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[3] Contributed to writing the overall report
[4] Contributed to conceptualization, data collection, data analysis and interpretation

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Contents

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Executive Summary

The European Arctic is witnessing increased activity across various sectors: fish farming, forestry, mining, tourism and indigenous peoples' activities, such as reindeer herding and hunting. Industries reliant on Arctic natural resources extraction and modification play a pivotal role, given the fragility of Arctic ecosystems necessitating careful utilization. Moreover, the social and cultural ramifications are significant alongside environmental concerns, as the Arctic is home to local and indigenous communities with distinct livelihoods vulnerable to substantial environmental changes. It is within this context that we examine the development of the different economic activities, and their effects on socio-cultural aspects and quality of life in the European Arctic as part of the ArcticHubs project.

This study aims to understand the development of the different economic activities, and their effects on socio-cultural aspects and quality of life in the European Arctic. To have a broader perspective, we compared it to selected Alpine hubs to generate learnings and find matching, overlapping, and contradictory issues concerning all hubs and countries. We frame our study using human development theory's capability approach and focused on the perspectives of the local stakeholders as to how they perceive development as linked to their achieved functioning. To address our aims, we used a mixed of methods: Expert interviews and Q-method surveys which were analysed through qualitative content analysis, Q-method's factor analysis and comparative analysis.

We identified a range of catalysts and barriers to the development of economic activities in the European Arctic and the learning cases. These were categorized into six main global themes: economic, environmental, social, political/legislative, cultural and technology. These barriers and catalysts serve as enablers and inhibitor to development. In terms of the synergies and trade-offs, there is a complex relationship among the industries present in the Arctic region, making it difficult to definitively state whether economic activities have synergies or trade-offs. Consequently, we presented their relationship on a spectrum, acknowledging the intermediate relationships between activities.

We also uncovered a wide range of local perspectives on the development of economic activities. These perspectives were aligned with achieved functionings and provides four main aspects: 1) Economic growth focuses on expanding economic opportunities and growth through various industries. (2) Social inclusion is concerned with the degree of community involvement in decision-making processes. (3) Environmental sustainability emphasizes conservation and the sustainable management of natural resources. And (4) Cultural conservation refers to continuing culture, traditions and ways of life. These four aspects emerged from the analysis of the Q-surveys and the interviews which implies that these are the functionings that our participants value and have reason to pursue. Lastly, comparing the Arctic and Alpine hubs, we found that industries undoubtedly bolster economic development within all the hubs, but they concurrently pose challenges to other functionings such as social inclusion, environmental sustainability, and cultural conservation. We found no single pattern during comparison but the local subjective perspectives on the development of the economic activities provided a nuanced picture. All of the hubs have very high human development, yet some participants perceive it differently. To conclude, the similarities and differences we observed between the European Arctic and Alpine regions highlight the need for tailored approaches to development that account for the unique socio-cultural contexts of each area. Therefore, we offer the following policy recommendations: Promote integrative development focused on sustainability; Adopt adaptive locally-fitted management practices; Foster inclusive growth; invest in sustainable infrastructure; Promote environmental stewardship and leverage local knowledge and science.

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1. Introduction

The Arctic is often romanticized as an untouched wilderness, where harsh weather and climate conditions limit human presence and impact (Saarinen und Varnajot 2019). However, the reality is far from this idealized image. In particular, the European Arctic – Finland, Sweden, Norway including Svalbard, Faroe Islands, Greenland and Iceland - is witnessing increased activity across various sectors. Industries reliant on Arctic natural resources extraction and modification play a pivotal role, given the fragility of Arctic ecosystems necessitating careful utilization. Moreover, the social and cultural ramifications are significant alongside environmental concerns, as the Arctic is home to local and indigenous communities with distinct livelihoods vulnerable to substantial environmental changes (Glomsrød et al. 2021). It is within this context that we look into the development of the different economic activities[5], and their effects on socio-cultural aspects and quality of life in the European Arctic as part of the ArcticHubs project.

The main economic activities selected for the ArcticHubs project are fish farming, forestry, mining, tourism and indigenous peoples' activities, such as reindeer husbandry[6] and hunting. The first four activities are industries with strong local environmental, social and cultural impacts, yet they are expanding in response to global drivers (Andersson und Keskitalo 2017; Bennett et al. 2021; Similä und Jokinen 2018). According to ArcticHubs' global economic drivers in the development of different industrial hubs in the European Arctic report (Suopajärvi et al. 2022), the intensification of the industries is boosted by global population growth and rising living standards. In turn, there is an increased need for food and energy production, more construction and use of resources, and technological development. Additionally, there is a rise in individuals with the financial capability to embark on long-distance travels to encounter diverse cultures and landscapes, such as the Arctic. Aside from the general global trends, each economic activity has their own driving force for expansion: Fish farming intensifies because of the increased demand for food; Forestry has increasing demand for timber due to the transition from fossil to bio-based economy; Mining expands because of the shift to carbon neutral societies, increasing the demand for minerals needed to produce solar panels and wind turbines for reduction in the consumption of fossil energy; and tourism which has an increasing number of travellers/tourists and cruise ships due to the increased accessibility of the area and increased capacity of tourists to travel. All these industry expansion and intensification affect local and indigenous communities, cultures and livelihood (Suopajärvi et al. 2022; Živojinović et al. 2022)

The European Arctic is home to the only recognized indigenous peoples[7] living in Europe: Sámi people in Sweden, Finland and Norway and Inuit people in Greenland (Eriksson 2023). Indigenous peoples keep tradition alive, through continuing hunting, fishing and reindeer herding[8] as their traditional livelihood. They also maintain traditional handicrafts or applied art, food, music, language, customs and religion (National Sami Information Centre 2005; Dahl 2008). Any changes in the environment affects Sámi and Inuit communities because traditional livelihood relies on a strong connection with the environment, its resources and ecosystem services. Indigenous communities are nowadays facing

[5] Economic activities refer to forestry, fish farming, mining, tourism and indigenous activities like reindeer husbandry and hunting. Industries however only refer to the first 4 economic activities as we do not aim to limit traditional livelihood only to their economic function.

[6] Reindeer husbandry is a general term to describe the livelihood of reindeer pastoralism. It includes the economic and cultural aspects ingrained in the means of subsistence as well as the social-ecological relationship between humans, animals, and the natural environment (Horstkotte et al. 2022).

[7] Preferred phrasing in Indigenous politics discussion.

[8] Reindeer herding is defined as the practical work with the herd or individual animals to secure their well- being. This covers a variety of activities, including as migration between grazing areas or seasonal grazing grounds, collecting or dividing herds according to ownership or herding groups, marking calves, killing, and protecting the herd from outside threats like predators (Horstkotte et al. 2022.

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great challenges because of the cumulative effects of the industrial sectors expanding on their lands, in addition to climate change (Ford et al. 2021; Glomsrød et al. 2021). Additionally, we also have to take in consideration the local communities living in the small towns and cities across the European Arctic. As they also impacted by the economic activities in the region and experiences not only the socioeconomic impacts of the industries but also its environmental impacts (see WP2 report, (Flick et al. 2022). On the other hand, while expanding industries have conflicts or trade-offs with traditional land use, it is also possible that synergies can be created, combining economic growth and environmental conservation to create new opportunities for local and indigenous communities (Živojinović et al. 2022).

All of this industry expansion and intensification, their associated impacts to local communities, indigenous peoples, environment and socio-cultural aspects highlights the complex dynamics involved in Arctic development. Nevertheless, development is a highly contested concept because of its multidimensionality, diverse interpretations and varying priorities across different stakeholders. Development encompasses economic growth, social progress, environmental sustainability, and cultural prosperity. Different actors have different priorities based on their beliefs, values and interest (Connelly 2007; Corbridge 2007; Sapkota 2018). For example, some may emphasize economic growth as development in terms of a countries' Gross Domestic Product (Lawn 2007) while others use Happiness index to measure development (Helliwell et al. 2024). Perceptions of development can also vary across regions and cultures e.g.; consumerism aligns with western development aspirations, while this may not resonate with indigenous communities. There is also the debate on what and how should environment, marginalized communities and social dimensions be taken in consideration in the development discussion, considering power dynamics (Escobar 1995; Sen 1999; Sachs 2006). While there are various well-studied concepts on how to frame development e.g., post development theory (Escobar 1995), institutional theory (North 1990), modernization theory (Rostow 1991), neoclassical economic growth theory (Solow 1956), to name a few, we frame our study using human development theory because the theory posits that development should not only be measured by economic growth, but by the expansion of people's capabilities to live the lives they value (Sen 1999). Since our focus is on understanding the perspectives of local stakeholders, including indigenous communities, exploring their perceptions of Arctic development is linked to their sense of capabilities, freedom and ability to live the life they prefer (Sen 1999). Human Development Theory is a paradigm shift in development discourse that emphasizes the improvement of individual human capacities and freedoms over traditional economic measurements. Sen (2003) contends that the idea of human development is multifaceted and includes elements like social inclusion, political engagement, cultural/heritage wellbeing, health, education, and environmental sustainability. The theory is also concerned about human 'functionings' and these are the actual activities and accomplishments that individuals engage in and attain as a result of their capabilities and freedom (Sen 1999). By understanding local people's perspectives and incorporating Sen's concept of development, we can gain valuable insights on the effects of the economic activities in the overall quality of life, social and cultural wellbeing in the European Arctic.

Furthermore, to enhance our understanding of development in the European Arctic we need to consider the various catalysts, barriers, synergies, and trade-offs to development, provided by forestry, fish farming, mining, tourism, and indigenous activities. Catalysts are enablers and considered as pivotal actors or entities actively facilitating the attainment of common objectives. Catalysts leverage diverse skills and influence to bolster the endeavors of others, catalyzing transformative shifts within society. Additionally, catalysts can manifest as stimuli that accelerate or initiate changes within a specific context (Hussein et al. 2018; Collins Dictionary 2021). Conversely, barriers encompass regulations, constraints, or circumstances that render certain goals or activities unattainable. These limitations, spanning governmental, physical, or sociocultural realms, obstruct progress towards

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objectives (Oxford 2024). On the other hand, trade-offs refer to the obstacles and disadvantages associated with a particular set of activities, which may pose challenges in finding a harmonious resolution (Cook et al. 2019). While, synergies denote the concurrent benefits that arise in conjunction with activities from different economic sectors (Cook et al. 2019). Identifying catalysts and barriers, provide insights into challenges and dynamics involved in fostering progress and growth locally and with the economic activities (Khanzode et al. 2021). While identifying synergies and trade-offs are essential to make informed decisions and ensure effective resource management (Dade et al. 2019). This is particular for economic activities that intersect and overlap within the same geographical areas, such as the case of the Arctic.

Finally, to obtain a broader perspective on the European Arctic development, it is essential for us to juxtapose it with other region such as the Alpine countries of Austria and Italy. While the Arctic and Alpine regions are distinct in many ways, they share certain geographical characteristics such as harsh climates, rugged terrain, and a dependence on natural resources, like forestry, tourism and mining. However, unlike the Arctic regions where development activities are increasing, Austria and Italy have already undergone this process and are presently in the phase of change and adaptation. These similarities and differences can make comparisons meaningful in understanding how different regions cope with similar challenges and effects of the industries.

Considering the previously discussed issues and concepts, we therefore pose the following questions:

1. What are the catalysts, barriers, trade-offs and synergies in the development of economic activities in the European Arctic and Alpine countries?
2. How local stakeholders and citizens perceive the development of existing and new economic activities in the European Arctic and Alpine countries?
3. What are the similarities and differences across the Arctic and Alpine countries?

This project report responds to Task 3.4. comparative case analysis and learning from others outside the Arctic. **This task aims to generate a better understanding about what is important for the local people in the European Arctic** regarding forestry, fish farming, mining, indigenous culture, and tourism, by finding matching, overlapping, and contradictory issues concerning all hubs and countries; and develop policy recommendations. The report builds on the studies and reports from previous work packages: WP1 determined global drivers affecting the ArcticHubs, WP2 investigated the environmental impacts of the economic activities, while WP3 focuses on the socioeconomic and cultural impacts of the economic industries in the Arctic. We put particular focus on D3.2. Report about context and effects of existing and new economic activities on local societies and cultures. As this report already contains a systematic overview of effects of economic activities in the Arctic regions, we use it here as basis for further examination of impacts and effects of the industries.

In the following sections, we describe our conceptual framework, then the materials and methods used to address each research questions. After which, we provide our findings on local people's perceptions and discuss our results using human development theory as a guiding lens. Finally, we provide our concluding remarks and policy recommendations.

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2. Study sites

We address our research questions on study sites of the ArcticHubs project which includes 15 hubs and 4 learning cases from Austria and Italy, see figure 1 for the map. By hubs, we mean nodes that hosts a combination of industries and economic activities including traditional livelihood, where challenges and impacts facing the Arctic are acute and tangible (LUKE 2021). ArcticHubs project is focused on five main economic activities that are present in the Arctic: fish farming, forestry, tourism, mining and indigenous activities particularly reindeer husbandry and hunting.

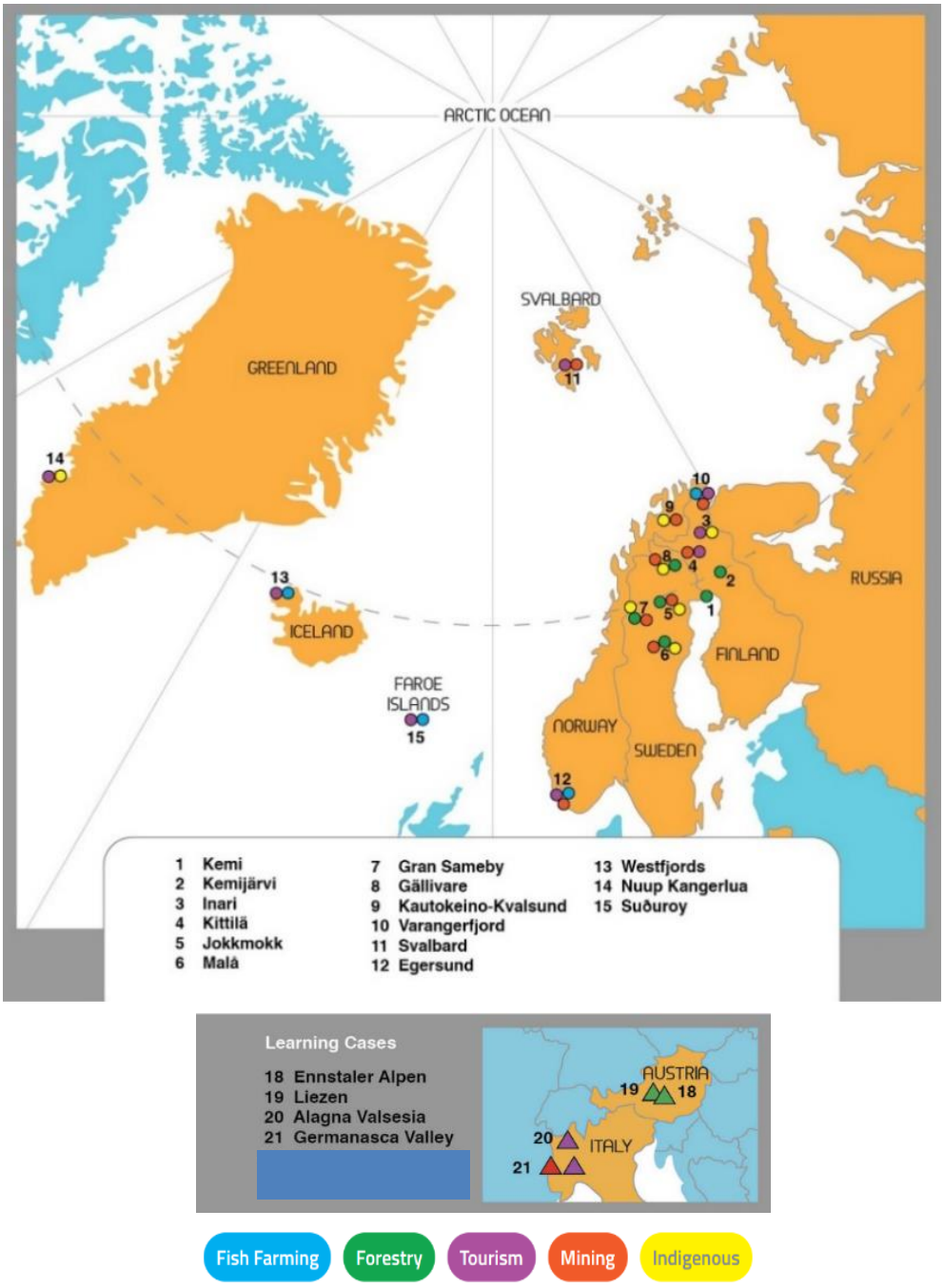

Figure 1. ArcticHubs project location of hubs and learning cases. Numbers in the map refer to the locations and the colors represent the economic activity

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3. Conceptual Framework

To operationalize the human development theory, we used its conceptual framework called the Capabilities Approach. We adapted and modified the framework by Robeyns (2005), Sen (1999), Des Gasper (2002), see figure 2. We used this approach because it is a tool and a framework to understand our research questions, and it provides a recipe how to compare different welfare economies and in this case the Arctic region and the Alpine examples (Robeyns 2005).

