (Participant 4):

> The way I think about it, it doesn't change the thing that it's frustrating when you have all of a sudden really warm days in the middle of the winter, the perfect coldest winter season, you suddenly have plus six or seven and possibly some rain. It's frustrating, but you have to deal with it. (…) There's nothing you can do about it, but just take it as it comes. So that's definitely a challenge. (Participant 4)

Indeed, there was a shared understanding that outdoor and nature-based sports such as long-distance dog sledding are inherently vulnerable to environmental changes, and that nature will not always cooperate. This implies the need for the individuals that are involved to accept uncertain conditions and accept that the natural environment is not something that can be controlled.

During the interviews, mushers seemed resigned to simply navigate these challenges as they come, showing a form of helplessness. Participant 4 even went further and explained that

expecting smooth conditions would be unrealistic. A kind of quiet resignation also emerged from the discussion with all the mushers. This resignation is not in the sense of defeat but rather an acknowledgement that some things are beyond their control. They are not trying to resist to change or to deny it, they simply and calmly accept it. When the weather shifts or the trail becomes more challenging, their only option is to keep going.

This acceptance not only shapes how mushers experience the race itself, it also redefines what success means to them under fast-changing conditions. When mushers accept that long-distance racing conditions are not always in their hands, they also accept that success is not necessarily measured by final ranking, but rather by personal accomplishment. Although the race happens simultaneously for everyone, mushers traveling at the same pace often face the same weather disruptions under the same rules. Success is in this context defined by each individual's sense of achievement, as the following quotes illustrate:

> It comes to the fundamental thing in long distance racing. You have to make the trip. If you only go there with a race in mind and want to compete hard, even if you would be considered one of the top teams, you still have to make sure that you and your team actually make the trip, that you finish. (Participant 4)

> (So many) kilometers done in that weather. It feels like a bigger victory than actually my last time when I finished the race. Because it was so much harder for me. I think this year, I'm much prouder than when I finished the race last time. (Participant 3).

> The most important with an event like this, is that everyone is in the same situation. Everyone has the same rules. If a storm is coming up, if you are not lucky you will get it. If the storm is on the other side of the mountain and you don't get it but the others do, that's just part of the event. (Participant 2)

This process of acceptance reflects on studies conducted in psychological resilience in child development by Ann Masten (2001). Throughout her research, she defines resilience as a process inherent to any human, and not as a heroic or rare capacity as it can be sometimes thought. Being resilient from Masten’s perspective is not about showcasing extraordinary capacities or character traits to bounce back and fight back; it is a quieter form of acceptance of the reality and results from capacities such as emotional regulation or problem-solving, even under stressful situations (Masten, 2001, p. 227). This way to understand resilience aligns quite well with the attitudes

observed among the mushers who maintain a steady and coping mindset despite the situations they are in. Rather than resisting change, mushers rely on internalized coping mechanisms to deal with uncertain conditions, suggesting that acceptance itself can be a protective psychological factor. This idea of accepting uncertainty without resistance and even viewing difficulties as opportunities for growth was clearly reflected by participant 3 when she reflected on the positive conclusions from enduring challenging weather conditions.

This section emphasized the resilience and coping capacities of the mushers in particular, as they were the ones most visibly demonstrating the need to accept uncontrollable conditions. As the central figures of the race, mushers are those who remain continuously exposed to environmental challenges throughout the event. However, it is important to acknowledge that the other actors involved in the Finnmarksløpet also face similar environmental pressures. From my own observations, they also showcase a great capacity for accepting and coping with the sometimes-challenging natural conditions, even though they were not all included among the interviewees in this study. While the race could not take place without the essential involvement of other actors such as organizers, veterinarians, race technicians, volunteers, photographers; the mushers endure directly the fluctuating conditions, which may explain why their narratives more frequently centered around this concept of acceptance.

5.1.3 Reactivity

The third sub-section emerged during the analysis of the interviews, particularly in the discussion with the representative of the Finnmarksløpet organization, who emphasized the high degree of reactivity required to adjust to sudden changes in the race caused by adverse weather perturbations. Being able to cope with sudden issues requires a combination of reactivity, flexibility, and sometimes inventiveness for the mushers, but also for the organization and logistics team to find solutions to maintain the race as it is.

Indeed, mushers are highly dependent on the race organization, not only to plan feasible routes, but more importantly, to ensure that those routes are safe. This trust in the organization was emphasized by participant 3, who explained:

> I think this race makes you as a dog musher feel very safe, even though the weather's not treating you well, because everything is so well planned and organized. (…) When I saw the Alta river, it was basically open. I was thinking, shit, I'm really close to open water here, just two meters from the trail. I trust the trail breakers, but still it was a bit concerning. (Participant 3)

While she did mention a moment of concern upon seeing open water near the Alta River, her reflection underscored the confidence placed by mushers in the race crew. Mushers are truly appreciative towards the hard work put by these teams to constantly adjust the trail depending on the environmental conditions and doing their best to ensure a safe race for everybody, which was also highlighted by participant 4:

> They were forced to change the trail a little bit just because of one river was opened. So, of course, there was quite a big change they had to do, but because of eventually a fairly small thing. It happened so last minute that they were not able to build any like man-made bridge there. (Participant 4)

However, participant 1 underlined the fact that such situations are not usual and have, in fact, always been part of organizing a long-distance sled dog race. The main difference is that problems such as opening rivers are occurring more frequently. Within this context of absorptive capacity, some challenges such as a lack of snow on some limited parts of the trails are considered manageable and do not require specific adjustments. In contrast, open water areas where the ice breaks poses a more serious safety concern and requires immediate changes, and the difficulty lies in the fact that these conditions can appear suddenly, days or even hours before the race. In these conditions, the organization has to react quickly to reroute or secure the trail, which reflects an ability from the race team to be extremely reactive to deal with environmental-related issues. This capacity aligns with the concept of absorptive capacity, as defined by Béné et al. (2012), where a system cope with and absorb shocks while maintaining its basic functions and structure. Changes do not aim at improving the system's organization, but simply to continue operating despite external turbulences.

To react appropriately and effectively to these conditions, Participant 1, as part of the Finnmarksløpet organization, emphasized the need to strengthen their capacity *"to be more able*

to handle unstable" situations. As he elaborated on this point, he highlighted the need to invest in "*know-how*". In his words:

> What we can do is to get more know-how. It is about how we could increase and strengthen our knowledge, how to get new techniques, tools, products, wisdom, and people who can handle those things. (Participant 1)

Increasing this "know-how" capacity reinforces the idea that resilience in this context is not merely about reacting to crises but also from building knowledge and an internal capacity to deal with challenges. The ability to react efficiently in these situations requires the combination of different factors, but most specifically it requires the combination of knowledge, experience, and flexibility. The same interviewee acknowledged a certain passivity from the racing milieu in general, blaming that *"we talk too much about, oh, it's become so warm, it's so wet, so windy, so this or that. We need to talk more about how to deal with it".* From his perspective, gathering experienced people would be a key asset to enhance the organization's readiness to cope with unexpected situations. This suggests that the focus should shift from simply observing the environmental changes to actively prepare for them.

In this sense, resilience becomes more dynamic and proactive, moving away from the absorptive perspective which is characterized by more a passive and immediate reactions to shocks. As the frequency and unpredictability of such issues is increasing, it reveals the limitations of the coping capacity of the organization, which seems no longer sufficient. As Participant 1 suggests, it is now necessary to move beyond short-term solutions and to proactively invest in the future of the Finnmarksløpet through active learning, innovation or collaboration. Such a shift to long-term vision reflects the principles of the adaptive resilience and the limits of the absorptive resilience.

5.1.4 Limitations of absorptive strategies

As showcased by the end of the previous section, the absorptive resilience has its limits, especially when the intensity of changes increases. While coping solutions allow for immediate responses to environmental challenges, this capacity remains limited by the inability to address long-term or more frequent disruptions (Béné et al. 2012). This reflects the sentiments expressed

by most participants concerning the increasing frequency and intensity of weather-related challenges.

While this may not be apparent now, it raises concerns about how this might evolve over time. The organization team is always on alert, trying to predict and address potential issues, including the ones arising from environmental factors. This was illustrated by Participant 1's explanation of the constant state of anticipation and readiness:

> For example, this year, three weeks before the race, it was less snow, the snow has melted and there were some parts where very little snow. Three weeks before the race, we had a meeting with all the trail breakers areas. There's like five areas. I called all of them to check what's going on. And we checked them along the forecast 10, 12 days ahead, but if there was some big issues, then we will have to do something fast. (Participant 1).

This constant state of readiness can lead to reduced efficiency in handling unexpected challenges or result in poor decision-making under stress or fatigue. Over time, the need for constant last-minute solutions, without sufficient preparation or foresight, could affect the organization's overall well-being and hinder its ability to function smoothly. This highlights the limitations of depending too much on a reactive process, as it makes the organization more vulnerable to failures.

This reflects a certain similarity between absorptive capacity and engineering resilience, as both aim to maintain a system's function without requiring major structural changes. However, as noted by Folke (2016), this approach is less effective when addressing challenges like climate change, which involve slow, incremental, and long-term transformations. Such processes often exceed the limits of systems designed to absorb shocks and return to a prior state (Lew & Cheer, 2017, p. 10).

The main limit and concern that was highlighted by every participant is the safety. Safety for the dogs but also for the mushers seems to be the red line that cannot be crossed. While psychological resilience and the ability to cope with challenges are essential traits in long-distance mushing, they are only considered valid strategies as long as safety remains uncompromised.

Participant 3 explained that some conditions caused by rough weather such as extremely icy trails or routes without snow not only make the trail more challenging, but it can also become genuinely dangerous. She went on by explaining one particularly harsh training she had in the winter, highlighting that she would not take the same risks. She said:

> I ended up cutting loose eight dogs and I had two dogs in the team because it was terrible, I would have probably die. And I broke the sled, it was horrible. It looked like a train had been running over me, I was bleeding so much from my head. I don't ever want to feel that feeling ever again. (Participant 3)

She went on to express her concerns about the situation on the Finnmark Plateau during the Finnmarksløpet: "*On the plateau, there was nothing, no snow. If I flip the sled, I was not sure if I would be able to get the sled up again, because it was only ice*." (Participant 3). Another musher echoed this perception about the risks associated with steering the sled without snow: "*Because of the lack of snow, it makes it more demanding to maneuver the sled. And it makes it kind of tricky or possibly dangerous for yourself. Sometimes, you might choose to take a personal risk, but risking the dogs is a line I won't cross.*" (Participant 4).