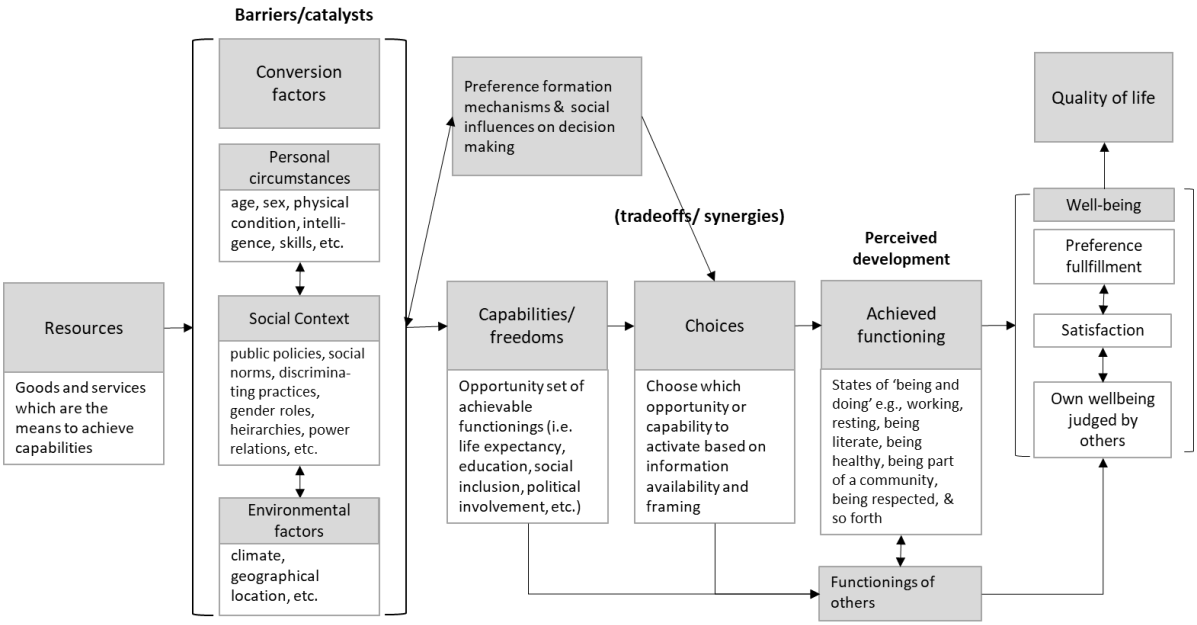

Figure 2. Capability approach adapted and modified from Robeyns (2005), Sen (1999) and Des (2002). Gray boxes are components and white boxes are description and/or examples. Our research focus is in bold text.

The capabilities approach considers the resources or the goods and services as various inputs or assets that individuals can access to improve their wellbeing and expand their capabilities. This includes: social, human, economic resources and natural capital that people can effectively utilize (Lienert und Burger 2015; Robeyns 2005). For example, a piece of land is a resource not only because of its inherent price value on the market but because it provides an opportunity for recreation or livelihood either by forestry, reindeer herding or tourism. The land enables the functioning of being able to work or even being part of a community i.e., reindeer herding community. The relation between the resource and the achieved functioning is influenced by conversion factors which are divided into personal circumstances (e.g., sex, age, skills); social context (e.g., norms, roles and power relations); and environmental factors (e.g., climate, location, etc.) (*Ibid* 2005). These factors can be a barrier or a catalyst to individual and collective development because they may either restrict or enable basic opportunities necessary for a decent overall wellbeing and decent quality of life. Following our earlier example, if the government imposes strict protection of the land, then it becomes difficult to use the land as a resource to enable capabilities. The same with the norm 'Everyman's right' to use the forest, which gives access to the public but limits landowner control and his capabilities. As such, the capabilities approach also takes into account human diversity and the plurality of socio-cultural and environmental contexts that affect the conversion factors and the succeeding capabilities.

Capabilities and freedoms are a set or combination of potential functionings. They are equivalent to a set of opportunities or possibilities a person has, e.g., access to education to acquire knowledge and skills including access to quality teachers and educational materials (*Ibid* 2005). For Sen (1999) capabilities may refer, but not limited to, literacy, health, political freedom, social inclusion,

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environmental sustainability and cultural conservation[9]. On the one hand, freedoms are the opportunities a person can have to exercise agency, make their choices and pursue their own goals and interest e.g., political participation. These choices however are informed by preferences formation mechanisms (e.g., cultural influences, information exposure, economic incentives, psychological factors, and institutional contexts) and social influences to arrive at their achieved functioning. Here, we include the trade-offs and synergies as a tool in weighing options and understanding the dynamics behind preferences, choices and decision making. More so, how information is made available and how it is framed collectively affects individual choices to pursue achieved functioning. Lastly, achieved functioning is the concrete outcome or capabilities that people have, reflecting what they can do and be in the world or simply the state of being and doing. While functioning is essential to the concept of human well-being, an individual's freedom to select from the range of possible capabilities and choices matters more than their actual functionings (Kaushik und Lòpez-Calva 2011). Well-being should be understood in terms of people's capabilities and functionings (Nussbaum 2000).

As one of the main critics of the human development theory is its emphasis on individual freedoms, we adapted the concept of Des Gasper (2002) wherein the author acknowledges that other people affect individual functionings and overall wellbeing. Their opinions and tendency to judge other people's preferences and satisfaction can have positive and negative effects in an individual wellbeing or the overall quality of life experienced by individuals and communities.

Despite all of these concepts and descriptions, it still begs the question what role do local people's perspectives play in development or in pursuing achieved functioning. Is perceived development even related to achieved functioning? According to Sen (1999, 2003) perceived development and achieved functioning are related, however they are not always equivalent. Perceived development reflects how individuals subjectively interpret and evaluate their own experiences and achieved functionings. Perceived development is subjective and influenced by individuals' perceptions, beliefs, and interpretations of their circumstances, whereas achieved functioning is objective and based on observable activities and achievements. There may be discrepancies between individuals' perceptions of their development and their actual achieved functionings. For example, individuals may perceive their well-being or quality of life differently from what objective indicators suggest due to factors such as adaptation, or cognitive biases. Perceived development can also be influenced by various contextual factors, such as social comparisons, personal expectations, and life experiences, which may not always align with individuals achieved functionings (Nygren 1999). Nevertheless, studying local people' perspectives provide an insight into local realities. By knowing how local people perceive their achieved functioning, we can bring about the local difficulties and necessities of development (Yeasmin Rosy 2015). At the same time, it challenges static positions of local versus universal knowledge, and highlights the complexity of knowledge articulation especially when applied to social negotiation context (Nygren 1999). By exploring local perspectives, we can also highlight individuals' agency and autonomy in shaping their own development trajectories. Investigating local perspectives also have practical implications for informing policy decisions and development interventions. By understanding how individuals perceive their own development, policymakers can design more responsive and effective policies that address people's subjective needs, aspirations, and priorities (Ryan und Deci 2001).

[9] Cultural conservation refers to the measures taken to extend the life of cultural heritage while strengthening transmission of its significant heritage messages and values (UNESCO 2024).

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4. Materials and methods

4.1. Data collection

4.1.1.Expert Interviews

One part of the data for this research is based on data collected from expert interviews conducted on October 2021 to March 2022. A semi-structured interview guide based on task 3.1 was used in all interviews and focused on 6 main topics: (1) importance of the economic activity; (2) actors and agents; (3) issues, conflicts, synergies and trade-offs; (4) barriers and catalyst; and (5) impacts on culture and conditions to coexist. A total of 68 participants were interviewed across the different hubs and includes experts of various economic activities, local stakeholders and representatives of indigenous communities, see Table 1 for the summary of experts interviewed and see appendix I for details and appendix II for the questionnaire.

Further background information was also obtained through a literature review conducted in Scopus and Web of Science. We searched for social science articles about the development of fish farming, forestry, mining, tourism and indigenous activities in the hubs, for example we used a search string: "Fish farming" AND "Varangerfjord" to have a more comprehensive coverage or the current studies. Additionally, we also made use of the reports published within the ArcticHubs project which provided local contexts and basic information about each hub and economic activity.

Table 1. Summary of expert interviews conducted per hub

Hub name	No of expert interviewed
Egersund	3
Gällivare	4
Germanasca	3
Gran	5
Inari	7
Island of Suðuroy	3
Jokkmokk	3
Kemi	5
Kemijärvi	5
Kittilä	5
Leoben	6
Malå	5
Nuup Kangerlua	5
Svalbard	4
Varangerfjord	1
Westfjords	4

All the interviews were conducted in local languages. Project partners transcribed the interviews and provided a summary of the transcripts in English, which we used in the analysis of this study. All relevant literature and transcripts were loaded into Atlas.ti - a data analysis software that facilitates analysis of qualitative data for qualitative research. Atlas.ti assisted in reducing data complexity through coding which enables the identification of themes and the selection of statements for the Q-method. All methods used this study are summarized in figure 5.

4.1.2.Q-method survey

For studying perspectives, we used Q-method which is a mixed qualitative and quantitative method to study perspectives in a systematic and replicable manner (R. Brown 1993). Q-method is a scientific study of subjectivity – or the sum of behavioural activity that constitutes a person's current viewpoint, opinions, beliefs, values, tastes, perspectives and what they think and feel about a certain topic (Stephenson 1935). For this study, we conducted a two-tier approach: (1) Arctic region level Q-study which included all the hubs, see map in figure 1; and (2) hub level Q-study which were conducted in 8 selected hubs (Kittilä, Gällivare, Egersund, Suduroy, Westfjords, Nuuk, Leoben and Val Germanasca), one hub per country including learning cases from Austria and Italy. The advantage of this approach is that we gain more confidence in the final interpretation of the findings since the two-tier approach will reveal regional and local nuances in selected hubs. Q-method is composed of 5 steps and below are the details on how we applied the method to this study:

1. **Concourse development.** Concourse is the collection of the universe of statements that can be said about the development of the Arctic and the hubs. It consists of ordinary conversation, commentary and discourses of everyday life (Brown 1993). We used semi-structured expert

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interviews and relevant literature to determine discourses and current discussions in the project areas.

2. **Q-set selection.** Selection of sample statements from the concourse or from the universe of statements about Arctic and hub development. The Q-set selection was done in a structured manner, the codes were first created based on the main topics of the interview guideline and then we included a roughly equal number of items relative to each demarcated subtheme. This assures that there is system and rigidity in the sampling process and we can claim that the Q-set is undoubtedly representative of concourse (Watts und Stenner 2005). To balance the statements, we also divided them into pro, neutral and anti to industry development. Creation of the Q-set was also done together with the project partners to make sure that the statements selected were current and relevant to the hubs. For the Arctic level, the Q set were also sent to the project policy board for feedback, see table 2 for the total number of Qset derived per study location.
3. **P-set selection.** Determination of the participants who will be part of the study. Invited participants were carefully selected rather than randomized so that variability in a specific case or situation can be analysed. Therefore, a purposive sample of individuals who potentially have differing perspectives/opinions about the study topic and those who could provide the best insights on the study topic were included (Brown 1993). Example of respondents were: experts, authorities, local citizens and special participants who stand to gain or lose whatever the result of the development, e.g., indigenous peoples, youth, etc, see table 2 for the summary of the number of P-set and number of participants witth follow-up questions and answers. Participants' data were anonymized and all data were stored in an encrypted data storage and centre at BOKU.

Table 2. Summary of number of Q-set, P-set and follow up Questions and Answers

Location/hubs, country	Total Q-set (Statements)	Total P-set (Participants)	P-set with follow up Q&A
Arctic*	35	32	32
Kittila, FI	30	14	14
Gällivare, SE	36	22	21
Egersund, NO	29	18	15
Westfjords, IS	32	18	18
Suduroy, FO	24	18	16
Nuuk, GL	34	17	17
Leoben, AT**	27	14	12
Val Germanasca, IT**	24	14	12

*Arctic includes all other ArcticHubs – project location | **Learning cases

4. **Q-sorting**. The ranking of the statements along an inverted triangle grid or Q-grid, see figure 3. Participants rank the statements from agree to disagree with varying rank and order. Q-sort allows participants to make their point of view objective and observable. This also means capturing subjectivity, reliably, scientifically and experimentally (Brown 1993; Watts und Stenner 2005; Simmon und Stenner 2012). We developed an online survey where participants can conduct the Q-sorting. We used Q-sortouch software to create the survey and generate the links which were provided to the project partners for feedback and for translating the survey to various languages (i.e., Finnish, Swedish, Norwegian, Icelandic, Faroese, Danish, Greenlandic, German and Italian). Q-sorting was done online in three ways: 1) the survey link was sent to participants and they accomplished the survey independently; 2) the participants were invited in an online or in-person meeting where they accomplish the survey with the guidance of a researcher. This was done so participants and researchers can ask clarifying questions with each other; and 3) the survey was accomplished in a focus group or a workshop setting, where the participants complete the survey simultaneously.

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5. **Analysis and interpretation.** The final step in Q-method includes statistical analysis and interpretation to reveal group of perspectives. Please refer to section 4.2.2. Q-method analysis for the details.

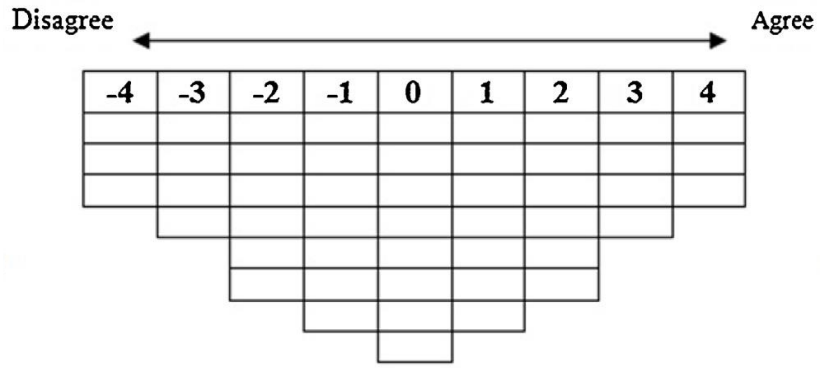

Figure 3. Q-method grid used on this study. Adapted from Gudurić (2013)

4.2. Data Analysis

4.2.1.Qualitative content analysis

Qualitative content analysis is a strategy used to systematically analyse text (Mayring 2000). At its core, it begins with a systematic coding to reduce huge amount of data, then categorizing them to determine trends, patterns of words used, their frequency, relationship and structures (Schreier 2012). While there are different ways to conduct qualitative content analysis i.e., with rigorous categories for coding by Schreier (2012) or deductive qualitative content analysis; we followed Mayring's (2000) inductive approach because it provides codes or themes to emerge organically from the data rather than from predetermined notions or hypothesis. Through this process, we gain a deep understanding of the data and generate insights that are grounded in the participants' perspectives and experiences (Hsieh und Shannon 2005). Conversely, one can argue that we can use the conversion factors of Human development theory to code the statements, however, it should be clear that the theory did not prescribe a comprehensive list of factors that can be used, but instead argued that researchers should rely on open strategies to create their own list of capabilities and conversion factors. This is also not to limit our views on local realities (Sen 1999; Robeyns 2005).

The expert interview transcripts were the main material used for this analysis. In aggregate, three researchers at BOKU worked on the analysis. Coding of the transcripts were done in atlas.ti following inductive analysis. First, the texts were coded based on the main topics of the questionnaire (actors, barriers, synergies, etc.) and then a second coding was done and applied to the whole transcript. This decision was made to account for the possibility that interviewees might address significant points at any stage during the interview. For instance, a participant may provide a brief response to a question about the importance of the industry at the outset and then expand upon their answer later in the interview. This approach ensures that we capture and interpret their responses adequately.

Barriers and Catalysts. Out of the total 1,580 meaning units or quotations that were coded based on the questionnaires' main topics, a total of 118 and 95 meaning units were extracted for barriers and catalysts, respectively. These were initially coded with 57 codes for barriers and 42 codes for catalyst. Initial codes are the basic themes of the quotations as interpreted by the researchers. Based on the similarities of the meaning conveyed, we grouped them into organizing themes and further reduced to 23 organizing themes for barriers and 12 for catalyst. This is further divided into a maximum of 6 global themes or aspects, see table 3 for the summary.

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Table 3. Summary of content analysis for barriers and catalysts

Steps	Barriers			Catalyst		
	Arctic	Alpine	Total	Arctic	Alpine	Total
Meaning units or quotations	86	32	118	74	21	95
Initial codes/basic themes	45	12	57	34	8	42
Organizing theme	14	9	23	9	3	12
Global theme/ aspects	6	6	-	5	3	-

However, it should be noted that outliers - codes and quotations that does not fit a certain theme was retained to have a more nuanced understanding. All the codes and corresponding themes were reviewed and revised repeatedly by the researchers until all has agreed to the results, and information saturation has been met.

Trade-offs and synergies. In addition to the interview transcripts, the analysis of trade-offs and synergies were complemented with D3.2 Report about context and effects of existing and new economic activities on local societies and cultures (Živojinović et al. 2022). This is to provide more details to the trade-offs and synergies identified by the interviewees. Following the qualitative content analysis, we initially identified 81 meaning units for synergies and 27 for trade-offs from the interview transcripts using atlas.ti. This is to first understand how interviewees used the words synergies and trade-offs based on contextual use. We then developed first impressions and notes on the relationship of the economic activities as discussed by the interviewees. For example, an interviewee stated: Husky entrepreneurs and reindeer herders have not had any problems either. The routes have been designed in such a way that there is no inconvenience to either trader" (124), this simply implies that there is synergy between tourism operator and reindeer herders. However, another interviewee states: "…these trade-offs are related to reindeer husbandry and tourism, mainly. Metsähallitus has regular negotiations with the representatives of reindeer husbandry, and they are informed about the forestry practices. We also coordinate and co-operate with regular negotiations with municipality and tourism representatives." (I16). While the interviewee clearly stated the presence of a trade-off, there is no further details mentioned about the trade-off itself but instead, they went into discussing how to resolve these issues. Since there is no consensus on the relationship of tourism and reindeer husbandry, we used the scientific reports to get the full picture of the situation: "Indigenous activities attracts tourists and helps increase Sámi culture awareness however, tourism also brings disturbance to the reindeer because of touristic movements (e.g., snowmobiles, husky sledding etc.)" (Myntti et al. 2022; Suopajärvi et al. 2022). Based on these quotations, we then interpret tourism and reindeer husbandry to be in an intermediary relationship or having both trade-offs and synergies. These constant comparison of the meaning units to each other and to the scientific reports aided in the development of the trade-offs and synergies table presented in the results chapter 5.2.