Indeed, bad conditions caused by weather could in some situations push the mushers to reconsider participating to the race. From the interviewed participants, none of them actually had to crash due to unfavorable weather conditions, but if the weather would get as bad that it would represent a risk for the dogs, then they will reconsider participating, as explained by Participant 4:

> Some of the ways are risky for yourself. Some of the ways can be more risky for the dogs. That is something what you have to probably evaluate. If the ground would be such that it would be really high risk to be rough, rocky, kind of a small gravel, or something else that would be really hard for the dogs feet, then probably I would not go. This is not worth it. (Participant 4)

What emerges is a clear pattern where mushers are willing to endure and cope to tough and changing conditions, but not at the expense of their dogs' well-being. Despite their competitive mindset and commitment to completing the race, the top priority is the dogs. For many, pushing beyond those limits is not only unsafe, but also a risk to betray the trust that connects them with

their team as said participant 3: *"I'm so scared to push my dogs over their limit because they use more energy on the bad weather than if it's good weather. So I was like really scared of like pushing them too much and lose their faith in me as a musher".*

5.1.5 Summary of the absorptive capacity

Overall, considering absorptive capacity in the Finnmarksløpet context led to four main subcategories. First, it was important to assess the current state of the weather conditions, identifying visible changes, and understanding the challenges these pose to the race. The second axis focused on the acceptance and individual resilience especially among mushers, who tend to accept adverse conditions as part of the experience. The third aspect concerned what is needed to strengthen absorptive capacity: a combination of reactivity, flexibility, and knowledge. However, the absorptive capacity remains limited in the face of ongoing climatic change. It seems likely that this capacity to simply cope with upcoming situations will no longer be sufficient, potentially threatening critical aspects of the race, including dog safety and overall operational viability.

5.2 Adaptative capacity

As previously discussed, the adaptive capacity involves a proactive approach by the organization, here the Finnmarksløpet, to handle changes. Oppositely to the previous capacity, the adaptive capacity is not about merely reacting to what is happening. It is about intentionally planning strategies to enable the system to adapt to external shocks. Despite being a more flexible and open solution, the adaptive capacities must not compromise the core identity of the organization and changes should be "incremental" (Duchek, 2020; Béné et al., 2012).

In the context of the Finnmarksløpet, thinking about solutions that fall into the “adaptation” category currently appear to be abstract and at a “thinking phase” with limited concrete actions taken so far. Participant 5 even state that adapting the race is right now “not necessary”. However, the absorptive capacity has its limits over time and, considering the increasing uncertainty regarding the climatic, it becomes crucial to consider adaptive measures to preserve the race's current model. Adjustments will need to be carefully considered to keep the race viable without crossing the red line that defines its identity.

Before exploring the different options that emerged as potential solutions to adapt to changing climatic conditions, it is important to note that none of the interview participants currently saw a need for radical changes. Instead, there was a general openness to adjust certain aspects of the race if conditions were to worsen in the future, especially regarding the trail and the snow conditions. All the participants expressed a relatively high level of confidence in the continuation of similar winter conditions over the next ten years.

5.2.1 Trail management

Without any doubt, the most widely agreed-upon solution for addressing the impacts of climate change was to improve trail management, including the possibility of relocating sections of the trail. Participants consistently pointed to the geographic positioning of certain parts of the route as a recurring challenge in recent editions, particularly zones involving river crossings or segments located closer to the coastline, such as Alta and Varangerbotn (Participant 1). As

previously mentioned, these areas are especially vulnerable to rapidly changing weather conditions, making them less reliable as climate variability increases.

First of all, it is important to clarify what was meant by "trail management" solutions. Participant 1 explained that *"the most important factor for us is to be able to move if we have some troubles to find other part of the trails, some new trails that will be more snow safe, with less river crossing and that is not maybe that exposed."*. In other words, adapting the trail could involve rerouting certain sections of the track towards areas that are more reliable in terms of snow coverage, and less vulnerable to ice-related challenges.

Such changes can vary in scale, from relatively minor adjustments to more extensive rerouting. As Participant 1 noted, it can be as simple as *"mov(ing) the trail around the lake and cut some trees"* in order to avoid problematic areas, such as lakes with overflow or sections where ice conditions are unsure. Participant 4 shared the same perspective and said:

> It was just warm enough that one river at the mountains opened a bit too much to be safe to cross. Then, it's about planning the trail, they just make you go through another way. They've had put a longer stretch over the mountains between Jergul and Levajok. (Participant 4)

Participant 1 also explained that last minute changes to the trail are not a new challenge for the Finnmarksløpet organization, these issues have existed for a long time and required quick reactions, with an example from the 90s when the ice was suddenly not safe before the teams' passage: *"They moved the teams with car from one place to another over a fjord or something that was open. And then they had a restart"*. He also mentioned a similar situation happening in 2004: *"They had a big trail change due to very, very warm weather and lots of rain".*

These examples reflect a strong absorptive capacity, as seen in the precedent section, demonstrating the level of flexibility and knowledge required to maintain the race despite sudden disruptions. However, these short-term adjustments are occurring with increasing frequency due to increasingly unpredictable weather patterns, gradually becoming a routine aspect of trail management. As a result, there appears to be a growing blurring of boundaries between absorptive and adaptive capacity because these disruptions are no longer exceptional events and

are now highly anticipated. This recurrent pattern highlights a certain need to consider more structural and long-term adaptations.

Participants 2 and 3 suggested the possibility to not only avoid problematic segments, but to consider the relocation of larger sections of the trail to areas that would most likely be less exposed and more climatically reliable. They both mentioned the option to move parts of the trail over the Finnish border. Indeed, Finland is less frequently affected by intense phenomena such as polar low pressures, which causes sudden and hazardous weather shifts in Norway. These situations are often responsible for challenging periods during the race, as highlighted by Participant 5, who described being stuck in a storm for three days, which ultimately led to his withdrawal from the race. Participant 3 shared her thoughts about this option:

> If possible, they would have to take part of the race in Finland. (…) I think for Finnmarksløpet they need to make a new way of thinking. Even if the name is as it should be in Finnmark, I think Finland should be involved. For the future of Finnmarksløpet, the best shot will be to move it partly somewhere else. (Participant 3)

Indeed, the Finnish weather seems to be generally perceived as more stable and predictable than their Norwegians neighbors. Participant 5 pointed this fact out:

> I know in Tromsø it has been maybe three, four times this year that snow has come and then it has gone. It comes one meter and next week it's almost everything gone. (…) It changes so fast and so often. It's close to the sea, so that makes it more difficult weather there than here (in Finland). (Participant 5)

On one hand, a greater weather stability could be beneficial for mushers, as it would allow them to better anticipate and adapt their strategies based on the forecast. Indeed, dogs are selected according to the expected weather conditions based on both physical characteristics but also individual temperaments. For example, participant 5 shared that he decided to leave one of his dogs out of the team due to the warm forecast, as the dog was the "*fluffiest of the team*". Nevertheless, unexpected conditions occurred, and temperatures dropped to minus 30 degrees Celsius for a few days. This can be seen as a minor problem, but making strategic decisions becomes more complicated with unreliable forecasts. On the other hand, more predictable weather conditions would allow the race organization to enhance their ability to anticipate effectively. When weather patterns are less erratic, it becomes easier to make logistical and

safety-related decisions with a higher degree of certainty. The examples above suggest that the apparently more stable weather patterns in Finland could make it an appealing option when considering relocating parts of the trail to areas less exposed to extreme weather events.

While Finland may offer a more predictable environment in general, it still has its own challenges. As participant 4 explained, Finland is not totally immune to variability either and has its own challenges:

> We have two main kinds of weather frontiers. If the weather comes from the continent, from the east—from Russia—it's extremely cold in winter and extremely warm in summer. But if it comes from the Atlantic Ocean, it's warmer and can bring snow or rain. So yes, it's variable, just in a different way. The contrast is really important. (Participant 4)

This observation aligns with meteorological studies emphasizing the contrast between coastal and continental areas due to difference in terms of air masses. As Autio and Heikkinen (2002) explain, the Finnish climate is both under the influence of the North Atlantic climate, influenced itself by phenomenon such as the Gulf Stream, and of the Asian continent from the east, defined usually with colder winters and sunnier summers. This position between two kind of climates explains in a way the variability of Finland's winters. However, this variability remains less important than the one from coastal Norway, where the exposure to Atlantic air is obviously more important than in Finland and characterized by more frequent changes, milder winters, and wetter conditions (Autio & Heikkinen, 2002).

One concern was raised regarding the possibility of relocating part of the trail to new areas: the presence of reindeer herding areas. Indeed, Participant 2 underlined the fact that there has been discussions previously about moving the trail partly to Finland, but they encountered some resistance from the herders as she explained: "*Since Finnmark is bordering to Finland, they tried in a way to get the trail from Kirkenes, when it's going back to Alta, to go into Finland, and then it was I think four reindeer herders that said yes, and it was one that said no."*. Participant 3 also emphasized the same issue, stating: *"I think the major issue is the reindeer herders, because that would mean trespassing their areas."*

The issue with crossing reindeer herding areas shows the difficulty of adapting the trail and balancing the needs for the race while respecting the traditions of local communities. Reindeer herding is already a threatened practice, not only due to land use pressures, but also by the consequences of climate change. Moving the trail to herding areas seems a delicate matter, as the herders have valid reasons to protect their animal and livelihoods from additional stress that may be caused by sled dogs or by snowmobiles used for marking the trail. As Participant 3 explained, reindeers are struggling to find food and are even beginning to give birth earlier than usual as a result of changing climatic conditions:

> I have many friends who are in the reindeer society, and they see that it's a crisis everywhere now because the reindeers can't find food due to the ice on the ground. They are basically starving if the reindeer herders don't feed them every day, because they can't get to the food through the layers of ice and unpredictable weather. (…) With this weather, many of the reindeers have already started to give birth to the calves, which is really unusual, because they don't usually do it before mid-May. (Participant 3)

Overall, relocating parts of the trail to the Finnish side, or further inland in Norway, could be a viable option to reduce exposure to the high variability and unpredictability of weather patterns. However, this option would require pushing the collaboration with local herders further and try to find a common ground that balances the needs of both the race and the herds.

5.2.2 Snow management

During each interview, another potential adaptation strategy that was addressed was the use of artificial or stored snow. The responses varied significantly, but the general consensus showed that this solution would most likely not be practical for the Finnmarksløpet, for a variety of reasons.

Indeed, as observed in other long-distance races that were cancelled, one of the main challenges was the lack of snow. This underscores the need for better snow preservation and distribution methods to address potential snow shortages along the trail. This is not an underdeveloped practice in the broader context of winter sports; Participant 1 highlighted that Finland has already experimented successful methods to conserve snow. He said:

> They started to put tarp in Finland. They do big, big, big piles of snow and they cover it. And even though there's plus 25 degrees in the summer, there will be lots of snow left so they could put it out early. (Participant 1)

This technique results from the concept of "snow farming". Participant 1 referred to the techniques used by ski resorts in Finland such as Levi Ski Resort, where snow from the previous season is piled up and preserved under specialized blankets combined with insulation technologies. These methods allow a significant amount of snow to survive even through warm summers, enabling an early start to the winter season (Levi, n.d). Another alternative to poor snow coverage could be the use of snow cannons, a technique widely used by ski resorts—especially when preparing for major events (Levi, n.d.). The potential of snow storage solutions has been extensively researched and implemented at ski resorts, in regions such as the Pyrenees, to adapt to warmer winters (Grau, 2024). In the context of the Finnmarksløpet, storing, covering, and snow making techniques could potentially serve as a backup solution to ensure snow availability in case of unexpected shortages along the trail, either due to warm winter or unexpected rainfall for example.

However, considering the scope of the Finnmarksløpet with trails ranging from 200 to 1200 kilometers, the process of covering the entire trail with artificial or stored snow is simply not feasible. Fixing snow conditions along the entire route was not even seen as an option. As Participant 1 and 3 noted, improving snow coverage on particularly critical or dangerous sections of the trail might be a more realistic and worthwhile consideration for the future.

The issue of budget was only briefly mentioned during the interviews and was not even considered as the biggest issue. Indeed, the logistics alone make it nearly impossible to cover such vast distances with man-made or conserved snow. While Finnmarksløpet is one of the most important long-distance sled dog races, even its financial and human resources are limited, and the ultimate decision-maker is the nature. As Participant 4 put it:

> When you talk about hundreds of kilometers of trail, you must have the conditions from nature. You can fix small things. You know, if you have a little river open somewhere, you can build a temporary bridge and stuff like that you can do. But if you don't have snow or proper ice, then there's nothing you can do. (Participant 4)

Therefore, adaptations based on snow management appeared feasible only on limited sections of the trail and would not be applicable to the entire route in the event of a snowless year. This limitation reflected once again the supremacy of nature, highlighting the extent to which the event remains deeply dependent on natural conditions.

5.2.3 Schedule management

During the interviews, one question focused on the possibility of adjusting the race schedule by moving the event to a different date, one that might offer safer or more predictable winter conditions. Participant 1 clearly expressed that this was not an option that they would be willing to think about. As he said:

> No, no, we will not move. We will not move. I can say that for 99% sure we will not move because if we move further on earlier, there are so many other things that will be an issue. It has been week 9, 10 or 11 and it will be for many more decades. (Participant 1)

Indeed, moving the date of the race to earlier in the winter season would not necessarily fix the problems related to the weather conditions. None of the interviewees were able to identify a specific period that could be considered significantly safer or more reliable in terms of snow and temperature. As Participant 3 pointed out, even earlier in the season, snow conditions in Norway have been made of "*ups and downs*", inconsistent and with repeated fluctuations. The other issue that would be raised by changing the date is related to the already tightly packed and busy schedule of the overall race season, which leaves little room for adjustment. For example, Participants 1 and 3 mentioned that the other important race in Norway, Femundløpet, was already quite close to the Finnmarksløpet in terms of schedule.

Another reason against an earlier date is that other races leading up to Finnmarksløpet serve as valuable "training camps" for both mushers and dogs. Advancing the race would risk reducing participants' preparation time and overall readiness. Participant 1 explained that maintaining other races and participating to them is important for the mushers, he said:

> It's so important that that many races aren't cancelled. We need races to be raced because mushers need to move. If it is hard to train, if it is hard to race and few races, then of course for Finnmarksløpet and everybody in the sport, this will go back. (Participant 1)

The importance of racing prior to the Finnmarksløpet as part of the training process was also emphasized by Participant 3. She shared her experience of participating in another smaller race few weeks before the Finnmarksløpet. That race marked her first time of the season training with actual snow and sled, highlighting how late snow training can sometimes begin for some mushers, and how essential these preliminary races are for proper preparation. As she explained:

> And last year when I was doing the Beaskádas race in Finnmark, which is the first or second week of January, it was the first time on the sled for the winter season. So, I was basically training. Some years, I'm training on wheels all the way until that weekend. (Participant 3)

This example shows how closely tied the race schedule is to training routines, and how moving the Finnmarksløpet to an earlier date could negatively impact mushers preparation, especially in seasons with delayed snowfall or heavy rainfalls. Therefore, this option to move the Finnmarksløpet was not something plausible either.

5.2.4 Summary of the adaptative capacity

Overall, the adaptive capacity of the Finnmarksløpet appears to be quite limited at the moment. While there is an acute awareness of ongoing changes, there seem to be very few concrete adaptations being implemented. Solutions such as modifying the schedule or fully covering the trail with artificial snow appear to be largely disregarded. Other more feasible adaptations such as relocating larger parts of the trail to less exposed areas or covering dangerous zones with additional snow could be considered. However, there seems to be a degree of inertia, possibly due to the belief that snow and ice conditions will not drastically change in the near future to the extent that would require significant adjustments.

5.3 Transformative capacity

The third and last component of the resilience framework is the transformative capacity. This capacity is defined by Walker et al. (2004, p. 7) as "the capacity to create a fundamentally new system when ecological, economic, or social (including political) conditions make the existing system untenable". A key word in this definition is *fundamentally*, as it underscores the depth of change required. As Béné et al. (2012) further explain, transformation involves major shifts not only in a system's structure and functions, but also in its underlying values. It is the most evolutive form of response to external pressures out of the three dimensions, requiring a rethinking of the system's own foundations and with the highest level of change.

In general, achieving deep and transformative modifications encounters more obstacles and resistance than the other two capacities, where less invasive and more socially accepted adjustments are involved. Indeed, transforming a system to make it deal better with changes is not only about the structural or functional modifications; it often challenges the already embedded norms and deep-rooted assumptions. Such level of change can be particularly difficult to accept, as it touches on the core values that individuals and institutions rely on (Béné et al., 2012).

In the context of the Finnmarksløpet, long-distance racing is an institution that has largely maintained its original form and identity since its beginnings, which could suggest that any attempt to alter its fundamental structure could be met with some degree of resistance. However, given the ongoing environmental changes and the uncertainty surrounding how long the current system can withstand increasing ecological pressures before becoming unsustainable, it is important to begin considering the potential for transformative capacity. While interview participants and the broader dog mushing community do not currently anticipate an imminent "collapse" of the system, nobody knows how fast climate change could impact the race. As Participant 3 said: "*the thing is that with the climate change we don't know how things will be in the future*".

A few transformative changes could be imagined to be applied at the Finnmarksløpet, but they would be challenging to put in action. According to Ostrom (2010, as cited in Folke et al. 2021, p. 850), this would require the combination of different elements such as “trust, cooperation, collective action and flexible institutions”. In the case of long-distance dog sled racing, this could mean reimagining how the sport is practiced, where it takes place, and even rethinking the very meaning and purpose of the race itself. Based on broader discussions within the community, two potential transformative directions were considered to steer the interviews.

5.3.1 Wheeled racing

Considering the increasingly pessimistic forecasts for snow conditions in the upcoming decades, one alternative to preserve a race-like experience without relying on snow was to introduce wheeled races. This would mark a significant change from the traditional snow-based format toward what is already known as "dryland mushing". In theory, it could serve as an alternative if natural snow becomes unreliable and artificial or stored snow would not be part of the options.

“Wheeled racing” was explained to the interviewees as a replacement of traditional sleds with carts or kick-bikes and would take place on dirt or gravel trails. Due to increasingly volatile winter conditions, dryland mushing has already been recognized by the International Federation of Sleddog Sports (IFSS) as an official discipline, including activities such as rig racing, bikejoring, scootering, and canicross. Among these, rig racing is the most similar to traditional sled dog racing and consists of “dogs (are) harnessed in the same way as for a sled with the sled being replaced by a 3- or 4-wheel rig or cart” (IFSS, n.d.). Such practice is not unfamiliar to mushers. Rig racing and other techniques such as driving with all-terrain vehicle (ATV) are commonly used as training methods during autumn or even late summer, helping teams build strength and endurance after the more relaxed summer period. It serves as a key part of the preparation for the winter racing season.

The responses to this possibility were mostly negative from the interview participants. The main reason was that dryland racing is simply not considered part of the race’s identity. When asked about this potential shift, Participant 1 said: “*this is not what we do. (...) This is not our DNA*”.

This sentiment was shared by Participant 4, who said:

> Right now it sounds awkward to me, at least as something to be developed up here. When we are training on wheels, that's normal, but it's different. It's the training, so it doesn't feel the same as competing. (Participant 4)

Participant 5 shared a similar opinion, explaining:

> I think if there is no snow then it's kind of end of the race. It's not just part of it. Like if there is no snow so then you just can't make the trail, then we need to go with the four wheelers or something. It will not be interesting and then it's not any more sled race. That will be different. (Participant 5)

Nevertheless, it is important to mention that the resistance towards implementing such changes is not only rooted in an emotional attachment to the original race format, but also on practical challenges of transforming long-distance sled racing into a format that could be held on bare ground. Unlike short dryland races, replicating the scale, endurance, and logistics of a 200, 600 to 1200 km race without snow presents serious technical and safety concerns for both mushers and dogs. As Participant 1 explained, "*it will be something completely different, and it will be hard pressure on the terrain. Terrain will be more smashed, risky, and the fun will disappear*".