4.2.2.Q-method analysis

Q-method analysis and interpretation consist of numerous steps, see figure 4. To begin with, the Q-sorts from Q-sortouch software were downloaded as an initial data matrix. Since the surveys were in different languages (i.e., Finnish, Swedish, Danish, Greenlandic, Faroese, Norwegian, Italian, German) we have to translate them to English first to be able to analyse and understand the data. We then uploaded the data to KADE 1.2 (Banasick 2019), where all the statistical tests were applied: correlation analysis, factor analysis, factor rotation and interpretation.

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Q-sorts are correlated to each other. This determines the nature and extent of the relationships that pertain among all the Q-sorts in the data set (Watts und Stenner 2005). As a rule of thumb, correlations are generally considered to be significant if they are approximately 2.58 times the standard error (Brown, 1980). A correlation matrix is then produced which is used in the next step of factor analysis, which is method for classifying variables or in this case, the Q-sorts (Brown 1993). This step tells us how many factors or different viewpoints exist in our data (Watts and Stenner 2005). To extract the factors, we used Principal Component Analysis (PCA) which is a factor analysis algorithm that considers the commonality and specificity of individual Q-sorts. PCA is also the most commonly used type of factor analysis in Q-method (Brown 1993). A set of unrotated factors are revealed at this step and in our analysis, PCA extracts about 8 factors per study area and based on eigenvalue (λ), only factors with λ >1 was considered adequate for further analysis.

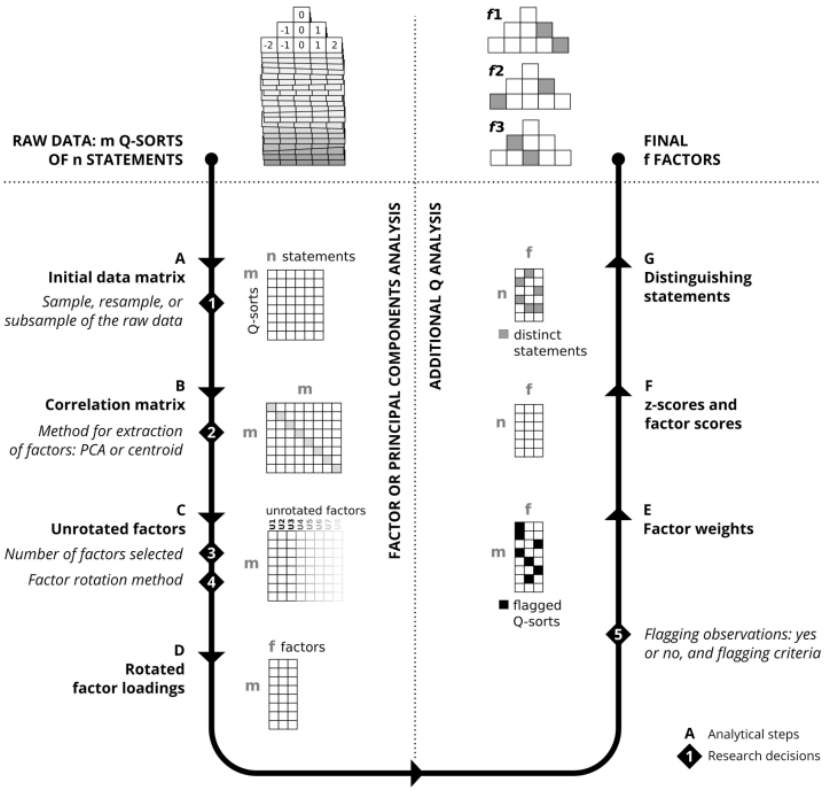

Figure 4. Standard analytical process in Q-method from Zabala und Pascual (2016).

Factor rotation was then applied to make the structure clearer, we used varimax and judgmental rotation to have a mix of mathematically precise solution and data-grounded, theoretical inclination in rotating the factors which results to rotated factor loadings (Brown 1993). We then flagged all the observations that are significant, meaning loadings that are higher than the significant factor loading and relevant at p>0.01 and p>0.05. All flagged Q-sorts are then included in the interpretation. Factor interpretation involves the production of a series of summarizing accounts, each of which explains the viewpoint being expressed by a particular factor or viewpoint. The summarizing accounts also include distinguishing and consensus statements that are the basis for the descriptions (Watts und Stenner 2005; Stenner et al. 2017; Simmon und Stenner 2012; Balch und Brown 1982; Brown 1993). Finally, the interpretated factors were consulted with project partners. Feedback either in written and oral were then used to refine the interpretation of the results. This includes changing names of the perspectives, or adding more context to the description.

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4.2.3.Comparative analysis

In this report, comparative analysis is concerned with isolating prominent similarities and differences among results; and explaining the perceived development of the local stakeholders in the Arctic and Alpine region (Pickvance 2001; Given 2008). Comparative analysis is more commonly used to provide explanations of causality, however, in social science and in multiple-case studies, causality is not monolithic as it involves a complex web of conditions and context (Miles und Huberman 1994). As such there is no single causality that may explain the occurrence of the event in question. Therefore, we used capabilities approach of the human development theory, that can explain development that does not forcibly smooth the diversity of the ArcticHubs and learning cases, but instead uses the results to develop a compelling set of explanations (Miles und Huberman 1994; Given 2008), refer to chapter 3 conceptual framework for more details on the concept.

We used comparative analysis to systematically compare and contrast the results of the qualitative content analysts and Q-method analysis. Aside from looking into the different Arctic hubs, we also compared it to the Alpine hubs which we consider as learning cases, because they have undergone the development path that the Arctic is experiencing today. Since we aim to compare complicated context-wise hubs to each other, we used human development theory not only to describe differences and similarities but also to contribute to theory development.

Two independent researchers examined the results of qualitative content analysis (barriers, catalysts, synergies and trade-offs) and Q-method (perspectives on development) in light of the components of the capability approach of the human development theory. Following the conceptual framework in chapter 2, we first looked at the available resources at country level by looking at GDP and resource rents. GDP represents the monetary value of all goods and services. Resource rents is the economic gain derived from exploiting natural resources (The World Bank 2024). Both indicators serve as an approximation to determine available resources to achieve wellbeing and development. While there are other resources that can be considered in the analysis, unfortunately, we do not have access to them e.g., information on social capital and privileges (endowments and entitlements). Furthermore, we also didn't have local level data therefore we resorted to using country-level data as a proxy. For the conversion factors, we looked into the barriers and catalysts that may deter or enable capabilities and compared Arctic and Alpine hubs. Synergies and trade-offs were analysed as an analytical tool to inform choices. And for the capabilities, we used the already established Human Development Index (HDI) of the United Nations Development Program (UNDP 2024) to be able to compare the countries. Perceived development as related to achieved functioning was compared to data emergent key aspects of the human development theory.

Through several in-person and online discussions, researchers discussed their findings and observations. To make sense of the patterns, similarities and differences, we always return to the interview data (e.g., transcripts and Q-surveys) so as to have a more organic, data-emergent explanation and descriptions. Finally, after multiple feedback and revisions, a consensus on the interpretation of the results were reached and then forwarded to project partners for evaluation. Feedback is then used to revised the results. All the methods used in this study is summarized in the figure 5.

4.3. Limitations of the study

We used Q-method to systematically explore the different viewpoints and perspectives on development of the Arctic in various locations and across European Arctic. We involved local stakeholders in the data collection process (through interviews and workshops) and incorporated local expert opinions into the concourse. In addition, Q-method was chosen only as an initial step in the

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project and the results obtained from the Q-studies informed and guided some of the subsequent stages of the research, where more detailed discussions and co-creative approaches were employed to further engage with local actors and stakeholders (e.g., as in WP5). However, we see the potential in the future research to plan for a more detailed follow up work after results from the Q-methods are obtained, in which more participative and co-creative process (e.g., participatory rural appraisal, Participatory Action Research, social labs etc.) could gain validation and additional insights.

Another limitation was data availability. We recognize that GDP and resource rents are not the only measure of resources, and we lack data on social capital and privileges, as this was not the main aim of our study. Additionally, we relied on secondary data and proxies i.e., country level data rather than local level data which may or may not be reflect local situations.

With regards to the methods used, qualitative content analysis is interpretative and may be challenging to replicate, which is true for most interpretative work. Researchers' frames and biases can be unconsciously applied to the interpretation, even though we worked iteratively (multiple revisions and feedback mechanisms) to reduce these biases. In addition, inaccurate translations of the interview transcripts and Q-method surveys are also considered as a limitation, since the data collection was done in local languages, we had to translate them to English to present them in this report. While we tried to consult the translations with our project partners, there may be concepts or words that are difficult or impossible to translate and may limit accurate interpretations.

Some Q-method studies' have relatively low number of respondents however this still falls within accepted ranges. According to Watts and Stenner (2005), 'large numbers of participants are not required for a Q methodological study' (p.73). This is because the Q-statements are the variable of analysis and participants are the observations – which is the opposite of usual R-statistics. Therefore, the latter should not exceed the former. Lastly, as the results of the Q-method very much relies on the quality of the Q-statements and the P-set or the participants included in the survey, the result does not present all the existing perspectives of development in the Arctic hubs and learning cases. Nonetheless, we structurally select the statements and identified relevant statements and participants together with the project partners to reduce this issue.

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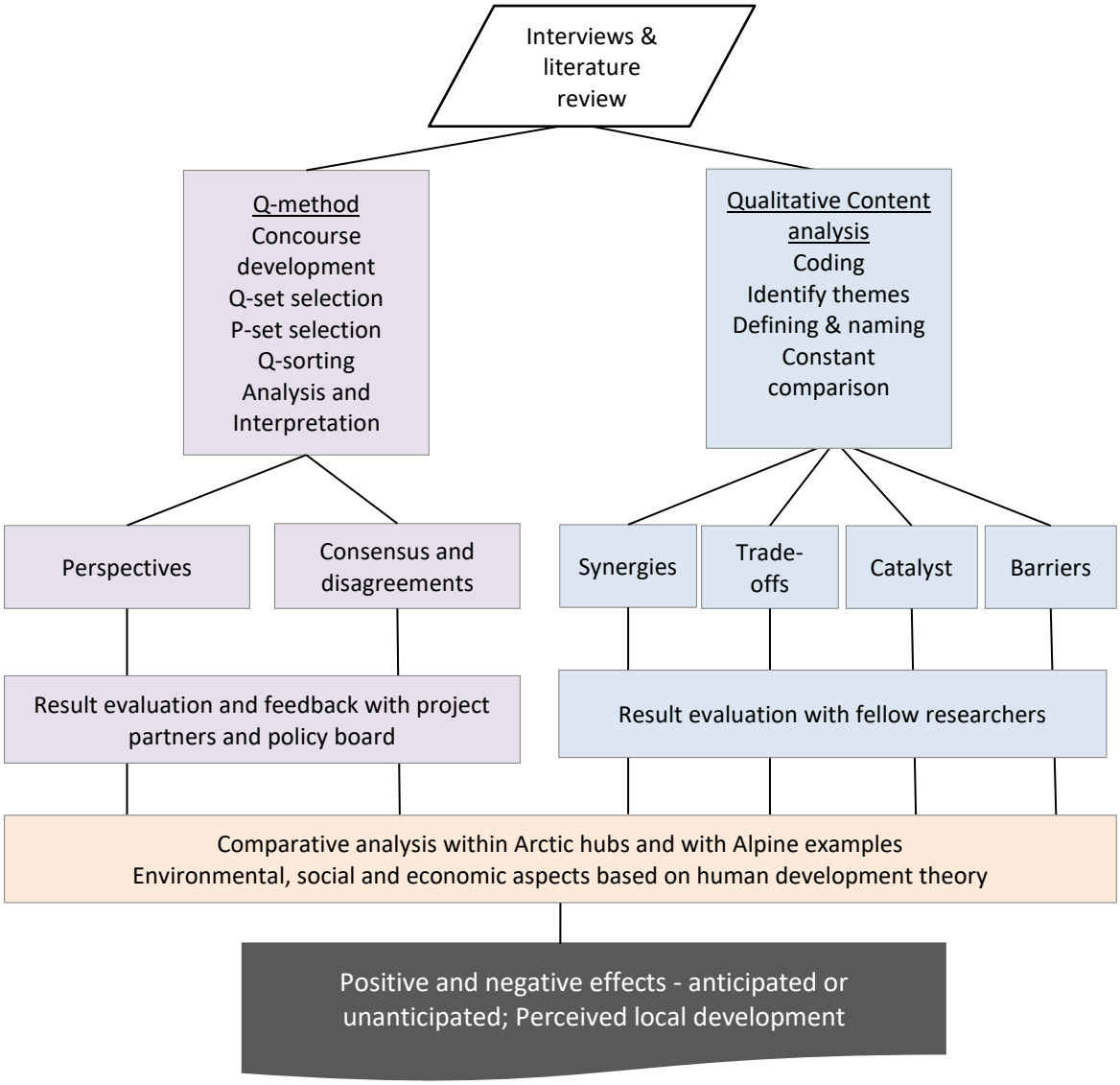

Figure 5. Summary of all the methods used in this study

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5. Results and Discussion

5.1. Catalysts and Barriers

We found a range of catalysts and barriers to development of the economic activities in the European Arctic and the learning cases. We divided it into 6 main global themes: economic, environmental, social, political/legislative, cultural and technology, see table 4 for the summary. The global themes are also found to fit into the conversion factors of the capabilities approach; however, we spliced the social factors into (1) social; (2) political/legislative and (3) cultural to bring more attention to their details. We also added a component of technology which emerged from the data analysed. Themes that we were not able to fit into the global themes mentioned above were retained to have a more diverse take on the catalysts and barriers and so as not to limit our understanding as well. Based on our analysis, below are the descriptions of each theme that is perceived to be the catalyst and barrier of development.

Catalyst of development in the European Arctic hubs and Alpine examples

1. Public and private sector. Entities involved in this theme as catalysts of development are the well-functioning municipalities, ministries, state and private companies e.g., mining companies, mining and forestry organizations that play a pivotal role in fostering economic expansion and development in their area. The public sector is seen as the promoter of the industries, and acts as coordinator and solver of land use issues, while the private sector brings jobs and employment (I7, I11, I12, I14, I13, I17, I18, I20, I19, I30, I33, I34).
2. Functioning infrastructure and economic structure. Catalyst for this theme are the robust infrastructure and a resilient economic framework that form the bedrock for sustained growth and diversification of economic activities in the area. This theme focused on the available roads and infrastructure, economic incentives and investments that supports the availability of premises for different land uses and continues operation of the industries (I14, I18).
3. Cumulative Benefits: Although not an entity or an agent, the catalyst to growth in this theme is the synergistic effects stemming from traditional livelihood and the current industries that can initiate the emergence of new economic opportunities and sectors (I54).
4. Sufficient Population: A critical mass of population provides a consumer base and labour force necessary for economic vitality and growth in the Arctic region and the local hubs (I18).
5. Local Community: Grassroots efforts and community-driven initiatives contribute to the organic development of economic ecosystems, fostering innovation and inclusivity. The local people are the ones who establish or continue local initiatives that supports sustainable industries (I27, I31, I32, I44),
6. Dialogue Among Stakeholders: Open communication and collaboration among diverse stakeholders foster mutual understanding and alignment of interests, driving collective progress. Dialogue also provides a venue for concerns to be voiced and heard therefore preventing or mitigating conflicts (I24, I44, I49, I48, I53).
7. Legislation: Regulatory frameworks, such as forest acts and other regional development policies, play a pivotal role in shaping economic landscapes and promoting sustainable practices, for example, Finland's new forest act has improved the situation of pendulous lichen forests that are important for reindeer husbandry (I23, I6, I40).
8. Cultural centres: Conservation and promotion of cultural heritage and diversity contribute to the resilience and vibrancy of local economies. Sámi Museums, training and recreation centres provide a venue where in traditional language and handicraft are preserved to passed on to the future generation. These centres also promote, enable and develop traditional livelihood. They also host a variety of events that raises awareness about the indigenous lives and culture (16, I4, I48, I58).
9. Reindeer herder: preserves the identity and livelihood of the Sámi indigenous group. Reindeer herders are seen as catalyst of development because it enables the continuity of traditional

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livelihood. They also enable and promote traditional knowledge, skills and ecological stewardship (I18, I49, I59).

10. Research, social media, and Digitalization: These modern tools facilitate knowledge dissemination, networking, and market access, catalysing entrepreneurship and economic growth. Social media serves as a platform to arouse interest and initiate a conversation around an issue. It can help to strengthen democracy and the upheld the voices of different people (I4, I5, I6, I7, I11, I18).

Table 4. Summary of perceived catalysts and barriers to development of local stakeholder in the European Arctic and learning cases

Global themes	Arctic hubs		Alpine hubs	
	Catalyst	Barriers	Catalyst	Barriers
Economic	Public and private sectors Functioning infrastructure & economic structure Cumulative benefits	Lack of capital Poor infrastructure Reliance on a single industry	Public and private sectors	Lack of capital Poor infrastructure
Environmental*	-	Lack of space Severe weather condition Land exploitation	-	Severe weather condition
Social	Sufficient population Local community Dialogue among stakeholders	Competing/conflicting human land uses Local's reluctance	Local community	Competing/conflicting human land uses Local's reluctance
Political/ legislation	Legislation	EU mandate for increased forest protection Biases influencing rules and regulations Complex licensing procedures	-	-
Cultural	Cultural centers Reindeer herder	Losing identity and culture	Cultural centers	Losing identity and culture
Technology	Research Social media Digitalization	-	-	Mechanization
Others	-	Risks Uncertainty Wildcards Climate change	-	Climate change

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Barriers of development in the European Arctic hubs and Alpine examples

1. Lack of Capital: Insufficient financial and human resources pose a significant barrier to development of economic activities in the European Arctic. The lack of educated workforce willing to move to the towns and live there poses challenges to the industries. Reliance on temporary, fly-in and out workforce is not sustainable (I11, I12, I16, I19, I33, I34).
2. Poor Infrastructure: Inadequate infrastructure e.g., poor road condition and maintenance hampers logistical efficiency and limits access to markets, hindering economic growth. This is particularly true for forest roads that are crucial in transporting logs from remote areas to processing sites (I17, I18).
3. Reliance on a single Industry: Overreliance on a single industry increases vulnerability to economic shocks and limits diversification efforts. Alternative jobs and opportunities also find it difficult to establish itself in an area that is fully reliant on a single industry (I2).
4. Lack of Space: Limited physical space constrains the expansion of economic activities and infrastructure development. This is particular to fish farming and aquaculture where there is not enough space for salmon farming in the fjords or seaweed farming (I1, I2, I49).
5. Severe Weather Conditions: Environmental challenges such as extreme weather events disrupt economic activities and pose risks to livelihoods, particularly tourism (I27).
6. Land Exploitation: Particular to reindeer husbandry, as land exploitation of mining and forestry industries means environmental degradation that affect the health and survival of the reindeer. Expansion of industries also mean more of their indigenous lands are encroached upon, therefore affecting their grazing lands and pastures (I49, I47, I59).
7. Conflicting Land Uses: Competition for land resources and conflicting land uses impede development. Conflicts with mining, forestry, tourism and reindeer husbandry slows down decision making processes, fragments the region and the local community (I4, I46, I11, I32, I36, I49, I48, I59).
8. Local Reluctance: Reluctance of locals to grant access hinder the implementation of economic initiatives and projects. This is particularly true for tourism as land owners and forest owners would like to keep their lands free of tourist activities, also refusing development to grant access to tourism sites (I32, I27, I14, I18, I59).
9. EU mandate for increased forest protection: Increasing nature protection areas limits the forestry, fish farming and mining sectors to expand and increase their production. However, this also affect small land owners and fishermen not only the bigger companies (18, I20, I23).
10. Biases influencing rules and regulations: Creates advantages or disadvantages for certain groups or activities, hindering equal opportunities and stifling innovation and progress. Larger companies and decision makers having more influence on the direction of development disadvantages the indigenous peoples and local communities (I16, I25, I29, I59).
11. Complex Licensing Procedures: Cumbersome regulatory processes and licensing procedures create barriers to entry and expansion of the industries (I18, I25, I31).
12. Loss of Identity and culture: Rapid economic development erode traditional identities and cultural heritage, leading to social dislocation and resistance. Expanding industries takes a toll on physical, emotional states of a reindeer herder. Part of their knowledge is lost every time another part of their land is taken. Sometimes they are also forced to make their reindeer stay in an enclosure and they get more disconnected to their culture (I29, I49, I51, I58).
13. Environmental Risks and Uncertainty: Emerging environmental risks, including those exacerbated by climate change, introduce uncertainties and challenges to economic planning and development (I18, I24, I13).

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5.2. Trade-offs and synergies among industries

Based on task 3.1 and the semi-structured interviews, we summarized the perceived trade-offs and synergies among the different economic activities in table 5. We also included energy/wind farms, and nature protection which are discussed by interviewees to be a crucial matter.

According to the reports and interviews, there is a complex relationship among the industries present in the Arctic region and it is challenging to state for certain that economic activities have synergies or trade off, therefore we used a spectrum where we consider a possibility that there can be an intermediate relationship between two activities. For fish farming, we found that it has trade off with nature conservation and mining. According to an interviewee, increasing shoreline protection in Norway would negatively affect the industry since there will be less space to operate in the fjords. Increased protection also means less access to the resources in the area (I35). In terms of mining, past production and fjord deposits caused seabed and water pollution, harming residential and leisure areas and disrupting fishing and reindeer herding. Local Sea Sámi fishermen oppose the mining company for its harmful impact on Varangerfjord's marine environment (Nygaard et al. 2022). In Egersund, environmental NGOs protested against seafloor tailing deposit in the 80s and the waste deposit was moved to the land, but this turned out to be very harmful too (Nygaard et al. 2022). For tourism, fish farming provides both benefits and drawback: established fish farming and aquaculture sector improves ports and roads that benefits tourist' mobility and access (I33, I36). However, the sea cages ruin the aesthetics of the fjords (I33, I32). Recreational/tourist fishermen and women can also disrupt the operations of the fish farms as tourist are sometimes ignorant of the fishing area zones (Edvardsdóttir et al. 2022). Tourism also brings with it littering and environmental wear and tear (Bogadóttir et al. 2022). Moreover, the absence of project location or hubs combining fish farming with other economic activities such as forestry, traditional hunting, reindeer husbandry, and wind farms limits our ability to determine the presence of synergies or trade-offs based on our interviews and reports.

Forestry was found to have severe trade-offs with reindeer husbandry. Forestry is considered by most reindeer herding communities as the most impending threat to reindeer husbandry due to the reduced landscape connectivity, and loss of ground and pendulous lichen rich forest, which are important reindeer food (I6, I7, I23, I18, I11 Lidestav et al. 2022) . Different forestry methods and different phases of forestry strongly affect the behaviour and the well-being of the reindeer (*ibid* 2022). Forestry also has a trade off with traditional Sámi hunting as forestry activities such as harvesting and silvicultural treatments disturb wild animals and their routes and hunting can prove to be challenging (*ibid* 2022). Lastly, forestry has a trade-off with nature protection as EU natura 2000 aims to increase protected areas for biodiversity protection, this means less area for production (I23, I20, I18). Although, Finland and Sweden have compensation for land owners to set aside some areas for protection. Interviewees mentioned that the payment isn't enough (I59, I23). On the other hand, forestry and mining are in an intermediate relationship since mining expansion are done in forest lands, but since forest lands in Sweden and Finland are either state owned or privately owned (*ibid* 2022), the landowners can negotiate an agreement of payment (I59). This is also the same with forestry and wind farms. The energy sector can pay rents to the forest owner where they built their wind turbines hence generating income for the forest owner without any activity on their part. Wind farms establishment are also more profitable as the boreal forest's productivity is low and improves forest roads (I11, I23). With tourism, forestry activities such as clear-cutting ruins the landscape which is what tourists in the Arctic are after but at the same time forest roads provide tourist access to remote areas (I7, I11, I12, I18 Bogadóttir et al. 2022; Živojinović et al. 2022).

Mining was found to have severe trade-offs with reindeer husbandry and nature conservation (I21, I49, I58, I44, I49). Mining expansion overlaps with Sámi and reindeer herding traditional lands. Most

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of the mines in the Arctic are in Indigenous lands and mines including their buffer areas cuts off reindeer routes and increased the fragmentation of grazing lands (Nygaard et al. 2022; Myntti et al. 2022; Živojinović et al. 2022). The road and railroads that serve as transport links from the mines to the processing sites also affect reindeer routes and increases reindeer roadkill incidents. Mines also produce dust that affects the capacity of the reindeer to find lichens on the ground (Nygaard et al. 2022). With nature conservation, irresponsible and unsustainable mining affects nature (I22, I21 I45, I9). In Kittilä, the stormwater from the mines used to eutrophicate the river, so the locals complained through media and directly towards the mining company, now the stormwater is diverted in a different direction, and in a different river (I22). Regarding mining and tourism, they both have drawbacks and benefits. Mining areas are transformed to tourism sites (I36), however open pit mines also ruin the landscape, especially for nature-based recreationist (Bogadóttir et al. 2022; Živojinović et al. 2022).

Tourism is found to have an intermediate relationship with all the economic activities present in the Arctic. Tourism brings disturbance to the reindeer because of touristic movements e.g., snowmobiles, husky sledding etc (I16, I7, I38). Tourism also brings littering and environmental wear and tear. However, tourism helps increase awareness about the local culture and Sámi traditions (I6, I7, (Bogadóttir et al. 2022). On the one hand, it is the reindeers and the Sámi culture that attracts tourists to visit the Arctic. Tourism has conflict with traditional hunting, as tourist's ignorance of the rules disturbs proper hunting areas (Bogadóttir et al. 2022). In Nuuk, there is a ban on humpback hunting because tourists view the activity as barbaric, even though hunting whale has been a long tradition in Nuuk. This ban angered small number of whale hunters citing that it was their tradition that has to make way for tourists wants (I26, I30). Contrastingly, it is the local culture, their traditions and unique nature of Greenland and the Arctic that attracts the tourist to come. In turn, tourism is a way to increase awareness about local culture, and make markets for locals and indigenous peoples to sell their goods (e.g., reindeer meat) and services (e.g., reindeer sledding) (Živojinović et al. 2022; Bogadóttir et al. 2022). With regards to nature conservation, it's the environmental wear and tear from mass tourism and littering. Nonetheless, natural parks and nature reserve are also one of the main reasons tourists comes to the Arctic (I18). Lastly, windfarms like mining and clear-cut forests, ruins the landscape and aesthetic of their romanticized wild Arctic (Živojinović et al. 2022).

Reindeer husbandry has trade-offs with wind farms (I23, I21, I43, I51, I46, I45, I56), this is because wind farms and associated infrastructure e.g., network grids, roads and maintenance buildings also cuts off reindeer routes and affect their behavior. Wind farms in the Arctic are mostly established in areas where reindeer migration routes are established for millennia (Lidestav et al. 2022). On the other hand, reindeer husbandry has synergies with traditional hunting and nature conservation. Traditional hunting is only done in very specific seasons which doesn't disrupt the reindeer herding cycle, it in fact is used by indigenous peoples to supplement their needs, especially for the incoming winter. Reindeer herders benefit from protected areas, meaning no industry operation, no disruptions. Nature is preserved and lichens are available for the reindeer (Myntti et al. 2022; Živojinović et al. 2022).

Traditional hunting in Greenland however has a different debacle, as traditional hunting is viewed as negatively impacting whale populations in the Fjord, while local hunters believe that they do it sustainably as part of their life, hence whales are still present in the fjord even with a hundred-years tradition of hunting. Hunting is also seen to balance the prey-predator populations, when done sustainably (I26, I27, I30), Lastly, nature conservation has trade-offs with wind farms because of the disruptions and competing land use (I4, I21).

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Table 5. Trade-offs and synergies among economic activities in the European Arctic and Learning cases

Activities	Fish Farming	Forestry	Mining	Tourism	Reindeer husbandry*	Traditional Hunting**	Nature protection	Wind farms
Fish Farming								
Forestry				LC				
Mining				LC				
Tourism								
Reindeer husbandry*								
Traditional hunting**								
Nature protection								
Wind farms								

*Indigenous peoples' economic activities include reindeer husbandry and hunting,
**Inuit tradition of hunting caribou, ox, whale
LC – learning cases

For the learning cases, mining and tourism are perceived to have synergies, as mining areas have already closed or partially operating that a portion of the mining sites are now used for tourism purposes (I62, I67). Museums about the legacy of mining of the towns are established to educate and increase awareness of visitors (I66, I67). Mines devote a certain area for tourism purposes e.g., Leoben uses a part of the mines for a motorbiking competition aka iron road events (I63), Germansca developed an ecomuseum and has collaboration with the skiing lifts (I67). On the one hand, forestry and tourism in our learning cases remains to have an intermediate relationship, however this is only particular to Leoben Austria. Like in the Arctic, tourism benefits from the forest roads that provide access to the forests and remote areas. In Leoben, the forest roads are also used for mountain biking which disturbs other visitors and locals. Some tourist also ignores hiking and biking trails which increases risks and liability to the landowner. Additionally, tourist's negative views in forest harvesting limits forestry activities because they prefer the forests to be untouched for their sports and recreation (I60, I61). However, this is not possible as forestry management and harvesting is actively practiced in Leoben (Bogadóttir et al. 2022; Živojinović et al. 2022; Lidestav et al. 2022).

5.3. Local Perspectives on development of existing and new economic activities in the Arctic

5.3.1. Arctic region level

Based on our analysis and interpretation, we found three group of perspectives on the development of the economic activities in the European Arctic. The first two perspectives are bipolar, meaning participants feel strongly about the same topic but are on opposite sides. The three perspectives explain 63% variance of the sample: factor 1a and 1b contributes 22% each, and factor 2 explains 19% of the variance, see table 6 - factor matrix with defining sorts flagged.

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Table 6. Arctic region's factor loadings with defining sorts flagged

Participant No.	Participant organization/position	Factor 1a	Factor 1b	Factor 2
1	Energy company	**0.5966***	-0.5966	0.2839
2	European Space Agency	**0.5978***	-0.5978	0.3025
3	University	**0.4567***	-0.4567	0.2948
4	University	-0.0145	0.0145	**0.7141***
5	Norge Mining	0.06	-0.06	**0.5918***
6	National bank	0.281	-0.281	**0.3898***
7	Finland Ministry of the Environment	-0.4984	**0.4984***	0.4557
8	Barents Regional Youth Council	0.1487	-0.1487	**0.4556***
9	Industry Expert	-0.5638	**0.5638***	0.2217
10	Research Institute	**0.5428***	-0.5428	0.181
11	Local citizen	**0.5683***	-0.5683	0.5223
12	University	**0.4726***	-0.4726	0.135
13	Research Center	0.1928	-0.1928	**0.4784***
14	Forestry industry	-0.731	**0.731***	0.1575
15	Local citizen	-0.3215	0.3215	0.2362
16	Local Municipality Assembly/Council	-0.5151	**0.5151***	0.1768
17	Gran Sameby	**0.7157***	-0.7157	-0.0207
18	Local citizen	0.3032	-0.3032	0.1145
19	Local citizen	0.1155	-0.1155	**0.6397***
20	Reindeer herding community	**0.719***	-0.719	0.2713
21	Icelandic Forest Service	-0.2119	0.2119	0.1373
22	University	0.1722	-0.1722	**0.5258***
23	Reindeer Herders' Association Finland	**0.6958***	-0.6958	0.412
24	The Centre for Economic Development, Transport and the Environment	0.2402	-0.2402	**0.7406***
25	Local Sámi indigenous tribe	**0.6991***	-0.6991	0.3542
26	Minister for Agriculture and Forestry of Finland	-0.0511	0.0511	**0.5208***
27	Finland's Ministry of Economic Affairs and Employment	-0.6824	**0.6824***	0.3594
28	Indigenous activity expert	**0.5862***	-0.5862	0.352
29	Barents Euro-Arctic Council	-0.2905	0.2905	**0.6155***
30	University	**0.7369***	-0.7369	0.2705
31	Local citizen	-0.2695	0.2695	**0.734***
32	Helsinki Institute of Sustainability Science	0.2464	-0.2464	**0.7194***
% Explained Variance		**22%**	**22%**	**19%**

*Flagged sorts - represents defining sorts for the factor

The description of the perspectives containing the most important points and distinguishing statements are detailed below. Additionally, we just wanted to note that the numbers in the brackets i.e., (34, +4) refer to the statement number (34) and the score (+4). All the statements and their corresponding numbers and scores per perspective are available in table 7 while the distinguishing statements are indicated in table 8.

Factor 1a. Extractive industries harm the environment and local culture. Advocates believe that extractive industries degrade the environment local cultures, livelihoods (34, +4) and the industries'

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only aim is to maximize profits (35, +4). Advocates are sceptic that expansion and development of economic activities in the Arctic region are decided in a transparent and inclusive manner (18, -4). They also strongly disagree that resource utilization in the Arctic region is being done in a responsible and sustainable way (13, -4). As such advocates believes that industries provide negative impacts to the Arctic's fragile ecosystems, has poor community involvement, and that all the cumulative effects of the industries be acknowledged in relation to reindeer husbandry (33, 25, 9, +3). It follows that advocates agree that the expansion of industries threaten the local and indigenous communities (14, +2) hence, they call for a stronger environmental protection in the Arctic (27, +2). They also agree that local communities benefit so little from the industries (23, +2; 20, -2); and that the use of Arctic natural resources will secure municipalities welfare ambitions (10, -2). Hence, advocates strongly disagree that there should be more economic incentives for the industries (11, -3). Advocates of perspective 1a, supports indigenous rights and see the current decision-making system as non-inclusive (2, -3; 26, 8, -2). They also disagree that indigenous tradition should change and adapt to the changing society (7, -3). When it comes to decision making, they agree that Arctic development should be more equitable and considers needs and priorities of the communities (22, +2).

Factor 1b. Utilizing natural resources ensures local growth. The opposite of 1a, advocates of this perspective believe that local development happen with the use or natural resources; and when all profits stay at the local communities and not be sent to the 'South' or capitals. They agree that by utilizing the natural resources of the Arctic region, municipalities secure their welfare ambitions (10, +4); and that developing skilled workforce locals is a key factor in the development of the Arctic (6, +4). However, advocates believe that all profits from extractive industries are remitted outside the local communities (23, -4). This group agree that there is no need for stronger environmental protection in the Arctic (27, +4) since the industries provide local benefits and important to the current green transition. Unlike perspective 1a, this group trust the industries and the decision makers to have their best interests at heart, even the indigenous communities (19, 35, 14, -3; 8, 25, 7, 34, -2; 18, +2). They also believe that the natural resources in the Arctic are used in a responsible and sustainable way (20, 13, +3). However, they see the rules and regulations from the EU as a barrier to development (28, +2).