Some participants also emphasized that the physical demands of dryland racing would not be suitable for the current sled dogs bred for long-distance sledding, which was supported by the opinion of a race veterinarian. During an informal discussion, she related that the terrain, temperatures, and impact on the dogs' joints and paws were factors that would make this transformation most likely impossible on such long distances and with that kind of dogs.

Participant 4 pointed out:

> When the conditions are such that you have to do it on wheels, I think it's too hard, or at least you would have to start considering completely different type of dogs to do it. Not this Arctic type of dogs, that's the thing. On a bare ground and presumably not cold either, it's not an option. (Participant 4)

Similarly, Participant 2 explained that: "*If it's too warm, then also for huskies it would be difficult, they have a lot of fur. Then maybe new dogs will come in, but it's hard to predict*".

Indeed, the breeds currently used in long-distance sled racing are primarily Alaskan and Siberian Huskies. Alaskan Malamutes and Greenlanders are also sled dog breeds sometimes spotted on trail. These dogs have been carefully bred and selected over decades to endure extreme cold and demanding terrain. With their thick fur, robust paws, specific airways, and unique body structure, they are biologically adapted to thrive in cold and intense conditions. The long-distance sled dog is not only an elite athlete, but they are also the heart and identity of the sport itself. (Reinhart 1996, pp. 137-138). While some breeders have begun incorporating shorter-haired dogs to better tolerate rising temperatures as explained by participant 5, this adaptation comes with trade-offs. These dogs are less suited for periods of extreme cold, which are still common due to the fluctuations of weather patterns. This makes it difficult to switch entirely to dogs that can handle warmer temperatures without risking their health or performance in colder conditions. Participant 5 also explained that events such as the Finnmarksløpet are part of the reasons why breeds like the Alaskan Husky are still existing: *"For example, everybody in Alaska have snowmobiles now and dogs were not that used anymore. Then they made the race to keep the dogs alive and have some purpose for them. Now the tourism businesses have also been growing really much, so that's keeping the dogs here and keep the culture of breeding sled dogs".*

All the reflections above highlight that switching the Finnmarksløpet to a wheeled format on gravel routes is not seen right now as a viable option to preserve the race. Participants consistently emphasized that without snow, it simply would not be Finnmarksløpet. For many, the idea of such a future format felt absurd or incompatible with what the race represents. This response underlines that the resistance to wheeled racing goes even beyond logistical or technical concerns and is intimately tied to the fundamental identity of long-distance mushing itself.

5.3.2 Redefining the race identity

Participant 2 brought up a perspective that was not initially considered as a possible transformation, but which appeared as an interesting angle to target the transformative capacity: rethinking the nature of long-distance racing itself. The Finnmarksløpet is characterized by its extreme nature where mushers and their companions cover up to 1200km in under a week, with minimal rest, through day and night, in extreme cold, snowstorms, and even rain. While the

weather-related challenges of the race may be uncontrollable, what can be controlled is the race format itself. Indeed, transformative changes do not only involve physical and structural adjustments but also cultural shifts, where the values and identities can be questioned. (Béné et al., 2012, p. 22).

Shifting the race format to a shorter format or less intense could reduce teams' exposure to the growing risks tied to climate change. However, it opens up a broader question regarding the identity of the Finnmarksløpet: does the specificity of this race lie in its "extremeness" or in something else? Participant 2 explained:

> I think you must always have that connection to animals in a way and you can have this in so many ways. You don't have to go 1200km to do it. That's the extreme. It's just a few that do that. (…) I hope they can make changes so that we can make a dog sledding broader. (Participant 2)

This insight opens the door to a broader conversation about the core values of the discipline, and about what truly defines the Finnmarksløpet. As Participant 2 emphasized: *"the relationship with the mushers, with the dogs, and then the nature elements is symbiotic"*. Therefore, if the most meaningful aspects of the race lie in values such as the human-dog relationship and the connection with the nature, then shifting to an alternative format, whether in terms of distance, location, or even equipment, would not necessarily compromise its essence.

She also highlighted the importance of solidarity among mushers: "*A lot of the mushers are helping each other out. If they lost something or whatever, or with advice. That is also, I think, a very important part. You are competitors, but at the same time, you wish the other well. You will help them if they need help."* These thoughts show that the heart of the Finnmarksløpet does not only lie in the extreme conditions, or the numbers of kilometers travelled, but in other meaningful values such as the relationships with others, with animal, with nature. If these values can be preserved, then it would potentially be possible to see an evolutive and transformative race format.

When mushers were asked what distinguishes the Finnmarksløpet from other races, one participant responded by emphasizing the community and organizational aspects that contribute

to the race success. From Participant 3 point of view, it is not just about the race itself, but about the gathering of people from various backgrounds, ages, and countries, creating a "*big family*" feeling. In her own words:

> It's a good organization, and it's a really good event that brings people together. And by that, I mean not only dog people, but also the locals. It's a party with everyone, from kids to old people, dog lovers, and everyone who likes to be outdoors. It's good because you get to see nature, you get to see wildlife. (…) I think it's very unique because most of the races are not that well organized. To be such a big race, most of the things go so smoothly. And also, the locals are really friendly, they would stand on the trail to hand out chocolate to you while you pass with your dogs, or hot chocolate, or in the middle of nowhere. That's an amazing feeling. (Participant 3)

However, this perception was not shared by all the participants. Two mushers emphasized that, despite the challenges encountered because of weather conditions, it is exactly these challenges that define the race and provide the sense of reward that comes from participating to the Finnmarksløpet. For them, overcoming the adversity presented by the Finnmarksløpet is what makes the achievement meaningful and what distinguishes it from other races that may not carry the same level of difficulty or endurance. This opinion was also highlighted during informal discussions with other mushers, which lead to think that the race identity remains deeply rooted in this “extremeness” and the status of the Finnmarksløpet as the longest dog sledding race in Europe.

5.3.3 Summary of the transformative capacity

Based on this diversity of perceptions, it seems delicate to come to a conclusion regarding the openness of the dog mushing community to envision transformative changes within the Finnmarksløpet, whether in terms of form or distance. Indeed, the identity of the Finnmarksløpet is rooted in different factors, which were previously described as the relation to nature, to the dogs, to others, and the achievement feeling to complete such a race. Throughout the interviews, participants did not hierarchize the values in the same order, which could pose problems in the future to determine which values should be prioritized over the others to keep the race happening. In the current context, letting go of even a single core aspect could feel like losing part of what defines the race. Thinking proactively about the future of the Finnmarksløpet, and

how it might evolve to remain viable under increasing climate pressures, is therefore not only complex but also emotionally challenging.

Reflecting on the transformative capacity of the Finnmarksløpet illustrates the tension between maintaining the race as it is to respect traditions and finding alternative solutions to potential future modifications caused by climate change. As Béné et al. (2012) previously underscored, transformation not only confronts structural shifts, but also the foundational values of a system, as we saw in this section. In this situation, implementing the above-mentioned transformations would touch the very essence of what the race represents, revealing both the difficulty and necessity of envisioning futures that may challenge the status-quo.

6 DISCUSSION

This discussion chapter aims to interpret and thematize the findings that emerged from the precedent chapter of this research. Rather than following the predefined structure of the three dimensions of resilience from Béné et al. (2012), this chapter is shaped by broader themes that emerged gradually from the interviews and discussions. These themes reflect not only how participants respond to the challenges of climate change, but also the deeper aspects that shape those responses. In contrast to the precedent chapter which outlined clear distinction between absorptive, adaptive, and transformative capacities, these capacities are not so easy to disconnect in practice and seem to overlap and blend together.

6.1 The perception of climate change

The global acknowledgment that climate change is happening is a concept that the mushing community broadly agrees upon. They recognize that changes are occurring, but for most of them, the threat feels distant and not something to worry about immediately, which could cause issues in the long run (Folke, 2016).

Despite visible changes in weather patterns, many participants exhibit a sense of climate optimism. They believe the threat is not urgent, and they expect that they will continue to have winters and snow for the coming decades. This creates a contradiction: while they all acknowledge that climatic conditions are becoming more intense, they do not foresee a winter without snow in Finnmark anytime soon. The idea of a snowless winter feels distant, and despite hopes that it may not occur, there appears to be little action taken so far to seriously consider or plan for it. The threat feels abstract and distant from their immediate experience, which could affect their willingness to take a more hands-on approach (Weber, 2010).

This fact is reinforced by the strong acceptance of the natural conditions observed among the participants. As previously mentioned, this sport is deeply intertwined with nature, which is regarded as the ultimate authority, something that cannot be changed. There is a profound sense of humility showed by mushers, recognizing that their control over external elements is

insignificant and they must accept whatever conditions arise. Facing unpredictable situations is considered as part of the thrill and adventure, they sign a pact with nature when they begin their Finnmarksløpet journey. This intrinsic connection reflects a strong emotional acceptance, where climate-related challenges are not seen as obstacles to be overcome, but as essential and expected components of the race. There is no doubt that this ability to endure and integrate climatic disturbances without resistance has been a strength of long-distance mushing, allowing the sport to withstand environmental fluctuations without drastic changes.

However, despite the admiration for this mindset, it influences the strategies pursued for the future of the race and determines where the line is drawn between what is worth adapting and what is not yet necessary. Currently, it is still manageable for the Finnmarksløpet to maintain the race as it is, with minor adjustments mechanisms in place and relying on their own coping mechanisms. From a longer-term perspective, it is difficult to predict what might happen to the race without bigger changes. The absorptive capacity, while effective in the short term, could potentially block long-term transformation and might not be desirable for the race's longevity. It raises important questions about the extent to which absorptive capacity remains beneficial, and when it becomes counterproductive, signaling the need for deeper adaptive or transformative change.

Given the increasingly pessimistic climate projections, simply enduring disruptions may eventually become an insufficient mechanism and making deeper changes could become essential to ensure the continuity of the race. In this context, the community may need to look beyond mere coping mechanisms and consider what structural changes or adaptations would be necessary to ensure the long-term sustainability of the Finnmarksløpet.

6.2 Safety as the bottom line

A recurrent theme that was identified throughout all the interviews and which was already highlighted in the section about the limits of absorptive capacity is the priority given to dogs' integrity and safety. Safety for everyone was also obviously mentioned by the Finnmarksløpet organization as a top one priority but obtained less attention during the other interviews.