Factor 2. Local community comes first. Advocates strongly believe that companies operating in different countries in the Arctic region must gain the trust of the local community (17, +4); and Arctic region development needs to be more equitable and considers Arctic communities needs and priorities (22, +4). Advocates strongly disagrees that traditional land uses restrict development (8, -4); and that local and Indigenous peoples' way of living culture and traditions should change to adapt to a changing society (7, -4). In effect, they believe that indigenous' way of life has positive environmental benefits and that some indigenous peoples are supportive of industry development (16, 24, +3). Advocates believe that traditional land uses actually contribute to development because it is built on sustainable use of the local environments, from the perspective of the local livelihoods and culture. Advocates of the 2nd perspective are not against development but they agree that there is a need for a stronger environmental protection in the Arctic (27, +2). They also believe that Industries must support local economies to be accepted by the local community, and that trust from the local communities is the key to progress. They believe that local people know better how to manage their land unlike people from other areas and another type of land use zones.

On decision making, advocates believe that Interest and rights of Indigenous peoples play a major role in discussions on the development of economic activities and the coordination of land use in the Arctic region (2, +2); and Indigenous peoples benefit from nature protection measures because protected areas are not subjected to extractive industry operations (3, +1). On the contrary, they disagree that State authorities are the main decision makers when it comes to industry development in the Arctic

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region (15, -2). Interestingly, they disagree that decision-making power over land use should be devolved from the central to the local level (5, -1).

All participants across Arctic region's 3 different perspectives agree that the cumulative effects of different land uses have to be acknowledged in relation to reindeer husbandry (9); and that the influx of tourists in the Arctic drives up inflation in the prices of goods and services (29). On the one hand, they all disagree that tourism supports awareness of Indigenous culture e.g. Sámi and Inuit as a way to keep Indigenous culture alive in Arctic (12). Most participants are uncertain whether mass tourism negatively impacts local cultures and ways of life as it can turn traditional culture into commodities for consumption and entertainment (31).

Table 7. Arctic's statements and the scores per perspectives

Statements	Factor 1a	Factor 1b	Factor 2
1.Tourism in the Arctic region creates a market for locally produced goods and services	0	0	3
2.Interest and rights of Indigenous peoples play a major role in discussions on the development of economic activities and the coordination of land use in the Arctic region	-3	1	1
3.Indigenous peoples benefit from nature protection measures because protected areas are not subjected to extractive industry operations	0	-2	1
4.Policy integration is needed from the national to the local level in order to make informed decisions about the industries' future in the Arctic region	1	0	0
5.Decision-making power over land use should be devolved from the central to the local level	-1	1	-1
6.Developing skilled workforce locally is a key factor in the successful development of the Arctic region	-1	**4**	0
7.Local and Indigenous peoples' way of living culture and traditions should change to adapt to a changing society	-3	-3	**-4**
8.Traditional land uses restrict development in the Arctic region	-2	-1	**-4**
9.The cumulative effects of different land uses have to be acknowledged in relation to reindeer husbandry	3	1	2
10.By utilizing the natural resources of the Arctic region municipalities secure their welfare ambitions	-2	**4**	-1
11.State governments should provide more economic incentives (e.g. increased subsidies and tax exemptions) to encourage growth and expansion of industries in the Arctic region	-3	0	0
12.Tourism supports awareness of Indigenous culture e.g. Sámi and Inuit as a way to keep Indigenous culture alive in Arctic	-1	-1	0
13.Utilizing the natural resources in the Arctic region is a responsible and sustainable way to support green transition	**-4**	2	-3
14.The expansion of economic activities in the Arctic region threatens the self-sufficiency of the local and Indigenous peoples' culture	2	-3	-1
15.State authorities are the main decision makers when it comes to industry development in the Arctic region	0	-1	-2
16.The Indigenous way of life has positive environmental benefits in the Arctic region	1	0	3
17.Companies operating in different countries in the Arctic region must gain the trust of the local community	1	3	**4**
18.Expansion and development of economic activities in the Arctic region are decided in a transparent and inclusive manner	**-4**	2	-1
19.State authorities prioritize economic growth over environmental and socio-cultural issues in the Arctic	1	-2	1

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20.Extractive activities in the Arctic region prevents out-migration and unemployment	-2	3	0
21.Tourism is a seasonal industry that does not provide year-round employment opportunities for local people in the Arctic region	-1	2	-3
22.Arctic region development needs to be more equitable and considers Arctic communities needs and priorities	2	1	4
23.Almost all profits from extractive industries are remitted outside the Arctic local communities	2	**-4**	-2
24.Indigenous peoples are not against all development of economic industries	0	3	3
25.International/global companies operating in the Arctic region do not really consider the welfare of the local people	3	-2	-2
26.Arctic communities are afraid to open the doors for new ideas development and industries	-2	0	-3
27.There is a need for stronger environmental protection the in Arctic region	2	**-4**	2
28.The EU Commission rules and regulations are a barrier to developing the industries because of its strict and complex requirements and processes	-1	2	-1
29.The influx of tourists in the Arctic drives up inflation in the prices of goods and services	0	1	1
30.Arctic communities do not develop in tandem with the expansion of industries	0	-1	1
31.Mass tourism negatively impacts local cultures and ways of life as it can turn traditional culture into commodities for consumption and entertainment	1	0	0
32.social media has heavily increased people's interest in the Arctic as a tourist destination	0	0	2
33.Mass tourism overwhelm fragile ecosystems in the Arctic leading to a range of negative impacts	3	-1	2
34.Extractive industries degrade the environment local cultures and livelihoods	**4**	-2	0
35.Industries in the Arctic region only aim to maximize profits	**4**	-3	-2

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 8. Arctic Distinguishing statements for each factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1a. Extractive industries harm the environment and local culture	10(-2;-0.83)*; 20(-2;-0.99)* 2(-3;-1.38)*; 11(-3;-1.73)* 13(-4;-1.92)*; 18(-4;-1.97)*	19(1;0.81);17(1;0.58)*; 32(0;0.35)*;24(0;0.23)*; 21(-1;-0.12)*	34(4;1.95)*; 35(4;1.65)* 25(3;1.15)*; 14(2;0.88)* 23(2;0.84)*
1b. Utilizing natural resources ensures local growth.	3(-2;-0.61); 19(-2;-1.06)* 34(-2;-1.13)*; 14(-3;-1.39)* 35(-3;-1.57)*; 27(-4;-1.71)* 23(-4;-2.05)*	5(1;0.42)*; 32(0;-0.34)* 33(-1;-0.41)*; 30(-1;-0.55)*	10(4;1.66)*; 6(4;1.54)* 20(3;1.42)*; 17(3;1.26)* 13(2;1.25)*; 18(2;0.96)* 21(2;0.85)*; 28(2;0.7)*
2. Local community comes first.	23(-2;-0.76)*; 35(-2;-0.8)* 13(-3;-1.1)*; 21(-3;-1.14)* 8(-4;-1.95)*; 7(-4;-2.14)*	19(1;0.36);20(0;0.12)*; 34(0;-0.04)* 10(-1;-0.27)*;14(-1;-0.41)* 18(-1;-0.44)*	17(4;2.26)*; 22(4;2.11)* 16(3;1.43)*; 1(3;1.26)* 32(2;0.87)*

All distinguishing statements are significant at p<.0.05. * Indicates significance at p<0.01

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5.3.2.Single hub level

A total of 8 hubs from the project were selected to conduct local level Q-study: 6 in Arctic countries and 2 in our learning cases in the Alpine region. Below are the description containing the most important points of the perspective of each hub level Q-study. Note that the numbers in the brackets i.e., (34, +4) refer to the statement number (34) and the score (+4). All the statements and their corresponding numbers and scores are available in the hubs' corresponding tables.

5.3.2.1. Kittilä - mining and tourism hub in Finland

We found three perspectives of which the third perspective is bipolar, meaning they participants feel strongly about the same topic but are on opposite sides. The three perspectives explain 76% variance of the sample: factor 1 explains 27%, factor 2 explains 25 % and factor 3a and 3b explains 12% each, see table 9 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 10 while the distinguishing statements are indicated in table 11. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 9. Kittilä's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2	Factor 3a	Factor 3b
1	Agnico Eagle	0.2557	**0.8324***	0.0651	-0.0651
2	Agnico Eagle	0.3652	**0.744***	-0.059	0.059
3	Forest Management Association	0.1132	0.4332	-0.6706	0.6706
4	Local citizen	0.0871	0.3719	**0.7102***	-0.7102
5	Forest owner	0.0135	**0.7378***	0.1984	-0.1984
6	Village Association	**0.8684***	0.0722	0.013	-0.013
7	Municipal council member	**0.7389***	0.3937	0.05	-0.05
8	Entreprenuer	**0.6439***	0.0157	0.2055	-0.2055
9	Local citizen	**0.7488***	0.2362	0.0777	-0.0777
10	Teacher	**0.6522***	0.3601	0.3449	-0.3449
11	Entreprenuer	**0.6754***	0.1628	-0.0309	0.0309
12	Reindeer herders' association	0.3972	-0.0879	**0.6745***	-0.6745
13	Nature conservation organization	0.4948	0.671	-0.0812	0.0812
14	Decision Maker	0.0821	**0.7211***	-0.1788	**0.1788***
% Explained Variance		**27**	**25**	**12**	**12**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Strong sustainable consumption**. The first factor of our study centres on a robust sustainable consumption perspective, revealing distinctive stances both in agreement and disagreement among respondents. On the agreeing side, respondents advocate for the reduction of consumption patterns (18, +4), express concerns about the local workforce's inadequacy for meeting industrial demands (15, +3), and call for scientific research to evaluate wind power's impact on reindeer husbandry (14, +1). Conversely, in disagreement, concerns arise regarding windmill farms' interference with reindeer grazing patterns (29, -1), the insufficiency of compensation for forest protection (Statement 24), and EU regulations hindering forest protection (9, -3). Factor 1 also underscores a strong inclination towards sustainable consumption, as evidenced by respondents prioritizing changing consumption patterns over increasing natural resource demands (15, +3) and acknowledging the local workforce shortage for meeting industrial needs (18, +4). Moreover, it highlights the necessity of mining companies engaging with local

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communities (1, +4) while suggesting improvements in land use zoning (17, -1) and cautioning against devolving all land-use decision-making to locals (19, 0).

While respondents vehemently oppose halting mining operations (22, -4) and sacrificing the environment for mining in Kittilä (11, -4), they advocate for environmental preservation alongside continued development (9, -3). They also express reservations about increased mining for green energy transition (13, -1), emphasizing the importance of reducing consumption patterns (15, +3) for achieving sustainability. Furthermore, respondents perceive tourism positively due to its impact on local populations and its compatibility with reindeer husbandry (7, +3; 20, +1; 27, -3). However, they view increased tourism as a threat to traditional ways of life (26, +2) and suggest utilizing tourist taxes for maintaining local services (12, +1). While acknowledging windmill farms' potential harm to forestry (16, -3), respondents maintain they should not be halted due to their perceived minimal disruption to reindeer grazing (29, -1), advocating instead for further research and compensation (14, -1; 24, -2).

Overall, Factor 1 represents the perspectives of local communities and authorities, advocating for sustainable economic development through reduced consumption patterns and thoughtful engagement with industries like mining and tourism, while balancing environmental concerns and traditional livelihoods.

2. **Factor 2**: **Weak sustainability.** Factor 2 of our study presents a weak sustainability perspective, focusing on maintaining economic development without necessarily reducing consumption patterns. This viewpoint is characterized by distinct agreements and disagreements among respondents, particularly emphasizing the positive contributions of industries like mining and tourism to the municipality. In terms of agreements, respondents strongly support the importance of developing both the mining industry and tourism in Kittilä (13, +4), highlighting their belief that these industries can work together effectively (5, +4). They perceive these industries as crucial for local economic vitality and green energy transition (13, +4; 2, +3), with mining companies playing a significant role in providing jobs and contributing to tax revenues (Statement 2). Additionally, they argue against halting mining operations, emphasizing their vital contribution to the municipality's finances (22, -4). However, disagreements arise regarding the mutual benefit between reindeer husbandry and nature conservation (10, -1), suggesting a departure from traditional sustainability perspectives. Respondents also challenge the notion that windmills harm forestry (16, -1), advocating for their development without disruption to the environment or traditional livelihoods. Moreover, they express dissatisfaction with the representation of Kittilä residents in municipal decision-making processes (8, -2), albeit without strong demands for change (19, -3).

   Factor 2 primarily represents views from nature associations and industries, particularly mining companies, and Metsähallitus. While acknowledging the need for environmental preservation, respondents prioritize economic development and technological solutions over reducing consumption patterns. They argue for the continuation of mining operations to sustain the municipality's economy, highlighting the significant contributions of mining to local employment and tax revenues. Additionally, they advocate for local control over mining taxes and oppose remittance to the state (21, +3), underscoring the importance of these funds for community development.

   Overall, Factor 2 reflects a perspective that seeks to balance economic growth with environmental concerns, prioritizing the continuation of key industries and local control over resources and decision-making processes.

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3. **Factor 3a: Reindeer herding and nature conservation.** Presents a distinct perspective focusing on the need to address consumption patterns alongside environmental and economic concerns. The most notable agreements among respondents include advocating for changing consumption patterns to reduce demand for natural resources (15, +4) and conducting scientific research to assess the impact of wind power on reindeer husbandry (14, +3). However, there is strong disagreement regarding the necessity of more metals from mines to support green energy transition (13, -1), with concerns raised about overconsumption of natural resources. Respondents express concerns about the potential negative impact of windmill farms on reindeer grazing and migration patterns (29, +4), emphasizing the importance of preserving traditional livelihoods and habitats. They also challenge the notion that tourism has a positive impact on population growth, highlighting the displacement of traditional ways of life and the encroachment on reindeer herding areas (7, -2; 27, +1). Additionally, they oppose the collection of tourist taxes for local services, suggesting a reluctance to prioritize tourism-related infrastructure over traditional livelihoods (12, -2).

   In terms of nature conservation, respondents believe in the mutual benefit between reindeer husbandry and nature conservation, advocating for fair compensation for forest protection and rejecting the notion that EU regulations hinder development (10, +2; 24, +3; 9, +4). They stress the importance of safeguarding forest biodiversity and argue against sacrificing the environment for mining activities (11, +4; 9, +4).

   Overall, Factor 3 represents a perspective that emphasizes the need for sustainable consumption patterns, environmental preservation, and equitable compensation for communities impacted by development activities. Respondents prioritize the protection of traditional livelihoods and natural habitats while advocating for responsible resource management and development strategies.

4. **Factor 3b Promoting Green energy development.** Presents a perspective emphasizing economic development alongside certain environmental and social concerns. Notable agreements among respondents include the belief that windmills do not harm forestry (16, +4) and the contention that extreme nature protectors disrupt forestry operations and livelihoods (28, +3). Conversely, there are strong disagreements regarding the need for scientific research on the impacts of wind power on reindeer husbandry (14, -4) and the mutual benefit between reindeer husbandry and nature conservation (10, -3). This perspective underscores the importance of mining activities in supporting the green energy transition through the production of metals for technologies such as solar panels and windmills (13, -3). Respondents reject the notion that windmill farms should be halted due to their perceived minimal impact on reindeer grazing (29, -4) and oppose conducting scientific research to assess wind power's effects on reindeer husbandry (14, -4).

   Furthermore, respondents express scepticism about the mutual benefit between reindeer husbandry and nature conservation, suggesting a prioritization of economic interests over conservation efforts (10, -3). They also challenge the fairness of land use zoning and oppose the idea of tourist routes encroaching on reindeer herding areas (17, -3; 27, -1). In terms of tourism, respondents perceive it as a threat to traditional ways of life due to rising costs and conflicts with local customs (26, +4). However, they support the collection of tourist taxes to maintain local tourism routes and public services, highlighting the potential positive impact on the region's economy and infrastructure (12, +3).

   Overall, Factor 3b represents a perspective that prioritizes economic development and resource extraction while expressing skepticism towards certain environmental conservation efforts and the

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traditional way of life. Respondents advocate for policies that support industry growth and revenue generation, albeit with some consideration for environmental and social impacts.

All participants across Kittilä's three different perspectives agree in varying ranks that the mining company has succeeded in getting the community on its side by providing jobs in Kittilä; that the mining company has contributed to the development of infrastructure (e.g., roads) and services in Kittilä (3); and reindeer husbandry and tourism get along well as reindeer herders get additional income from tourism (20). On the other side, all disagree that tourism companies are against windmills because they ruin the landscape (25). All participants are uncertain that many tourist companies have limited financial resources to improve infrastructure, which is needed for development (6).

Table 10. Kittilä statements and scores per perspectives

Statement	Factor 1	Factor 2	Factor 3a	Factor 3b
1.The mining company have to listen and involve the local communities to ensure access to resources.	**4**	3	0	1
2.The mining company has succeeded in getting the community on its side by providing jobs in Kittilä	0	3	0	1
3.The mining company has contributed to the development of infrastructure (e.g. roads) and services in Kittilä	2	2	0	1
4.The mining company helps maintain local identity and culture in Kittilä	-2	1	-3	-1
5.Mining and tourism are able to work together in Kittilä	2	**4**	0	0
"6.Many tourist companies have limited financial resources to improve infrastructure, which is needed for development."	0	0	1	0
7.The development of tourism has a positive impact on population as people migrate because new job opportunities are created.	3	2	-2	0
8.Local voice of Kittilä residents is well represented in the municipal?s economic and technical administration	0	-2	0	-3
9.EU regulation on strictly protecting more forest is a barrier to development of Kittilä.	-3	0	**-4**	1
10.Reindeer husbandry and nature conservation benefit from each other in Kittilä.	1	-1	2	-3
11.The environment has to be sacrificed for the mines in Kittilä.	**-4**	**-4**	**-4**	-1
12.Tourist tax should be collected to maintain local tourism routes and other public services in Kittilä.	1	-1	-2	3
13.We need more metals from the mines to support green energy transition such as production of green technologies (solar panels and windmills).	-1	**4**	-1	3
14.Scientific research should be conducted to determine the benefits and impacts of wind power on reindeer husbandry and how to compensate for the negative effects.	1	2	3	**-4**
15.Consumption patterns should be changed instead of the increase of the demand of natural resources.	3	0	**4**	0
16.Windmills does not harm forestry.	-3	1	-1	**4**
17.Land use zoning in Kittilä is fair and legitimate.	-1	-1	2	-3
18.The local workforce is not enough for the demand of the local industries.	**4**	1	0	0
19.All decision-making power over land use should be devolved from the central to the local level.	0	-3	-2	-2

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20.Reindeer husbandry and tourism get along well as reindeer herders get additional income from tourism.	1	0	3	2
21.Mining taxes collected in Kittilä should not be remitted to the state.	0	3	1	2
22.Mining operations should be stopped in Kittilä.	**-4**	**-4**	-3	-1
23.If the mineral exploration activities come closer to both the settlement and Levi tourist center, disputes with the local population will increase.	3	-1	2	0
24.Compensation for strictly protected private owned forest is not enough.	-2	1	3	2
25.Tourism companies are against windmills because they ruin the landscape.	-2	0	-1	-2
26.Increasing tourists in Kittilä is a threat to local people's traditional way of living.	2	-2	-3	**4**
27.Tourist routes are taking space from reindeer husbandry in Kittilä.	-3	-3	1	-1
28.Extreme nature-protectors harass forestry owners and operators by disturbing their work and livelihood.	-1	0	1	3
29.Establishing windmill farms should be stopped because it disturbs reindeer grazing and migration patterns.	-1	-3	**4**	**-4**
30.Local nature-based culture is disappearing due to modernization which affects the local culture and way of life.	0	-2	-1	-2

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 11. Kittilä distinguishing statements per factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1. Strong sustainble consumption	24(-2;-0.94)*; 9(-3;-1.1)	14(1;0.37); 29(-1;-0.54)	18(4;1.52); 15(3;1.32)
2. Weak sustainability	-	4(1;0.85); 16(1;0.47) 10(-1;-0.23)	-
3a. Reindeer herding and nature conservation	9(-4;-1.87)	17(2;0.58)*	15(4;2.16); 29(4;1.66)*
3b. Promoting Green energy development	10(-3;-1.32); 14(-4;-1.76)*	11(-1;-0.44)	16(4;1.76); 28(3;1.32)

All distinguishing statements are significant at p<.0.05. * Indicates significance at p<0.01

5.3.2.2. Gällivare - forestry, mining and reindeer husbandry hub (indigenous activity) in Sweden

We found three perspectives that explains 64% variance of the sample, factor 1 explains 15%, factor 2 explains 23% and factor 3 explains 26% variance of the sample, see table 12 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 13 while the distinguishing statements are indicated in table 14. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

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Table 12. Gällivare's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2	Factor 3
1	Gällivare municipal office	**0.5925***	0.3905	0.4234
2	Laponia	0.2938	0.4915	-0.6674*
3	Local Citizen	0.0215	0.0873	0.8055*
4	Gällivare municipal office	**0.6583***	-0.0208	0.3181
5	Gällivare municipal office	**0.7586***	0.1732	0.3516
6	Gällivare kulturmuseum	0.0688	0.1668	0.6942*
7	Forest Commons Association	0.1999	-0.2038	0.6369*
8	Gällivare mucipal office	0.3055	-0.1443	0.6663*
9	Ájtte museum	0.2651	0.4028	-0.6855*
10	Reindeer herding association	0.094	**0.788***	-0.1816
11	Reindeer herding association	0.1178	**0.7774***	-0.1925
12	Reindeer herding association	0.0893	**0.8342***	-0.1312
13	Reindeer herding association	0.2574	**0.6706***	-0.2292
14	Sámi Parliament	-0.1238	**0.7275***	0.1975
15	Sámi Parliament	0.2333	**0.8024***	0.0374
16	Forestry association/ works with Tourism and Mining	0.3788	0.0645	0.7312*
17	Forestry association	**0.619***	-0.2918	0.2405
18	Forestry association works with mining	**0.7736***	-0.2254	0.2694
19	Forestry association	0.2047	-0.1917	0.6989*
20	Forest Commons Association	0.3376	-0.4056	0.6917*
21	Forestry association	0.3571	-0.4017	0.6768*
22	University	0.3571	0.5017*	0.2603
% Explained Variance		**15**	**23**	**26**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Ambivalence to growth**. Perspective of contradictory statements on development of Gällivare. Advocates believe that Gällivare thrives only because of the mines (s1, +4) and that the current social transformation (merging of Malmberget and Gällivare) will provide a better and modern living environment (s12, +4). However, they also strongly believe that forest (s8, -4) and mining companies (s9. -4) does not invest in the municipality roads and infrastructure for the development of the municipality. They also believe that almost all revenues and taxes from the mining and hydropower companies are remitted outside the municipality (s22, +3) hence they have less benefits as compared to people from the South. Participants who loaded on this perspective noted that it is 'unfortunate' that the city relies on the mining company to develop but 'it is what it is' because Gällivare developed as a town because of the mines that was established 100+ years ago. Nevertheless, mining companies should expand and operate as long as possible so that locals have a secure livelihood (s2, +3) and that the development of the industries is part of the development of Gällivare (s4, +3). Advocates highlighted that the regulations are too strict that limits further expansion and development and they need the mines to continue working to have secure livelihood. But at the same time, they believe that the Swedish government prioritizes mining companies interests (s26, +2) rather than local ones.

2. **Factor 2: Reindeer and nature first.** Advocates strongly agree that (15, +4) based on the needs of the reindeer, herders seek to preserve and improve the integrity of the reindeer pasturelands. According to participants who loaded on this factor, their primary goal is to preserve and make the grazing lands better so that reindeers will have the best condition. This could improve the reindeer herder's way of life. They also strongly agree that (13, +4) nature resources are limited that Gällivare cannot compensate for the overconsumption in all Europe and the entire western world

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or globally. They agree that (36, +3) there should be no more mines in Sápmi. Existing mines can remain as the damage has already been done. But, expanding the mines mean more grazing lands will be inevitably destroyed. Despite of these impacts, they agree that (26, +3) the Swedish government prioritizes the mining companies interests, coupled with (19, +3) growth of green transition industries that has increased the demands for northern resources (i.e., electricity), including Gällivare, which affects local communities in ways that are not showcased by the state, media and extractive industries. They believe that (34, +2) consumption patterns and lifestyles ought to change rather than being easily accepted by decision makers to justify development. They also agree that (25, +2) mining explorations in Gällivare must be stopped as they are highly unsustainable projects. And (30, +2) mining and forestry in its present form cannot co-exist side-by-side with reindeer husbandry. Consistently, they don't agree that (2, -2) mining companies should expand and operate as long as possible in Gällivare so that locals have a secure livelihood. On the contrary, they agree that for Gällivare to be a more sustainable community in the long term, (23, +2), has to have more diversified production of goods and services and more alternative jobs, instead of just relying on the mines. Interestingly, they do not believe that development should stop nor do they deny that mining leads to development.

3. **Factor 3: Industry growth is equivalent to community growth.** Advocates allows economic dependence with the industries as they completely agree that (4, +4) the development of industries (mining/forestry/ reindeer husbandry) is part of the development of Gällivare; and (2, +4) mining companies should expand and operate as long as possible in Gällivare so that locals have a secure livelihood. They reject the idea that (36, -4) there should be no more mines in Sápmi, because according to advocates, this is impossible as all of the land in Gällivare is considered part of Sápmi. And they also completely disagree that (35, -4) to develop tourism further there should be no further industrial and infrastructure developments in Gällivare to maintain the image of the last wilderness of Europe. They highlighted that mining companies are major players in the city and are indirectly responsible for a large part of the economic development. They strongly believe that (9, +3) mining companies invest in Gällivare's roads and infrastructure (e.g., new cultural buildings, services, etc.) for the municipality's development. Additionally, mining exploration can provide new and profitable mines that are good for the municipality. As such, they reject the statements (25, -2) that mining explorations in Gällivare must be stopped as they are highly unsustainable projects; (27, -3) that mining does not lead to development, and (30, -3) that mining and forestry cannot co-exist side-by-side with reindeer husbandry.

   Advocates believe that the current decision-making processes are inclusive of Sámi (reindeer husbandry) perspectives and even prioritize their needs. As such they agree that (5, +3) reindeer husbandry have a strong influence on decision making regarding land use in Gällivare; and (6, +1) that Sámi people are included in developing "Sámi experiences" in marketing campaigns and in commodifying/capitalizing their culture. They believe that reindeer husbandry representatives have great influence in several land use issues and that the municipality provide large adjustments to meet their needs.

All participants across Gällivare's three different perspectives agree that the growth of green transition industries has increased the demands for northern resources, including in Gällivare (19); and that there should be more alternative job sectors instead of just relying on the mines (23).

Table 13. Gällivare statements and the scores per perspectives

Statement	Factor 1	Factor 2	Factor 3
1. Gällivare thrives only because of the mines.	3	**-4**	1

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2. Mining companies should expand and operate as long as possible in Gällivare so that locals have a secure livelihood.	2	-2	**4**
3. Existing procedures for obtaining permits for mine development in Gällivare are too relaxed.	-2	1	0
4. The development of industries (mining/forestry/ reindeer husbandry) is part of the development of Gällivare.	2	0	**4**
5. Reindeer husbandry have a strong influence on decision making regarding land use in Gällivare.	2	-3	3
6.Sámi people are included in developing "Sámi experiences" in marketing campaigns and in commodifying/capitalizing their culture.	-2	-1	0
7. The municipality should encourage immigration to Gällivare to have more available workforce for the industries to develop.	3	-1	3
8. Forest companies invests on Gällivare roads and infrastructure (e.g. new cultural buildings, services, etc) for the municipality's development.	**-4**	-3	1
9. Mining companies invests on Gällivare roads and infrastructure (e.g. new cultural buildings, services, etc) for the municipality's development.	-3	0	3
10. Modern technology can provide solutions to solve land use conflict of the industries.	0	-1	1
11. Competition between industries are good as it enables more honest exchange of needs and interests among stakeholders.	1	-1	2
12. The new Gällivare town (merging with Malmberget) will provide better and modern living environment.	**4**	0	1
13. Nature resources are limited and Gällivare cannot compensate for the overconsumption in all Europe and the entire western world or globally.	1	**4**	1
14. Gällivare experiences an increase in out-migration due to the areas remoteness and limited working opportunities.	-1	0	-1
15. Based on the needs of the reindeer, Reindeer herders seek to preserve and improve the integrity of the reindeer pasturelands."	1	**4**	0
16. Forestry is not a profitable business in Gällivare.	-3	0	-2
17. Sámi stakeholders are often not consulted or invited to participate until after development projects have been initiated.	0	1	-1
18. There is rarely a unified voice speaking on behalf of Sámi people.	0	0	0
19. The growth of green transition industries has increased the demands for northern resources, including Gällivare.	3	2	2
20. Environmental protection demands hamper forestry development (profit and investments) in Gällivare.	0	-3	2
21. In Gällivare, preservation of nature is more important than economic development.	0	-1	0
22. Almost all revenues and taxes from mining and hydropower companies in Gällivare are remitted migrate outside the municipality.	**4**	0	0
23. In Gällivare, there should be more alternative job sectors instead of just relying on the mines.	2	2	2
24. There is not enough raw material (e.g. timber, pulpwood) to supply the existing forest industry in Gällivare."	-2	1	-2
25. Mining explorations in Gällivare must be stopped as they are highly unsustainable projects.	0	3	-2
26. The Swedish government prioritizes the mining companies interests.	1	3	0
27. Mining does not lead to development.	-2	-2	-3

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28. Forestry operations as carried on today (e.g. clear cutting, fertilization, soil scarification) should be forbidden in Gällivare."	-1	1	-3
29. Reindeer husbandry benefit from forestry work conducted on their herding lands.	-3	**-4**	0
30. Mining and forestry cannot co-exist side-by-side with the Sápmi (Reindeer husbandry)	-1	2	-3
31. Sámi culture should not develop and be kept as traditional as possible.	-1	-2	-1
32. In Gällivare there is a weak interest in promoting minority cultures like the Sámi culture.	**-4**	1	-1
33. The restructuring of Gällivare or moving a part of the village in order to allow the enlargement of the mining site is only beneficial to the industry.	-1	0	-2
34. Consumption patterns and lifestyles ought to change rather than being easily accepted by decision makers to justify development.	1	2	-1
35. To develop tourism further there should be human development (no further industrial and infrastructure developments) in Gällivare to maintain the image of the last wilderness of Europe.	0	-2	**-4**
36. There should be no more mines in Sápmi.	0	3	**-4**

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements. Bold values are the most agree and the most disagree statements.

Table 14. Gällivare distinguishing statements per factor or perspective

Levels of agreement		Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
		-4 to -2	-1 to +1	+2 to +4
1.	Ambivalence to growth	3(-2;-0.85)*; 9(-3;-1.09)* 29(-3;-1.12)*; 8(-4;-1.96)	20(0;-0.19)*; 35(0;-0.32) 25(0;-0.43)*; 36(0;-0.47)* 33(-1;-0.57); 28(-1;-0.61)* 30(-1;-0.65)	22(4;1.64)*; 12(4;1.55)* 1(3;1.54)*
2.	Reindeer and nature first	2(-2;-0.8)*;35(-2;-0.98) 8(-3;-1.27); 20(-3;-1.32)* 5(-3;-1.4)*; 1(-4;-1.7)* 29(-4;-2.11)*	3(1;0.6); 28(1;0.51)* 32(1;0.51)*; 24(1;0.48)* 17(1;0.43)*; 4(0;0.09)* 16(0;0.06)*; 9(0;0.05)* 33(0;0.03); 12(0;-0.21)* 7(-1;-0.25)*; 11(-1;-0.74)*	15(4;1.95)*; 13(4;1.88)*; 36(3;1.68)*; 25(3;1.1)* 30(2;0.99)*
3.	Community growth = industry growth	33(-2;-1.12); 25(-2;-1.23)* 30(-3;-1.32); 28(-3;-1.48)* 35(-4;-1.77)*;36(-4;-2.17)*	10(1;0.64)*; 1(1;0.61)* 12(1;0.59)*; 8(1;0.56)* 6(0;0.51)*;29(0;0.2)* 26(0;0.16)*;3(0;0.04) 34(-1;-0.29)*	9(3;1.28)*; 20(2;0.69)*

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.3. Egersund - mining, tourism and fish farming hub in Norway

We found three perspectives that explain 59% variance of the sample, factor 1 explains 28%, factor 2 explains 15% and factor 3 explains 15%, see table 15 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 16 while the distinguishing statements are indicated in table 17. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

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Table 15. Egersund's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2	Factor 3
1	Dalane Museum	0.0872	-0.3997	**0.7448***
2	Entrepreneur	**0.5798***	0.4277	0.0941
3	Mining company	0.1988	**0.5573***	-0.2804
4	Private company	**0.6268***	0.1307	0.4511
5	Magma Geopark	**0.7204***	-0.1461	-0.05
6	Magma Geopark	**0.6805***	0.1712	0.5291
7	Local citizen	0.3159	**0.6032***	-0.2102
8	Municipal Office	0.2346	-0.3819	**0.6791***
9	Oil and gas industry	0.1202	-0.4003	**0.5383***
10	Magma Geopark	**0.8046***	0.0311	0.3681
11	Magma Geopark Rogaland	**0.7153***	0.0022	-0.3007
12	Regional Office	**0.6929***	0.0799	0.2314
13	Local citizen	**0.8456***	-0.0095	0.2688
14	Local citizen	0.207	0.1891	**0.7118***
15	University	-0.2426	**0.5377***	-0.2141
16	Local citizen	0.0003	**0.7599***	-0.049
17	Entrepreneur	-0.0927	**0.6682***	0.2609
18	Local citizen	**0.7724***	-0.1597	0.1647
% Explained Variance		**28**	**15**	**16**

*Flagged sorts - represents defining sorts for the factor

1. **Factor 1: Industry critical.** Advocates believe that the public should have insight into the content of the industry's agreements with landowners for activities that are based on new major interventions in nature (12, +4), as interests can mean development or ruin of the environment in the area. They also believe that natural parks provide better income for local businesses than the big industries (9, +4). At the same time, advocates strongly agree on the need for a more educated and skilled labour, especially in tourism (29, -4). They highlighted that expertise can bring about innovation that can mitigate the negative impacts of the industries. On the one hand, they are sceptic that the mining legacy in Egersund is a prerequisite of local acceptance of new mines (5, -3). Likewise, they are also doubtful of development synergies and local people supporting expansion of industries (1, 19, -3). Unlike the second perspective, advocates of this group strongly disagree that local people do not like to change and have no desire to change their lifestyles and local environment (20, -3), they noted that nature and biodiversity should be prioritized in development of their area.