Referring to safety ultimately refers to the fundamentals of the bond between a musher and their dogs, which is essential and inherent to the practice of long-distance racing. This relationship has been extensively documented, but it is also something deeply felt when immersed in this world. It naturally reflects on the concepts of the dogs' safety and well-being, which then connects to the larger topic of animal welfare. This attention brought to the dogs' welfare during races is especially true for the new generation of mushers, who seem to place even greater value and attention on ensuring their dogs' health (Engmann, 2024). Finishing the race with healthy dogs is for them their biggest victory.

In the context of the Finnmarksløpet, all participants emphasized that enduring difficult conditions is a core aspect of the race's identity and that they were personally prepared to face such circumstances. However, they all agreed on the fact that the physical and mental well-being of the dogs was the red line that could not be crossed, setting a clear boundary between what is acceptable and what is not, between when they will keep racing and when they will stop. Indeed, if climate-induced changes intensify considerably, some mushers have expressed a potential willingness to reconsider their participation in long-distance races, unwilling to compromise their dogs' health. This concern could serve as a motivational factor for race organizers to explore deeper adaptation measures, or even to rethink long-distance racing in another shorter or less intense format.

It is important to keep in mind that some long-distance races have been and are still closely linked to debates regarding the safety of animals during dog mushing events, hence related to animal welfare issues. This is the case for the Iditarod, which has faced almost continuous criticism from the media sphere due to concerns about dogs' health conditions and especially over the extreme conditions faced by the teams (PETA, 2020). Indeed, the Iditarod is not only longer than the Finnmarksløpet with a total distance of approximately 1,770 km, but it is also known for its more difficult terrain and more frequent weather-related challenges with sections of the trail without any snow (Iditarod, 2025). These conditions have led to multiple debates regarding human and non-human safety, raising ethical questions about the integrity of animals in such extreme events. As future climatic conditions are expected to worsen, the debates regarding the challenges of such races could become more intense.

The Finnmarksløpet is not concerned with similar issues at the moment and has consistently demonstrated high standards of animal welfare. With changing weather conditions, maintaining these safety and well-being standards could become a motivation factor for the race to strengthen its capacity to respond to environmental shifts. By doing so, the race could position itself as a leading example of proactive resilience within the world of long-distance mushing in a context of accelerating climate change.

6.3 Community

The third recurrent theme identified in this research is the central role of community. In many ways the Finnmarksløpet is about the community, especially as the race was for a long time held by few locals. This has been highlighted throughout numerous studies such as the ones from Chukhanova (2018), Engmann (2024), Jæger and Olsen (2017), Jæger, and Viken (2016), Granås (2018); but also deeply felt throughout this research. Without it, the Finnmarksløpet would not be logistically possible, and would certainly lack the emotional depth that gives it its spirit.

Long-distance sled dog racing is a unique sport where supporters cannot follow physically the event in its entirety or in real time. Once mushers leave the starting line and head into the wilderness, physical contact is lost within just a few tens of kilometers. The only physical opportunities for spectators to engage directly with the race are at the start, the finish, and at checkpoints, where cultural events are held and organized. Outside of these moments, physical interaction is limited between the participants and the outside. Yet, despite this physical distance, the Finnmarksløpet is kept together by a strong and active community.

On one hand, the Finnmarksløpet relies on the community on a practical and organizational level. As Participant 2 said, "*dog sledding is a small community*" where the efforts of organizers, veterinarians, trail managers, volunteers and handlers are combined to make the experience for mushers as smooth and safe as possible. The coordination of such a complex event requires dedication, trust and a precisely timed management of operations. This feeling of community is also something that can be found outside on the trail, where mushers do not hesitate to help each other's out, or earlier during the training season to maintain trails (Participant 2).

On the other hand, the community is not reflected only on the logistics aspect. It seems to be what gives the race its emotional and cultural meaning. The Finnmarksløpet is described as an important moment of gathering, a tradition, not simply a competition, a moment awaited by many (Engmann, 2024, pp. 61-63). Even individuals unfamiliar with sled dog racing are showing a great engagement, either to celebrate this traditional event, cheer the mushers and their dogs, bringing school classes to the starting line, or simply following the athletes through online tracking. This broader sense of community contributes to the atmosphere and continuity of the event, anchoring it in the place's identity (Granås, 2018).

In regard to this thesis aim to improve the understanding of the resilience ability to climate change of the Finnmarksløpet, the role of community in accepting which changes are right was highlighted multiple times. Indeed, the community is an important element to consider when it comes to defining the boundaries of what is acceptable in terms of resilience. As supported by Adger (2003), social relations hold an important influence over the adaptive capacity of a system. He defends the idea that values such as trust and cooperation, which are transmitted through community interactions, when they are shared, can act as a facilitator of change as it creates a common ground. However, this same connection with others within a community can also restrain changes if they come from the outside. Wilson (2012) described this phenomenon as "psychological conservatism", where communities exhibit resistance to change and a willingness to maintain the same way of life even with external pressures to do so. This dual function of community reflects the complex role it plays in planning resilience.

In the context of the Finnmarksløpet, this duality is clearly visible. While there is a strong desire from the community to preserve the race for future generations and to keep going for many years, there is also significant resistance to implementing deeper transformations that might compromise the race's authenticity, despite the pressures implied by climate change. Snow, sleds, and the unique Arctic environment are not simply practical requirements of the race; they are integral to its identity and to what it represents within the community.

6.4 Methodological considerations

To conclude this discussion chapter, reflecting on the methodological aspect limitations and implications of this research project seemed important. Despite being conducted with great care and attention, this topic and the analysis of data confronted me to several challenges that are worth to be acknowledged.

The first aspect that is worth highlighting is the limited number of participants that participated in the interviews. Five individuals were involved: three mushers, a representant from the Finnmarksløpet organization, and a representant from the Norwegian Sled Dog Association. This number represented less than what was aimed at the beginning of the process. A relatively small number of participants can be seen both as a strength and a limitation. On one hand, it limits the validity of the data and the generalization of the findings to the broader mushing community. With only few opinions on this research topic expressed and analyzed, the data lacks to reflect the full diversity of views and experiences. On the other hand, this project was not aiming at producing generalizable results. It was grounded in a qualitative and interpretivist approach, with the aim of going deeper in the conversations and to obtain a better understanding of what the topic meant for them.

This lack of quantity was compensated by the quality of the conversations. Despite the initial skepticism of some participants before starting the interviews, wondering about how they could actually contribute, they all expressed a genuine interest about the issue of climate change and the future of the Finnmarksløpet. This concern also extended to their broader professional involvement in sled dog tourism, as two mushers are also active within tourism infrastructures. The conversations unfolded in a thoughtful and open manner, leading to rich interviews in terms of personal perceptions, experiences, and concerns. It is also important to note that my own participation to the event as a volunteer and media team member definitely played an important role in shaping this research. This position allowed me to get a more global understanding of the event and the community around it. It also facilitated the informal discussions and observations, which deeply enriched my reflections and writing process.

Despite contributing to the academic conversation by exploring a relatively niche and extremely specific topic, this focus also introduced more complexity than initially anticipated. While these unique dimensions make the research distinctive and valuable, they also posed certain analytical challenges and occasionally stretched the scope of the project beyond what was originally expected. Indeed, the Finnmarksløpet is not only a sporting event, it is also a cultural moment, a tourism product, and a tradition for the community. All those dimensions were sometimes challenging to balance.

7 SUMMARY

The initial aim of this study was to explore how an event relying on outdoor and winter features could perceive and respond to environmental challenges in a world where climate change projections are increasingly worrying. With this in mind, my attention turned to a sport and event dear to me: the Finnmarksløpet. The Finnmarksløpet is a long-distance dog sledding race, which is an event highly vulnerable to weather-related changes. If these changes intensify, the long-term future of this race could be threatened. Therefore, the aim of this study became to explore how different actors evolving around the Finnmarksløpet perceive and respond to climate-related challenges. The main research question guiding this research was the following: *How does the Finnmarksløpet community demonstrate resilience in the face of climate change?* The answer to this question was broken down into three sub-questions. The first sub-question aimed at finding out what kind of challenges are threatening the Finnmarksløpet and how these risks are perceived. The second intended to explore the kinds of strategies currently being implemented or envisioned for the future. The third sub-question focused on understanding the factors that influence whether members of the Finnmarksløpet are inclined to act or not upon the consequences of climate change.

This research was framed by the concept of resilience, which is, to define it briefly, the ability to deal and recover from changes. Despite being a term applied to difference field, using resilience as the backbone of this thesis allowed for a comprehensive understanding of how an event like the Finnmarksløpet can react to environmental disruptions. More specifically, the framework developed by Béné et al. (2012) was employed to ground and frame the process of data analysis. This model divides resilience into three capacities: absorptive, adaptive, and transformative.

The research data was gathered through a qualitative approach, based on five semi-structured interviews conducted with two mushers, a race organization representative and a representative from the Norwegian Sleddog Association. Furthermore, field observations during the Finnmarksløpet 2025 provided precious contextual insights.

The findings were structured under the three categories of Béné et al. (2012) framework. In the first place, the findings addressed the first sub-question by identifying the specific challenges that climate change poses to the Finnmarksløpet. The risks mentioned were not primarily related to a general rise in temperatures, but rather to increasing inconsistency and unpredictability in weather patterns. Participants emphasized that the real difficulty lies in this growing variability, which makes it harder to plan, train, and organize the event. Then, the second sub-question was addressed by uncovering which strategies were already implemented or possible to implement to address changing climatic conditions.

The absorptive capacity revealed a strong ability of the system as a whole to cope with environmental changes as they occur. This capacity was characterized by a high degree of acceptance and personal resilience among the interviewees, especially from the mushers. Although visible changes in weather patterns were acknowledged, they were generally perceived and accepted as inherent to the nature of the Finnmarksløpet and the sport itself as long as the safety of the dogs remains uncompromised. The limitations of this capacity were also emphasized regarding the long-term sustainability of relying exclusively on absorptive strategies.

The adaptive capacity of the Finnmarksløpet currently remains in a “thinking phase”, with no concrete actions implemented this far. Potential adaptive mechanisms identified include rerouting larger parts of the trail to less exposed areas, as well as strategies addressing snow reliability. Techniques regarding the snow conservation or use of snow cannons were considered but were ultimately considered logistically unfeasible on a large scale. Nevertheless, they could be potential solutions to be applied on limited sensitive sections of the trail. Rescheduling the race to a different time period was also considered as an adaptive solution but was not regarded as a possible adaptation strategy due to the already tight racing agenda. Overall, the adaptive capacity of the Finnmarksløpet appears to be an area requiring further exploration, with the potential to offer short- to mid-term solutions.

The transformative capacity encountered more reluctance than the two previous ones, as it was expected. Deeper changes such as shifting from sleds to dryland races using wheeled carts or

modifying the race format into a less extreme version were discussed but not really accepted as viable solutions. This resistance seemed to be linked to the difficulty of projecting the extent of future winter degradation, making it harder for participants to think in a very long-term perspective. It also led to a re-questioning of the identity of the race itself, what the Finnmarksløpet represents.

During the analysis of these findings, three recurring themes were observed and then discussed, answering the third sub-question. The first theme regarded the perception of climate change, which dealt with the difficulties in predicting and trusting future scenarios. For now, there seemed to be a real difficulty in imagining the long-term implications of climate change in terms of how and when it might significantly alter the conditions of the race. This uncertainty limits the openness to take actions in the present, as the future still feels abstract or too far away. The second theme addressed the topic of safety and animal welfare, which was considered by all as a non-negotiable priority, and as an important factor in deciding to continue or cancel the participation to a long-distance race. The third theme highlighted the importance of community in decision-making and in shaping the identity of the race. Given the strong sense of community that is fostered during the Finnmarksløpet each year, it could be interesting to explore further and actually identify ways to sustain the race long-term and preserve this feeling even if, one day, the "extremeness" aspect might have to be scaled down due to climate change.

Overall, this thesis contributes to existing research in tourism by exploring various strategies for outdoor-based events, with a particular focus on those that are highly dependent on winter features, to address the current and future challenges posed by climate change. Addressing the vulnerability of those events, and more specifically of the Finnmarksløpet, through the lens of the three dimensions resilience framework provided valuable insights into how these events can absorb, adapt, and, if necessary, transform in response to environmental changes. This approach emphasized the dynamic nature of resilience, which can sometimes be seen as a goal in itself rather than a continuous process. It stressed the limitations of viewing resilience purely as an end-state, particularly in the context of climate change, where such a fixed goal cannot be achieved due to the ever-evolving nature of environmental conditions. This perspective resonates quite accurately with Béné et al. (2012, p. 21), who state "resilience emerges as the result not of

one but all of these three capacities", reinforcing the idea that resilience is a continuous adaptive process.

While the race currently relies heavily on reactive and coping mechanisms, the findings suggest a need to begin planning for more proactive adaptations. One option that was highlighted was to invest more time and thoughts improvements of difficult parts of the trail through snow making techniques, or relocation of well-known difficult areas. It could also be beneficial to start developing longer-term strategies and consider different scenarios for the future, including worst-case scenarios. In order to do so, fortifying the relations and dialogue with a diverse range of stakeholders would be essential to better understand which strategies are both viable and locally appropriate. Engaging with local communities, reindeer herders, sponsors, and other relevant actors would create space to collaboratively explore solutions. Another perspective to be explored would be to implement cross-sector collaboration between the Finnmarksløpet, other long-distance races, and the tourism sector. These findings closely align with the study by Scott and Gössling (2022), which concluded that the accelerating pace of climate change will not only compel tourism-related businesses to adapt in order to mitigate its negative impacts, but also encourage them to explore new development possibilities.

Indeed, challenges faced by the Finnmarksløpet are most likely similar as the ones faced by other races, but also by dog sledding tourism businesses. With the rapid growth of the dog sledding tourism sector, it is essential for kennels to find ways to maintain the reliability and quality of their tours, which could be threatened the same way as the Finnmarksløpet. Therefore, further research regarding the resilience capacity of dog sledding tourism businesses could help to develop solutions and share resources together to navigate climate change challenges. Additionally, the overall sustainability of events such as the Finnmarksløpet could benefit from further research. Being locally organized and volunteer-driven events, these races often operate with limited budget and human resources, which hinders their ability to address environmental changes, but also to simply endure the logistical requirements of organizing the race each year. The future of long-distance races in the coming years is most likely to be under threat from both environmental factors and mounting economic pressures. This would represent a loss from a competitive perspective, but also for all the values represented by long-distance sled dog racing.

8 REFERENCES

Adger, W. N. (2003). Social capital, collective action, and adaptation to climate change. *Der klimawandel: Sozialwissenschaftliche perspektiven*, 327-345.

Äijälä, M., Jylkäs, T., Rajab, V., & Vuorikari, T. (2020). Designing Future Wildlife Tourism Experiences: On Agency in Human–Sled Dog Encounters. Wildlife tourism futures: Encounters with wild, captive and artificial animals, 4.

AMAP (1998). *AMAP Assessment Report - Chapter 2*. Retrieved April 19, 2025 from https://www.amap.no/about/geographical-coverage

AMAP (2019). Arctic Climate Change Update 2019-An Update to Key Findings of Snow, Water, Ice and Permafrost in the Arctic 2017. An Assessment by the Arctic Monitoring and Assessment Program.

AMAP (n.d.). How is climate change impacting the arctic? Retrieved January 7, 2025 from https://climate.amap.no/the-background

Arctic Council (n.d.). The Arctic in a changing climate. Retrieved December 1, 2024 from https://arctic-council.org/explore/topics/climate/

Arctic Council (n.d.). About the Arctic Council. Retrieved January 7, 2025 from https://arctic-council.org/about/

Autio, J., & Heikkinen, O. (2002). The climate of northern Finland. *Fennia-International Journal of Geography*, *180*(1-2), 61-66.

Baines, M. (2024). *The Arctic's Role in Global Climate: Why Protecting It Matters*. Global Choices. Retrieved April 6, 2025 from https://globalchoices.org/the-arctics-role-in-global-climate-why-protecting-it-matters/

BarentsWatch (2013). Polar lows explained. Retrieved April 14, 2025 from https://www.barentswatch.no/en/articles/polar-lows-explained/

Béné, C., Wood, R. G., Newsham, A., & Davies, M. (2012). Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes. IDS Working Papers, 2012(405), 1-61.

Bennett, M. M., & Iaquinto, B. L. (2023). The geopolitics of China's Arctic tourism resources. Territory, Politics, Governance, 11(7), 1281-1302.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Brinkmann, S. (2014). Unstructured and semi-structured interviewing. The Oxford handbook of qualitative research, 2, 277-299.

Bürki, R., Elsasser, H., Abegg, B., & Koenig, U. (2005). Climate change and tourism in the Swiss Alps. Tourism, recreation and climate change, 155-163.

Butler, R. W. (Ed.). (2017). *Tourism and resilience*. CABI.

Cai, Y. (2020). Renaissance of resilience: a buzzword or a new ideal?. Management and Organization Review, 16(5), 976-980.

Canh, N. P., & Thanh, S. D. (2020). Domestic tourism spending and economic vulnerability. Annals of tourism research, 85, 103063.

Chukhanova, A. (2018). *"There is no other arrangement, which is bigger". A qualitative case study of event meanings for local communities in rural areas* (Master's thesis, UiT The Arctic University of Norway).

Cochrane, J. (2010). The sphere of tourism resilience. Tourism Recreation Research, 35(2), 173 185.

Constable, A. J., Harper, S., Dawson, J., Holsman, K., Mustonen, T., Piepenburg, D., & Rost, B. (2022). Polar regions (Cross-Chapter Paper 6). In H.-O. Pörtner, D. C. Roberts, M. Tignor, E. S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, & B. Rama (Eds.), Climate change 2022: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (pp. 2319–2368). Cambridge University Press. https://doi.org/10.1017/9781009325844.023

Cottrell, S. P. (2003). Influence of sociodemographics and environmental attitudes on general responsible environmental behavior among recreational boaters. Environment and behavior, 35(3), 347-375.

Daudelin, M. W. (1996). Learning from experience through reflection. *Organizational dynamics*, *24*(3), 36-48.

Decrop, A. (1999). Triangulation in qualitative tourism research. Tourism management, 20(1), 157-161.

Demiroglu, O. C., Lundmark, L., Saarinen, J., & Müller, D. K. (2019). The last resort? Ski tourism and climate change in Arctic Sweden. Journal of Tourism Futures, 6(1), 91-101.

Dogru, T., Marchio, E. A., Bulut, U., & Suess, C. (2019). Climate change: Vulnerability and resilience of tourism and the entire economy. *Tourism Management*, *72*, 292-305.

Duchek, S. (2020). Organizational resilience: a capability-based conceptualization. Business research, 13(1), 215-246.

Duro, J. A., Perez-Laborda, A., Turrion-Prats, J., & Fernández-Fernández, M. (2021). Covid-19 and tourism vulnerability. Tourism Management Perspectives, 38, 100819.

Eijgelaar, E., Thaper, C., & Peeters, P. (2010). Antarctic cruise tourism: The paradoxes of ambassadorship,"last chance tourism" and greenhouse gas emissions. *Journal of sustainable tourism*, *18*(3), 337-354.

Engmann, L. (2024). The Young Eyes On Dog Sledding Events–Themes that contribute to the event experiences of young dog mushers attending Finnmarksløpet 2024 (Master's thesis, UiT The Arctic University of Norway)

Espiner, S., Orchiston, C., & Higham, J. (2017). Resilience and sustainability: A complementary relationship? Towards a practical conceptual model for the sustainability–resilience nexus in tourism. Journal of sustainable tourism, 25(10), 1385-1400.