2. **Factor 2: Communities develop because of industries.** This perspective is very supportive of the industries as advocates strongly agree that the local community developed because of fish farming and aquaculture (15, +4) and more investments are needed for tourism (6, +4). They also disagree that protection of the wild salmon should outweigh the development of the industry (26, +4) and that the price of economic and industrial progress is too high for the environment (24, -4). Advocates are sceptic that industries pollute the environment and doesn't contribute to the community (27, 25, -3). They also doubt that more shoreline protection is needed or more assessment and compliance check should be required for the industries (18, 23, -2). Utilization of natural resources has been part of the community development for generations and nature changes anyway with or without human influence. As such, local people are supportive of the industries and have no desire to change their lifestyles (20, 5, 17, +3).

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3. **Factor 3: Increase shoreline and sea protection.** Focusing on nature protection and conservation, advocates of this perspective believe that Norway should increase shoreline protection from 10% up to 30% for 2030 (18, +4) and strongly agree that fish farms pollute the fjord and operations should stop (27, +4). They are also very sceptic of the benefits from the aquaculture industry (10, -4); and that current rent taxes to the industries will affect the mining industry's competitiveness (16, -4). Consistently, this group strongly agree that environmental assessments are needed to decide on best land use in the area (14, +3; 23, +2) and that protection of wild salmon is more important than development of the industries (26, +3). Advocates doubts that the community benefits from the industries (3, 1, 15, -3), rather industries increase resource conflicts, and that price of the economic development is too high for the environment (25, 11, +2; 24, +1). However, it should be noted that they are not against development (22, -3) but they are only critical of the current development path or Egersund especially when environmental protection is not prioritized.

All participants across Egersund's three different perspectives are uncertain whether the local community is actively involved and voices out their opinions regarding the development of their area (2). They all however disagree that there is no need for more educated and skilled labour in Magma Geopark (29).

Table 16. Egersund statements and the scores per perspectives

Statement	Factor 1	Factor 2	Factor 3
1.The local community supports the expansion of the current industries in Magma Geopark such as mining and fish farming.	-3	-1	-3
2.In Magma Geopark, the local community is actively involved and voices out their opinions regarding the development of their community.	0	0	0
3.Industries invests in the local community to improve infrastructure and services in Magma Geopark.	0	1	-3
4.Consistent governance and policies are the key to the development of the industries.	1	2	0
5.Magma Geopark's long history of mining makes it easier to get local acceptance for new mines to develop.	**-4**	3	-1
6.Investments are needed to improve tourism infrastructure in Magma Geopark Hub	3	4	1
7.The local community welcomes the increased number of tourists, cruise ships and longer tourist seasons in Magma Geopark.	2	2	-1
8.Regulations hinders the development of the industries due to it's long processing time.	0	-1	-1
9.National parks are popular tourist destination and provides better income for the local businesses.	**4**	0	0
10.Increase in production of aquaculture is significant for new job opportunities to develop.	-1	0	**-4**
11.New fish farms and mining expansion increases resource-use conflict in Magma Geopark.	2	0	2
12.The public should have insight into the content of the industry's agreements with landowners for activities that are based on new major interventions in nature.	**4**	-1	3
13.Magma Geopark needs to search for a more sustainable path to development.	0	1	0
14.Comprehensive assessments are needed to decide on the best use of the land in terms of benefit for the community and consequences for the environment.	1	0	3

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15.The local community grew around and developed further because of fish farming and aquaculture	-1	**4**	-2
16.The government's new basic rent tax will hit the mining industry hard by reducing industry competitiveness and development.	-2	-1	**-4**
17.Magma Geopark's development is an "automatic" driver linked to extraction and use of resources.	1	3	-1
18.Norway should increase shoreline protection from 10% up to 30% for 2030.	0	-2	**4**
19.The synergy of tourism and mining will guarantee the successful economic development of the community.	-3	1	-2
20.Local people do not like changes and have no desire to change their lifestyles and local environment.	-3	3	0
21.Magma Geopark's beautiful landscape is being ruined and polluted by windmills.	3	-2	1
22.Nature conservationists are against the development of any industry.	-2	1	-3
23.There should be more assessment, compliance check and regulations regarding industry development or expansion.	2	-2	2
24.The price of economic and industrial progress is too high for the environment.	1	**-4**	1
25.Large businesses do not contribute locally and their money is remitted somewhere else.	-1	-3	2
26.Protection of the wild salmon outweighs the development of aquaculture/fish farming industry.	-2	**-4**	3
27.Fish farms pollutes the fjord and operations should stop.	-1	-3	**4**
28.The establishment of new businesses that are based on major interventions in nature must require democratic support from the local community	3	2	1
29.There is no need for more educated and skilled labour in Magma Geopark.	**-4**	-3	-2

Bold values are the most agree and the most disagree statements.

Table 17. Egersund distinguishing statements per factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1. Industry critical	26(-2;-0.84)*; 16(-2;-0.94)* 20(-3;-1.3)*; 5(-4;-1.69)*	17(1;0.33); 18(0;0.01)* 25(-1;-0.63); 27(-1;-0.74)	9(4;1.54)*; 28(3;1.38)* 21(3;1.23); 6(3;1.12)
2. Communities develop because of industries.	21(-2;-1.05)*; 18(-2;-1.07)* 23(-2;-1.15)*; 25(-3;-1.24) 27(-3;-1.42); 26(-4;-1.55)* 24(-4;-1.7)*	22(1;0.35)*;19(1;0.3)* 11(0;0.24); 1(-1;-0.02)* 16(-1;-0.18)*;12(-1;-0.47)*	15(4;1.94)*; 6(4;1.73) 20(3;1.6)*; 5(3;0.95)* 17(3;0.9)
3. Increase shoreline and sea protection.	3(-3;-1.34)*; 10(-4;-1.5)* 16(-4;-1.84)*	21(1;0.51);6(1;0.47) 20(0;0.3)*;7(-1;-0.16)* 5(-1;-0.3)*;17(-1;-0.72)*	18(4;1.95)*;27(4;1.49)* 14(3;1.17);26(3;1.15)* 25(2;0.78)*

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.4. Westfjords - fish farming and tourism hub in Iceland

We found two group of perspectives that explains 51% of the variance of the sample, of which factor 1 explains 31% and factor 2 explains 20% of the variability, see table 18 - factor matrix with defining

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sorts flagged. The statements and the scores per perspectives are available in table 19 while the distinguishing statements are indicated in table 20. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 18. Westfjords Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2
1	Local citizen	0.0295	**0.6955***
2	Local citizen	**0.5142***	0.0744
3	Tourism organization	**0.7895***	0.1316
4	Employment Office	0.3859	**0.5805***
5	Power plant	**0.5764***	0.3939
6	Development of the city for all Westfjords/ infrastructure/ cultural events	**0.7047***	0.1906
7	Oddi fish production	**0.6847***	0.2989
8	Fisherman	0.0511	-0.2978
9	Oddi HF: Fish processing & Fishing	0.2649	0.325
10	Oddi HF: Fish processing & Fishing	0.2077	**0.8891***
11	Oddi HF: Fish processing & Fishing	0.4477	0.4428
12	Kindergarten	0.2077	**0.8891***
13	Tourist company	**0.7944***	0.0458
14	Fisheries company	**0.8486***	0.1388
15	Local citizen	**0.7823***	0.0747
16	Local citizen	**0.5286***	0.0461
% Explained Variance		**31**	**20**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Improve local infrastructure to support tourism and aquaculture.** Advocates strongly believe that Infrastructure in the Westfjords (such as roads, accommodation) needs to be improved so that more tourists can visit the area (1, +4) grounded in the need for Westfjords to develop infrastructure and roads to improve connection. Additionally, advocates strongly believe that the growth of tourism in the Westfjords brings increased income to the communities of the region (2, +4) and will support the community development and vitality. In line with these, advocates are very sceptic of popular hiking and cycling routes being disrupted by too many tourists (26, -4) and that increased tourism poses problems in ensuring the safety of local people (27, -4). Advocates noted that they are very much supportive of the tourism development in their area and in need of more projects (29, -3). Advocates believe that the municipalities welcome the strengthening of local industries, as they create jobs and increased income (6, +3) but there is a need for a holistic and comprehensive organisation so that stakeholders can see an advantage in participating in community development (16, +3) and that the future planning of aquaculture in the fjords should be based on research (10, +3).

   On tourism, advocates agree that tourism increases local awareness (14, +2) however it is difficult to run a tourism business all year round (13, +2). They are also sceptic that Westfjords doesn't need social media to promote Iceland further, especially the Westfjords as a tourist destination (28, -3) or that local landowners do not want tourism to develop in their area (24, -2). They are also sceptic of the alleged negative impacts of the tourism industry (12, 18, 15, -2).

   Like the 2nd perspective, advocates doubt the aquaculture industry, particularly noting that the quota system in Icelandic fisheries and the decline in fishing led to the deterioration of many rural

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areas (7, +2). They also believe that the local companies are not doing the right thing by not trusting large international companies (31, -3). However, they disagree that the future generations are being discouraged to work in aquaculture industry (30, -2). Advocates are however uncertain whether the authorities focus only on the economic and environmental impacts of aquaculture and tourism and not on the social and cultural impact of its activities (21, 25, 5, 8, 0).

2. **Factor 2: Insufficient investment hampers local growth**. Like the first factor, advocates believe that Infrastructure in the Westfjords (such as roads, accommodation) needs to be improved so that more tourists can visit the area (1, +4) but they nevertheless highlighted that it is the lack of funding and investment that hinders the development of industries in the region (4, +4). In line with this, they are sceptic that the growth of tourism in the Westfjords can pose a threat to vulnerable wildlife in the region, especially in terms of biodiversity (25, -4) because they believe that there is no chance that growth of tourism can be so high that can be threat to wildlife. Additionally, the need for tourism is more than essential to make Westfjords more alive. On the one hand, they are also very sceptic to the statement that air travel is now better and more frequent than before, which is good for local communities (5, +4) because flights are anyway expensive which is inaccessible to the locals, thereby not benefitting them but only the rich tourists. More so, advocates have a negative perception of the aquaculture industry as they believe that traditional fishing is usually pursued by individuals who have already invested in quotas, making it difficult for newcomers to enter the industry (32, +3); while the expanding aquaculture industry demands for bigger and better vessels (9, +3). They also agree that the laws and regulations in aquaculture are too complex (8, +3), the labour as temporary and not locally sourced (18, -2) and the future generation are discouraged from working in it (20, +1).

   On tourism, advocates are aware of the negative impacts of tourism and wants to work on lessening these effects, as such they agree that the amount of litter and waste in nature increases in popular recreational/tourist destinations (hiking trails/cycling trails/running trails/etc.) (12, +1) yet on the other hand they believe that it is important that travellers are aware of the environment they are visiting. This requires knowledge about responsible behaviour of tourists in the area in order to reduce their negative impact (11, +1). Advocates however only slightly agree that revenue from tourism should go towards the protection of the nature of the Westfjords (3, +1). Advocates are doubtful of their government with regards to deciding for the benefit of the community (6, -3, 19, -1). They are uncertain whether the local authorities have the local people's best interest at hear (21, 17, 16, 7, 0).

All participants across Westfjord's two similar perspectives strongly agree that Infrastructure in the Westfjords (such as roads, accommodation) needs to be improved so that more tourists can visit the area (1), growth of tourism in the Westfjords brings increased income to the communities of the region (2) and due to the growing aquaculture, the demand for better roads as well as bigger and better vessels for ferry transport has increased (9). All participants disagree that popular hiking and cycling routes are being disrupted by too many tourists (26) and not needing social media to promote Iceland further, especially the Westfjords as a tourist destination (28). Lastly, all participants are uncertain whether the authorities focus only on the economic and environmental impacts of aquaculture, and not on the social and cultural impact of its activities (21).

Table 19. Westfjords statements and the scores per perspectives

Statement	Factor 1	Factor 2
1.Infrastructure in the Westfjords (such as roads, accommodation) needs to be improved so that more tourists can visit the area.	**4**	**4**

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2.The growth of tourism in the Westfjords brings increased income to the communities of the region.	**4**	3
3.Revenue from tourism should go towards the protection of the nature of the Westfjords.	-1	1
4.Lack of funding and investment hinders the development of industries in the region.	1	**4**
5.Air travel is now better and more frequent than before, which is good for local communities.	0	**-4**
6.The municipalities welcome the strengthening of local industries, as they create jobs and increased income.	3	-3
7.The quota system in Icelandic fisheries and the decline in fishing led to the deterioration of many rural areas.	1	0
8.Laws and regulations in aquaculture and the complex procedures for obtaining authorisations have hindered further development in the industry.	0	2
9.Due to the growing aquaculture, the demand for better roads as well as bigger and better vessels for ferry transport has increased.	2	3
10.The future planning of aquaculture and the use of fjords in the area must be based on research.	3	0
11.It is important that travelers are aware of the environment they are visiting. This requires knowledge about responsible behaviour of tourists in the area in order to reduce their negative impact.	1	1
12.The amount of litter and waste in nature increases in popular recreational/tourist destinations (hiking trails/cycling trails/running trails/etc.).	-1	1
13.It is difficult to run a tourism business all year round when tourists only come for about 4-5 months a year.	2	1
14.Tourism increases local awareness in the Westfjords	2	1
15.Large international companies do not see the benefit of having good relations with local people.	-2	0
16.There is a need for a holistic and comprehensive organisation so that stakeholders can see an advantage in participating in community development in the Westfjords.	3	0
17.The locals have no involvement in decisions on permits for fish farming in the fjords.	-1	0
18.Industries such as aquaculture and tourism rely on temporary labour, supported by people of foreign origin who stay in the communities for short periods of time.	-1	2
19.The authorities determine the extent of aquaculture in each fjord.	1	-1
20.Even though at first glance it seems appropriate to make the fish itself the centre of attention, the societal impact of the industry should also be looked at equally.	1	-2
21.The authorities focus only on the economic and environmental impacts of aquaculture, and not on the social and cultural impact of its activities.	0	0
22.Jobs in aquaculture seem to appeal to men rather than women.	0	-2
23.Tourism jobs seem to appeal to women rather than men.	-1	-1
24.Some landowners do not want any development of tourism on their land, such as promoting access to popular tourist destinations.	-2	-1
25.The growth of tourism in the Westfjords can pose a threat to vulnerable wildlife in the region, especially in terms of biodiversity.	0	**-4**
26.Popular hiking and cycling routes are being disrupted by too many tourists.	**-4**	-3
27.Increased tourism poses problems in ensuring the safety of local people.	**-4**	-1

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28.We don't need social media to promote Iceland further, especially the Westfjords as a tourist destination	-3	-3
29.There are plenty of projects in the Westfjords and no need to develop heavy industry further.	-3	-2
30.Children and future generations are discouraged from working in the aquaculture industry.	-2	2
31.Local aquaculture companies do the right thing by not trusting large international companies as their operations are not planned permanently.	-3	-1
32.Traditional fishing is usually pursued by individuals who have already invested in quotas, making it difficult for newcomers to enter the industry.	0	3

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 20. Westfjords distinguishing statements per factor or perspective

Levels of agreement		Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
		-4 to -2	-1 to +1	+2 to +4
1.	Improve local infrastructure to support tourism and aquaculture	15(-2;-0.67);30(-2;-0.77)* 31(-3;-1.11)*;27(-4;-1.92)*	7(1;0.72); 20(1;0.62)* 4(1;0.29)*; 19(1;0.24) 5(0;0.08)*; 8(0;-0.15)* 22(0;-0.22), 32(0;-0.27)* 25(0;-0.36)*; 3(-1;-0.51)* 12(-1;-0.53)*;18(-1;-0.56)*	6(3;1.71)*; 16(3;1.19)* 10(3;1.18)*
2.	Insufficient investment hampers local growth.	20(-2;-0.63)*; 22(-2;-0.82) 6(-3;-1.24)*; 25(-4;-1.84)* 5(-4;-2.01)*	12(1;0.59)*; 3(1;0.34)* 10(0;0.19)*; 16(0;0.08)* 15(0;0.02); 7(0;0) 31(-1;-0.27)*; 27(-1;-0.31)*;19(-1;-0.46)	4(4;2.01)*; 32(3;1.19)* 8(2;0.9)*; 30(2;0.74)* 18(2;0.71)*

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.5. Suduroy. A fish farming and tourism hub in Faroe Islands

We found two group of perspectives that explains 52% of the variance of the sample, of which factor 1 explains 31% and factor 2 explains 21% of the variability, see table 21 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 22 while the distinguishing statements are indicated in table 23. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 21. Suduroy's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2
1	Salmon Business	0.4903	-0.2159
2	City Council Member	**0.5559***	0.2201
3	School	**0.8192***	0.0077
4	Municipal Office	**0.7723***	-0.028
5	Entrepreneur	**0.8223***	-0.0806
6	Fisherman	0.1938	0.1914
7	Local citizen	0.3973	0.5243
8	Entrepreneur	-0.0105	0.4476
9	Teacher	**0.7807***	0.304
10	Teacher - guidance counsellor	**0.6892***	0.4022

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11	Teacher - guidance counsellor	**0.7289***	0.2781
12	Teacher	0.5513	**0.6242***
13	Decision maker	**0.5454***	-0.2583
14	Student	-0.0925	**0.8182***
15	Student	0.3706	**0.7204***
16	Student	0.4446	0.4796
17	Student	**0.6172***	0.4421
18	Student	0.0156	**0.8792***
% Explained Variance		**31**	**21**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Prioritize nature and people.** Advocates strongly agree that interest in people and nature should be determined rather than envious gains (20, +4). They strongly disagree that tourists should have access to the natural environment without asking for permission (hikes pitching tents, fishing) (12, -4) since nature should be preserved and prioritized rather than exploited for tourism purposes (13, +2). However, advocates are not against development, they prefer to have tourism and fish farming to be better organized in terms of mobility (15, +3) and inclusivity in decision making (17, +3). Nevertheless, they agree that fish farming is important to Suduroy (1, +2) although industries have more influence in the area (6, +2). It follows that they agree that the local people are not allowed to participate in the decision-making process in Suduroy (16, +1). Advocates noted that it should be the local people that set the agenda for development and it should be based on local needs.