Finavia (2025). Statistics for 2024: Peak year at Lapland airports – Finland's passenger numbers are growing more slowly than in other Nordic countries. Retrieved April 8 2025 from https://www.finavia.fi/en/newsroom/2025/statistics-2024-peak-year-lapland-airports-finlands-passenger-numbers-are-growing#:~:text=Tourism%20in%20Lapland%20continued%20its,the%20number%20was%201.5%20million

Finnmarksløpet 2024a. About. Retrieved November 22, 2024, from https://finnmarkslopet.no/finnmarkslopet-en/about/

Finnmarksløpet 2024b. Volunteer Information. Retrieved November 22, 2024, from https://finnmarkslopet.no/volunteer/information/

Finnmarksløpet 2025a. Contestant Information. Retrieved April 11, 2025, from https://finnmarkslopet.no/for-contestants/contestant-info/

Finnmarksløpet 2025b. Rules. Retrieved April 11, 2025, from https://finnmarkslopet.no/for-contestants/contestant-info/rules/

Finnmarksløpet 2025c. The Trail. Retrieved April 11, 2025, from https://finnmarkslopet.no/finnmarkslopet-en/map/

Folke, C. 2016. Resilience (Republished). Ecology and Society 21(4):44. https://doi.org/10.5751/ES-09088-210444

Folke, C., Colding, J., & Berkes, F. (2002). Building resilience and adaptive capacity in social-ecological systems. Navigating Social-Ecological Systems. Cambridge University Press, Cambridge, UK, 352-387.

Folke, C., Polasky, S., Rockström, J., Galaz, V., Westley, F., Lamont, M., Scheffer, M., Österblom, H., Carpenter, S.R., Chapin, F.S. & Seto, K.C., Weber, E.U., Crona, B.E., Daily, G.C., Dasgupta, P., Gaffney, O., Gordon, L.J., Hoff, H., Levin, S.A., Lubchenco, J., Steffen, W., Walker, B.H, (2021). Our future in the Anthropocene biosphere. *Ambio*, *50*, 834-869.

García-Rosell, J. C., & Tallberg, L. (2021). Animals as tourism stakeholders: Huskies, reindeer, and horses working in Lapland. In Exploring non-human work in tourism: From beasts of burden to animal ambassadors (pp. 103-121). De Gruyter Oldenbourg.

Giemsch, L., Feine, S. C., Alt, K. W., Fu, Q., Hilgers, A., Hülle, D., Knipper, C., Krause, J., Lacy, S., Nehlich, O., Niess, C., Pääbo, S., Pawlik, A., Richards, M. P., Schünemann, V., Street, M., Thalmann, O., Tinnes, J., Trinkaus, E., & Schmitz, R. W., (2013). Interdisciplinary investigations of the late glacial double burial from Bonn-Oberkassel. Science, 342, 871-874.

Gössling, S., & Scott, D. (2008). Climate change and tourism: exploring destination vulnerability. *Tourism Review International*, *12*(1), 1.

Granås, B. (2018). Destinizing Finnmark: Place making through dogsledding. Annals of Tourism Research, 72, 48-57.

Grau, O. (2024). Innovative Snow Storage Solutions for the Pyrenees Ski Resorts (Bachelor's thesis, NTNU).

Gressgård, L. J., & Hansen, K. (2015). Knowledge exchange and learning from failures in distributed environments: The role of contractor relationship management and work characteristics. *Reliability Engineering & System Safety*, *133*, 167-175.

Grimm, D. (2015). Dawn of the dog. Science, 348(6232), 274–279.

Guba, E. G. (1990). The alternative paradigm dialog. In. EG Guba.(ed). The paradigm dialog.

Haanpää, M., & García-Rosell, J. C. (2020). Understanding performativity and embodied tourism experiences in animal-based tourism in the Arctic. In The Routledge handbook of tourism experience management and marketing. Routledge, 229-237.

Hall, C. M. (2018). Resilience theory and tourism. In Resilient destinations and tourism (pp. 34-47). Routledge.

Hall, N. J., Johnston, A. M., Bray, E. E., Otto, C. M., MacLean, E. L., & Udell, M. A. (2021). Working dog training for the twenty-first century. Frontiers in veterinary science, 8, 646022.

Herrman, H., Stewart, D. E., Diaz-Granados, N., Berger, E. L., Jackson, B., & Yuen, T. (2011). What is resilience?. *The Canadian Journal of Psychiatry*, *56*(5), 258-265.

Holling, C. S. (1973). Resilience and stability of ecological systems.

Iditarod (2025). Iditarod Route 2025. Retrieved April 18, 2025 from https://iditarod.com/race-map/

Intergovernmental Panel on Climate Change (IPCC) (2001) *A Report of Working Group II, Climate Change 2001: Impacts, Adaptation, and Vulnerability*, McCarthy, J.J. Canziani, O.F. Leary, N.A. Dokken, D.J. White, K.S. (eds) Cambirdge, UK: Cambridge University Press

International Federation of Sleddog Sports. (n.d.). *IFSS Sports Disciplines*. Retrieved April 17, 2025 from https://sleddogsport.net/upload/document/about/Ifss_sport_activities.pdf

Isacsson, A. D. (1996). Sled dogs in our environment. Possibilities and implications, a socioecological study.

Jæger, K. (2020). Event start-ups as catalysts for place, sport and tourism development: Moment scapes and geographical considerations. Sport in Society, 23(1), 40-55.

Jæger, K., & Olsen, K. (2017). On commodification: volunteer experiences in festivals. Journal of Tourism and Cultural Change, 15(5), 407-421.

Jæger, K., & Viken, A. (2016). Sled dog racing and tourism development in Finnmark. A symbiotic relationship. In *Tourism destination development* (pp. 131-150). Routledge.

Jeans, H., Castillo, G., & Thomas, S. (2017). The future is a choice: absorb, adapt, transform resilience capacities. UK: Oxfam GB.

Jennings, G. (2010). Research Processes for Evaluating Quality Experiences: Reflections from the 'Experiences' Field(s). In M. Morgan, P. Lugosi, & B. Ritchie (Eds.), The tourism and leisure experience: Consumer and managerial perspectives (pp. 81–98).

Jiang, Y., Ritchie, B. W., & Verreynne, M. L. (2021). Developing disaster resilience: A processual and reflective approach. Tourism Management, 87, 104374.

Kashiwase, H., Ohshima, K. I., Nihashi, S., & Eicken, H. (2017). Evidence for ice-ocean albedo feedback in the Arctic Ocean shifting to a seasonal ice zone. *Scientific Reports*, *7*(1), 8170.

Kendra, J. M., & Wachtendorf, T. (2003). Elements of resilience after the world trade center disaster: reconstituting New York City's Emergency Operations Centre. *Disasters*, *27*(1), 37-53.

Knudsen, I. B. (2019). From Polar Exploration to Sled Dog Racing. A Brief Overview of some Important Elements in Norwegian Sled Dog History. *Dog sledding in Norway: Multidisciplinary research perspectives*, *28*(15), 09-02.

Koenig, U., & Abegg, B. (1997). Impacts of climate change on winter tourism in the Swiss Alps. *Journal of sustainable tourism*, *5*(1), 46-58.

Levi. (n.d). The Secret of Snow. Retrieved April 16, 2025, from https://www.levi.fi/en/news-and-stories/the-secret-of-snow/

Lew, A. A., & Cheer, J. M. (2017). Environmental change, resilience and tourism: Definitions and frameworks. In *Tourism Resilience and Adaptation to Environmental Change* (pp. 3-12). Routledge.

Lochmiller, C. R. (2021). Conducting thematic analysis with qualitative data. *The qualitative report*, *26*(6), 2029-2044.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child development*, *71*(3), 543-562.

Mack, N. (2005). Qualitative research methods: A data collector's field guide.

Maher, P. T. (2017). Tourism futures in the Arctic. In *The Interconnected Arctic—UArctic Congress 2016* (pp. 213-220). Springer International Publishing.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American psychologist*, *56*(3), 227.

McCubbin, L. (2001). Challenges to the Definition of Resilience.

Mojadeddi, Z., & Rosenberg, J. (2024). Automated transcription of interviews in qualitative research using artificial intelligence: a simple guide. *J Surg Res Prac*, *5*, 1-6.

National Snow and Ice Data Center (2025). *Arctic Weather and Climate: Why it matters.* Retrieved April 8, 2025 from https://nsidc.org/learn/parts-cryosphere/arctic-weather-and-climate/why-arctic-weather-and-climate-matter

Nilsson, R. O., & Demiroglu, O. C. (2024). Impacts of climate change on dogsledding recreation and tourism in Arctic Sweden. *International journal of biometeorology*, *68*(3), 595-611.

Njoroge, J. M. (2015). Climate change and tourism adaptation: Literature review. *Tourism and hospitality management*, *21*(1), 95-108.

Norges Hundekjørerforbund (2023). *Race Rules And Event Regulations For Sled Dog Sports*. Retrieved April 18, 2025 from https://bloccontent.blob.core.windows.net/files/200000195/6748/2024/1/18/nhf-konkregler-engelsk-januar-2023-monika-.pdf

Ostrom, E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change 20: 550–557.

PeTA, 2020. The 2020 Iditarod is over, but PeTA's fight for dogs continues. Retrieved April 20, 2025 from https://www.peta.org/blog/2020-iditarod-death-race-coverage/

Pilkington, C. (2024). Yukon Quest organizers announce race will end early due to poor trail conditions. Retrieved April 19, 2025 from https://www.cbc.ca/news/canada/north/yukon-quest-2024-bad-trail-conditions-1.7104789

Pine II, B.J. and J.H. Gilmore (1999), The Experience Economy: Work is Theatre and Every Business a Stage, Boston, MA: Harvard Business School Press.

Pitulko, V. V., & Kasparov, A. K. (2017). Archaeological dogs from the early Holocene Zhokhov site in the eastern Siberian Arctic. Journal of Archaeological Science: Reports, 13, 491-515.

Plakoyiannaki, E., & Stavraki, G. (2022). Qualitative Research for Tourism. In Encyclopedia of Tourism Management and Marketing (Ed. D. Buhalis), 2022 Edward Elgar Publishin, 1–7.

Pocinho, M., Garcês, S., & De Jesus, S. N. (2022). Wellbeing and resilience in tourism: A systematic literature review during COVID-19. Frontiers in Psychology, 12, 748947.

Pollina, E., Corvino, C., & Greco, C. (2025). Snow in short supply as Italy gears up to host Winter Olympics. Retrieved April 19, 2025 from https://www.reuters.com/sports/with-games-countdown-cortina-races-build-sliding-centre-2025-02-03/

Prebensen, N. K. (2007). Investing in an Event: The Case of a Sledge Dog Race in Norway "The Finnmarksløpet". Event Management, 11(3), 99–108. https://doi.org/10.3727/152599508784548857

Prebensen, N. K. (2010). Value Creation Through Stakeholder Participation: A Case Study of an Event in the High North. Event Management, 14(1), 37–52. https://doi.org/10.3727/152599510X12724735767552

Proag, V. (2014). The concept of vulnerability and resilience. *Procedia Economics and Finance*, *18*, 369-376.

Reinhart, G. A. (1996). Overview of the history of sled dogs, the Iditarod race, and sled dog research in Alaska.

Resnik, D. B. (2011). *What is ethics in research & why is it important*.

Reuters (2024). *FIS, WMO join forces to raise climate change awareness*. Retrieved April 18, 2025 from https://www.reuters.com/business/environment/fis-wmo-join-forces-raise-climate-change-awareness-2024-10-03/

Saarinen, J., & Varnajot, A. (2019). The Arctic in tourism: complementing and contesting perspectives on tourism in the Arctic. *Polar Geography*, *42*(2), 109-124.

Saarinen, J., & Tervo, K. (2010). Sustainability and Emerging Awareness of a Changing Climate: The Tourism Industry's Knowledge and Perceptions of the Future of Nature-based Winter Tourism in Finland–. In Tourism and Change in Polar Regions (pp. 165-182). Routledge.

Schrot, O. G., Christensen, J. H., & Formayer, H. (2019). Greenland winter tourism in a changing climate. Journal of Outdoor Recreation and Tourism, 27, 100224.

Scott, D., & Gössling, S. (2022). A review of research into tourism and climate change-Launching the annals of tourism research curated collection on tourism and climate change. *Annals of Tourism Research*, *95*, 103409.

Simpson, M. C., Gössling, S., Scott, D., Hall, C. M., & Gladin, E. (2008). Climate change adaptation and mitigation in the tourism sector: frameworks, tools and practices.

Smit, B. (2002). Atlas. ti for qualitative data analysis. Perspectives in education, 20(3), 65-75.

Sohn, J. I., Alakshendra, A., Kim, H. J., Kim, K. H., & Kim, H. D. (2021). Understanding the new characteristics and development strategies of coastal tourism for post-COVID-19: A case study in Korea. Sustainability, 13(13), 7408.

Sönmez, S. F. (1998). Tourism, terrorism, and political instability. *Annals of tourism research*, *25*(2), 416-456.

TENK (Finnish National Board on Research Integrity). (2019). The ethical principles of research with human participants and ethical review in the human sciences in Finland. Finnish National Board on Research Integrity. Retrieved December 7, 2024, from https://tenk.fi/sites/default/files/2021-01/Ethical_review_in_human_sciences_2020.pdf

TENK (Finnish National Board on Research Integrity) (2023). *Responsible Conduct of Research.* Retrieved April 6, 2025, from https://tenk.fi/en/research-misconduct/responsible-conduct-research-rcr

Toft, B., Reynolds, S., & Perrow, C. (2005). Learning from disasters: a management approach.

UArctic (n.d.). About Us. Retrieved January 7, 2025, from https://www.uarctic.org/about-us/

University of Lapland (2023). Use of Artificial Intelligence-Based Tools at the University of Lapland. Retrieved April 6, 2025 from https://www.ulapland.fi/loader.aspx?id=4e43873c-14c4-412b-8fa4-83497893ffeb

UNWTO (n.d.). The One Planet Sustainable Tourism Program. Retrieved January 7, 2025, from https://www.unwto.org/sustainable-development/one-planet

Visit Greenland (2024). Tourism Statistics Report Greenland 2023. Retrieved April 8, 2025, from https://tourismstat.gl/wp-content/uploads/2024/05/Tourism-Statistics-Report-Greenland-2023.pdf

Walker, B., Holling, C. S., Carpenter, S. R., & Kinzig, A. (2004). Resilience, adaptability and transformability in social–ecological systems. Ecology and society, 9(2).

Walle, A. H. (1997). Quantitative versus qualitative tourism research. Annals of tourism research, 24(3), 524-536.

Weber, E. U. (2010). What shapes perceptions of climate change?. Wiley Interdisciplinary Reviews: Climate Change, 1(3), 332-342.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. Organization science, 16(4), 409-421.

Wicker, P., & Thormann, T. F. (2024). Environmental impacts of major sport events. In Research Handbook on Major Sporting Events (pp. 373-385). Edward Elgar Publishing. Working dog training for the twenty-first century. Frontiers in veterinary science, 8, 646022.

Wilson, G. (2012). Path dependency: 'lock-in' mechanisms, power structures and pathways of the (im)possible at community level. In *Community resilience and environmental transitions*. Routledge. (pp. 111-144).

Wisniewski, K. (2025). 40th annual John Beargrease Sled Dog Marathon postponed, organizers trying to remain optimistic. Retrieved April 19, 2025 from https://wtip.org/40th-annual-john-beargrease-sled-dog-marathon

World Meteorological Organization (2024). *FIS and WMO partnership highlights the harmful effects of climate change on winter sports and tourism.* Retrieved October 3 2024 from https://wmo.int/news/media-centre/fis-and-wmo-partnership-highlights-harmful-effects-of-climate-change-winter-sports-and-tourism

Yeh, C. C., & Huang, C. H. (2018). An innovative trend of sport event in environmental perspective. In Innovative Technologies and Learning: First International Conference, ICITL 2018, Portoroz, Slovenia, August 27–30, 2018, Proceedings 1 (pp. 625-630). Springer

Zelenskaya, E. (2018). Geopolitics and tourism in the Arctic: The case of the national park 'Russian Arctic'. Journal of Policy Research in Tourism, Leisure and Events, 10(1), 33-47.

APPENDIX 1: Letter of Consent

Information letter for participants

Dear participant,

My name is Maelys Kuczynski, and I am currently conducting interviews in the context of my master thesis, with the objective to take a closer look into the consequences that climate change might have on dog sledding events, and especially on long distance races such as the Finnmarksløpet. The aim of this interview is to gain a deeper understanding of how various individuals perceive the future of long-distance sled dog racing within changing conditions and to develop a clearer vision of the Finnmarksløpet's resilience.

This research is being conducted as part of the Tourism, Culture, and International Management master's program at the University of Lapland (Rovaniemi, Finland) under the supervision of Professor Markku Vieru, who you may contact for further information if needed.

The results of this thesis will be publicly available, I would be happy to share a copy with you if you are interested in reviewing the final results. The interview is expected to last between 30 and 60mn and will be audio-recorded for the research purpose.

By signing this letter, you give consent to use the interview material confidentially and exclusively for research purposes. The research follows the principles for responsible conduct of research dictated by the Finnish Advisory Board on Research. The data will be handled anonymously. Please note that your participation is entirely voluntary**,** and you may withdraw at any time, for any reason, without any consequences.

Thank you for your time and participation!

Maelys Kuczynski
TourCIM Master student

I give consent by signing this letter to use the interview as data for the purpose mentioned above.

Name, signature, and date: _____

APPENDIX 2: Interview Guidelines

Interview Guidelines – Thesis about the resilience of the Finnmarksløpet towards climate change

Finnmarksløpet representative

Part 1 – Presentation

1. Can you tell me more about yourself, your role at Finnmarksløpet, and how you got involved with the race?
2. What does your job look like during the race and throughout the year?

Part 2 – Climate change and Finnmarksløpet

3. What are your views on climate change?
4. Do you think believe that change could impact Finnmarksløpet in the future? If so, in what ways?
5. Have there been years when the race faced weather-related problems? How did you deal with it?
6. How much of a priority is climate change for Finnmarksløpet? Do you actively discuss about it?

Part 3 – Handling the changes

7. Have you ever thought about what would happen if there wasn't enough snow?
8. If things get more difficult, have you thought about ways to keep the race going?
9. If conditions keep changing, do you think the race might have to adapt—like using carts instead of sleds or shortening the distance?
10. Do you think these kinds of changes would be accepted by mushers and the wider sled dog community?
11. Does the Finnmarksløpet have the financial support to make those kinds of adjustments?

Part 4 – Closing

12. Looking ahead, what do you think is the most important factor in keeping Finnmarksløpet running despite climate change?
13. Is there anything else you'd like to add or any topic that you think is important?

Norwegian Sled Dog Association (NHS) representative

Part 1 – Presentation

1. Can you tell me more about yourself, your role at Finnmarksløpet and at the NHS?

Part 2 – Climate change and long-distance races

1. From your perspective, what are the biggest climate-related challenges that could affect the sport?
2. Has NHF had discussions about how climate change might impact sled dog racing, particularly long-distance races like Finnmarksløpet?

Part 3 - Challenges

3. Have you already seen races struggling with these issues? How have they dealt with them?
4. Some races have been canceled due to a lack of snow. Do you think there were alternative solutions, or was cancellation the only realistic choice?
5. How prepared do you think the sled dog racing community is for increasing climate unpredictability?

Part 4 – Solutions

6. Are there discussions within NHF about how to adapt races if conditions become more difficult? Or is cancellation the only option being considered?
7. Could alternative race formats—such as modified routes, artificial snow, or even wheeled races—be a possibility in the future?
8. What do you think is needed to help sled dog racing remain sustainable in a changing climate? (More funding? Innovation? Community discussions?)

Part 5 – Closing

9. Looking ahead, what do you think is the most important factor in keeping Finnmarksløpet running despite climate change?
10. Is there anything else you'd like to add or any topic that you think is important?

Musher

Part 1 – Presentation

1. Can you tell me a bit about your experience with dog mushing and Finnmarksløpet?
2. What do you value the most about the Finnmarksløpet? What makes it different from other races?

Part 2 – Climate change

3. From your perspective, how have weather and snow conditions changed over the years?
4. How do changing weather conditions affect your training and races?
5. Have you ever had to reconsider participating in a race due to weather?

Part 3 – Solutions

6. What kind of changes or adaptations do you think races like Finnmarksløpet might need in the future? (related to snow, ice, trail, schedule…)
7. What would be acceptable changes vs. what would go "too far" in your eyes?
8. Is there something you'd never want to see happen in the sport?
9. Would you personally continue racing if the format changed significantly — like wheeled carts instead of sleds? Why or why not?

Part 4 – Closing

10. Do you have any ideas of your own for how Finnmarksløpet—or the sport in general—could respond to the changing climate?
11. How do you think the mushing community is dealing with all of this?
12. Looking ahead, what do you think is the most important factor in keeping Finnmarksløpet running despite climate change?
13. Is there anything else you'd like to add or any topic that you think is important?