   Advocates are sceptic of large international companies buying smaller companies in Suduroy (4, -3). They noted that these international companies influence authorities in their favour, as such new buildings gets developed without the knowledge of the local people. On fish farming, they are sceptic that salmon farming can be further developed (3, -2) since the system is not effective. They also believe that relationship between tourism and fish farming is doing well (8, -2). Tourism on the other hand, advocates agree that there should be more regulations and advocates are not certain about the benefits that the tourism sector claims (10, 24, 0).

2. **Factor 2: Two facets of industries**. Unlike the first perspective, advocates of this group are supportive of tourism as it creates a market for local products (11, +4). They also agree that tourists should have access to the natural environment without asking for permission (e.g., hikes, pitching tents, fishing) (12, +1) and that the tourism industry has a lot of potential and is not in conflict with local's everyday life (19, -2; 25, -1). However, they believe that cruise tourism provides less benefits to the local community (4, -3). They noted that tourists come and go without really understanding the circumstances of the places they visit. With how big cruise tourism is, they doubt that smaller rural areas will be able to regulate or control the industry (24, -2).

   On fish farming, advocates are critical of the fish farming industry since they view it as an ecologically un-friendly operation (2, -4). On the one hand, they agree that fishing is important for the culture of Suduroy Island (1, 2), salmon farming can be further developed in the Island and worldwide (14, +3; 3, +1). They believe that local people have reasonable access to natural resources in the Island but nature protection should be prioritized and organized better (13, +2; 22, +1). They believe the local people have the capacity to manage their local development (9, +1). However, they are uncertain whether the local people are allowed to participate in the decision-making process (16, 5, 0), and if the industries have more influence in decision making (6, 0).

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All participants across Suduroy's two different perspectives agree that fishing is important for Suduroy (1), yet both believe that the industry is not ecologically friendly (2). Hence, all participants agree that nature protection should be prioritized and better organized (13). Both perspectives also strongly disagree that it's useful for the local communities in Suduroy that large international companies buy smaller companies (4). And they all agree that the local people are not allowed to participate in the decision-making process in the context Suduroy's development (16). They are uncertain whether the local community have a say on how resources in their area is being exhausted (5) or whether tourism can really be used to promote local society and consciousness of local culture and history (10).

Table 22. Suduroy statements and the scores per perspectives

Statement	Factor 1	Factor 2
1.Fishing is important for the culture of the South Island.	2	2
2.The Fishing industry in the South is an ecologically friendly one.	-3	**-4**
3.The Suduroy salmon can grow even more.	-2	1
4.It's useful for the local communities in the South that large international companies buy smaller companies on the island.	-3	-3
5.The general (country) should have a greater impact on how the South's natural resources are being exhausted.	0	0
6.Industry and companies have more influence on the culture of the South than local talentin the world.	2	0
7.Every inhabitant of the South has reasonable access to naturalresources and for the maintenance of life.	-1	3
8.The inter-agency relationship between tourism and agriculture is well-known in the South.	-2	0
9.In the South, there is enough time and energy to devote and manage the journey.	-2	1
10.Tourism can be used to promote local society and promote the consciousness of local culture and history.	0	0
11.Tourism creates a market for local products.	1	**4**
12.Tourists should have access to the natural environment without asking for permission (hikes and hikes, tents, fishing o.s.fr.)	**-4**	1
13.The universe should be better organized to protect nature.	2	2
14.The victory of the South Korean salmon will not be used locally, but will end up in the vast majority of the world.	1	3
15.Public transportation is needed to prevent more damage to the ocean environment.	3	2
16.The local people are not allowed to participate in the decision-making process in the context of the culture of the forties.	1	0
17.Human efforts to ensure the spread of the disease and the lack of vision are lost when decisions are made in connection with the culture of the South.	3	-1
18.In the case of cruise travel, the large cruise companies that have a greater impact on culture than local communities they come to.	-1	-3
19.The result of the South's tourism industry is very limited.	-1	-2
20.Interest in people and nature should be determined rather than envious gains.	**4**	-1
21.Nature is a growing trend, and this will bring a difference between local people and the permanent victory.	1	-1
22.The nature of the Phoeni is very valuable and beautiful. She should not be disturbed, so one can experience the peace of nature without a column and too many people.	0	1

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23.Big companies don't care much about local people and the local culture.	0	-2
24.Smaller rural areas are unable to manage their own tourism work.	0	-2
25.Tourism can be a challenge for people's normal day and for the sake of the good.	-1	-1

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 23. Suduroy's distinguishing statements per factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1. Prioritize nature and people	3(-2;-1.07)*; 8(-2;-1.19)* 9(-2;-1.26)*; 12(-4;-2.11)*	21(1;0.6)*;14(1;0.57)* 11(1;0.45)*; 23(0;0.38)* 24(0;0.3)*; 18(-1;0.26)* 25(-1;0.01); 19(-1;-0.04) 7(-1;-0.61)*	20(4;1.27)*; 17(3;0.98)*; 6(2;0.94)*
2. Two facets of industries	19(-2;-0.76); 23(-2;-0.83)* 24(-2;-0.84)*;18(-3;-1.12)*	9(1;0.62)*,3(1;0.51)* 12(1;0.5)*, 6(0;0)* 8(0;-0.14)*, 17(-1;-0.42)* 21(-1;-0.43)*;25(-1;-0.57) 20(-1;-0.63)*	11(4;1.78)*; 14(3;1.58)*; 7(3;1.3)*

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.6. Nuuk - tourism and indigenous activity hub in Greenland

Focusing the local way-of living and culture, both the traditional-orientated with roots from the Inuit culture, like hunting and fishing and the modern Greenlandic and international-orientated culture. We found three perspectives that explains 52% of the variance of the sample, of which factor 1 constitute 21%, factor 2, 18% and factor 3, 13%, see table 24 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 25 while the distinguishing statements are indicated in table 26. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 24. Nuuk's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2	Factor 3
1	Local citizen	0.5834	0.5242	-0.1356
2	Local citizen	0.0037	**0.818***	0.1754
3	Hunter/entrepreneur	0.1742	0.1757	**0.5921***
4	Construction industry	0.1941	**0.725***	-0.0913
5	Expert – tourism and indigenous	**0.7459***	0.2023	0.2068
6	Local citizen	0.0953	0.3466	**0.6817***
7	Local expert, Tourism operator	0.1681	0.2698	0.2703
8	Local citizen	0.1834	0.3351	0.1123
9	Student	0.3077	**0.6188***	0.2042
10	Municipal employee	0.2417	0.1422	**0.4844***
11	Local citizen	0.2339	0.2853	**-0.543***
12	Local citizen	**0.6079***	0.1432	0.3897

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13	Greenland of natural resources	**0.7447***	0.2189	-0.1049
14	Entrepreneur	**0.7859***	0.1853	0.2919
15	Local citizen	**0.5477***	0.0709	0.5243
16	Local citizen	0.0974	**0.808***	0.276
17	Journalist	**0.7479***	0.0996	0.1155
% Explained Variance		**21**	**18**	**13**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Inclusive evidence-based tourism growth.** Advocates agree that it is important to carry out studies of the environment around Nuuk so that the environmental impact of tourism can be monitored (15, + 4) and the local population must be involved in decision-making processes so that the principle of public common ownership of our land sea and resources is not deviated from (21, +4). Advocates agree that tourism in Nuuk is developing rapidly but public debates on how local people, both descendants of Inuit and newcomers want to manage and protect jointly owned resources are still absent (22. +3). They also call for an urgent need to start a new dialogue on how we understand the indigenous peoples Greenlanders as being the original rights holders of land, sea and natural resources (23, +2). On the one hand, advocates are very sceptic on increasing the number of cruise ships visiting Nuuk (30, -4) because the industry pollutes, disturbs the area and exceeds the carrying capacity of Nuuk, all the while, bringing very little income and benefits to the community (24, +2). Likewise, they agree that the authorities' limited regulation and monitoring of tourism activities creates a risk of uncontrolled negative impacts on nature and culture (25, +2).

   Advocates strongly disagree that local Kalaallit entrepreneurs do not have strong networks as Danish newcomers and find it difficult to get a foothold in the tourist industry (16, -4), they noted that in comparison to local Kalaallit, non-local new tourism operators have insufficient knowledge about Nuuk's local environment and nature, historical and cultural aspects (17, +3), making them not as credible as the local ones. However, advocates still noted that Nuuk still has a tourism potential (3, -3) if nature-based and locally anchored. Advocates highlighted that tourist comes to Nuuk and Greenland for the nature and the authentic experiences the country has to offer. Nonetheless, they are aware that there are internal tourism operator conflicts (31, -3) and that the natural resources are under pressure from increased use (20, -2).

2. **Factor 2: Locally based growth.** In support of rapid tourism development, advocates strongly agree that tourism operators must quickly develop tourism facilities so that Nuuk can be ready to receive the potentially many tourists (4, +4). And thanks to the new airport, Nuuk is ideal as Greenland's new tourist destination or travel mecca (1, +4). They agree that authorities need to regularly update Nuuk's tourism strategy and action plan (11, +3). However, they want to keep tourism development locally anchored: no need or wish to recruit foreign labor and no need or wish for foreign investors to build capacity and investments in Nuuk (12, -4; 5, -2). They agree that the unique Greenlandic way of developing tourism is prioritized to ensure local anchoring (10, +2) Even though, local Kalaallit entrepreneurs do not have strong networks as newcomers and therefore find it difficult to get a foothold in the tourist industry (16, +3). Contrastingly, they are very aware that the needs of local people are not considered and involved in tourism development (26, -4; 27, -3) and that there are few tourist operators who are working to strengthen traditions, local culture and develop the modern life (18, +1). Finally, advocates are uncertain on the involvement of the indigenous peoples with regards to resource use rights and in decision making (20, 23, 0).

3. **Factor 3: Upholding indigenous rights.** Like the first perspective, this group also believe that the local population must be involved in decision-making processes so that the principle of public common ownership of our land sea and resources is not deviated from (21, +4) but has given more

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priority to the issues of the indigenous peoples, as such they agree that it is not a constructive solution that the tourism is given priority e.g. whale safari is promoted while the traditional hunting profession is disregarded and a ban on catching humpback whales in Nuup Kangerlua is introduced. (19, +4). Advocates noted that tourists should know the relationship of indigenous peoples and nature and how important it is for their culture and way of life. Advocates also call on the urgent need to start a new dialogue on how we understand the indigenous peoples Greenlanders as being the original rights holders of land, sea and natural resources (23, +2). They agree that the authorities value tourism revenue over the protection of nature and culture (14, +3). On the other hand, advocates agree that the current tourism industry is locally based, as such tourism supports Greenlandic produced handicrafts over imported ones (9, +3); local ways are prioritized (10, +2), and the pace of development has been adapted to ensure widespread local ownership of the tourism industry (7, +1).

Advocates are very sceptic that the residents in Nuuk prefer to be called locals instead of indigenous (34, -4) highlighting that 88% of the population in Greenland are indigenous peoples. They are also sceptic of the notion that a tourism law is needed to ensure that foreign investment is integrated into society (33, -4). Advocates wanted to make sure that Nuuk will not be overrun with tourist and foreign sourced development. They also disagree that the media are effective at reporting about the effects of tourism in Nuuk (29, -3)

All participants across the three Nuuk perspective disagree that there a need for foreign investors as local tourism operators lack the finances to develop capacity (5); the number of cruise ships should be increased in Nuuk (30), and tourism creates a healthier and richer modern local community (32). On the one hand, they all agree that the tourism industry is supporting Greenlandic-produced handicrafts instead/over imported mass-produced souvenirs (9).

Table 25. Nuuk statements and the scores per perspectives

Statement	Factor 1	Factor 2	Factor 3
1. Due to the new airport, Nuuk is ideal as Greenland's new tourist destination or travel mecca.	1	**4**	-1
2. Tourists want to experience the authentic Greenland.	3	3	1
3. Nuuk is not a potential tourist destination	-3	2	0
4. Tourism operators must quickly develop tourism facilities so that Nuuk can be ready to receive the potentially many tourists.	1	**4**	1
5. There is a need for foreign investors as local tourism operators lack the finances to develop capacity.	-1	-2	-1
6. Tax revenues from the becoming important tourist industry should pay off the loan for the construction of the international airport.	0	2	0
7. The pace of development has been adapted to ensure widespread local ownership of the tourism industry.	-1	1	1
8. Nuuk tourism operators are imitating other destinations' ways of developing tourism	-2	0	-1
9. The tourism industry is supporting Greenlandic-produced handicrafts instead/over imported mass-produced souvenirs.	1	1	3
10. Unique Greenlandic way of developing tourism is prioritized to ensure local anchoring.	0	2	2
11. There is a need for the municipality, tourism operators, citizens and associations to regularly update Nuuk's tourism strategy and action plan.	2	3	2

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12. There is a need of recruit foreign labor for the tourist industry.	1	**-4**	-2
13. The young workforce does not choose to work in the tourism industry since other professions offer better employment conditions.	-1	0	2
14. The authorities value tourism revenue over the protection of nature and culture.	0	0	3
15. It is important to carry out studies of the environment around Nuuk so that the environmental impact of tourism can be monitored.	**4**	2	3
16. Local Greenlandic entrepreneurs do not have strong networks as the newcomers and therefore find it difficult to get a foothold in the tourist industry.	**-4**	3	-2
17. Unlike the local Greenlanders some tourism operators (newcomers) have insufficient knowledge of local cultural-historical aspects and limited skills in operating safety in the nature.	3	1	0
18. Too few tourist operators are consciously working to strengthen both the traditional local Greenlandic culture and develop the modern local culture.	0	1	1
19. It is not a constructive solution that the tourism is given priority e.g. whale safari is promoted while the traditional hunting profession is disregarded and a ban on catching humpback whales in Nuup Kangerlua is introduced.	0	-1	**4**
20. The use of land, sea and natural resources by the Greenlanders, indigenous peoples is under pressure from an increasing number of newcomers and their use of the same resources.	-2	0	0
21. The local population must be involved in decision-making processes so that the principle of public common ownership of our land sea and resources is not deviated from.	**4**	1	**4**
22. Tourism is developing rapidly but common public debates on how we want to manage and protect our jointly owned resources are still absent.	3	-1	-1
23. There is an urgent need to start a new dialogue on how we understand the indigenous peoples Greenlanders as being the original rights holders of land, sea and natural resources.	2	0	2
24. The local community earns little money from cruise ships; therefore the number of ship calls should be limited.	2	0	-3
25. The authorities' limited regulation and monitoring of tourism activities creates a risk of uncontrolled negative impacts on nature and culture.	2	-1	1
26. The knowledge, wishes and needs of fishermen and their families are involved in tourism development.	-3	**-4**	-2
27. Greenlandic cultural operators are strongly involved in tourism development.	-2	-3	0
28. Research must be done into how tourism affects socio-economic and cultural conditions.	0	-1	0
29. The media are effective at reporting on the negative and positive impacts/effects of tourism.	-2	-2	-3
30. The number of cruise ships should be increased.	**-4**	-3	-3
31. When the tourism operators disagree on use of resources they blame and accuse each other rather than talking their way to mutual understanding and forming compromises.	-3	-1	-2
32. Tourism creates a healthier and richer modern local community.	-1	-2	-1
33. A tourism law is needed to ensure that foreign investment is integrated into society.	1	-2	**-4**

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34. The residents in Nuuk prefer to be called local instead of indigenous.	-1	-3	**-4**

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 26. Nuuk distinguishing statements per factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1. Inclusive evidence-based tourism growth.	3(-3;-1.29)*;16(-4;-1.33)	1(1;0.39); 19(0;0.02)	22(3;1.59); 17(3;1.2)
2. Locally based growth.	33(-2;-0.87)*; 26(-4;-1.86) 12(-4;-1.89)	21(1;0.63); 19(-1;-0.66)	4(4;2.13); 1(4;1.61)* 16(3;1); 15(2;0.7)
3. Upholding indigenous rights.	12(-2;-0.98); 24(-3;-1.22)* 33(-4;-2)*	2(1;0.52);3(0;-0.26)*	19(4;1.78)*;13(2;0.84)

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.7. Leoben - forestry hub in Austria

We found three perspectives that explains 52% of the variance of the sample, factor 1 explains 21%, factor 2 contributes 19% and factor 3 explains 12% of the variance, see table 27 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 28 while the distinguishing statements are indicated in table 29. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 27. Leoben's Factor Matrix with Defining Sorts Flagged

Participant No.	Participant organization/position	Factor 1	Factor 2	Factor 3
1	Local citizen	-0.3515	-0.1452	0.0456
2	Local citizen	-0.2642	**0.6771***	-0.0716
3	Forest Association	-0.0082	-0.0582	**0.7281***
4	Austrian Mining Association	**0.8269***	0.1625	-0.0601
5	Local citizen	-0.1221	**0.7715***	-0.0428
6	University	-0.2522	0.4143	**0.5931***
7	Local citizen	0.3426	**0.5806***	0.3734
8	Local citizen	**0.6937***	0.2531	0.1391
9	Miners Associaton	0.2322	**0.4634***	-0.367
10	Local citizen	**0.645***	0.2545	-0.2423
11	University	0.0804	**0.6826***	0.447
12	Local citizen	**0.4926***	-0.0537	0.3178
13	Mining expert	**0.4944***	0.1232	0.4259
14	Steel industry	**0.6681***	0.4584	0.0493
% Explained Variance		**21**	**19**	**12**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Mining legacy.** Advocates strongly relies on the mining industry or its legacy. They believe that mining and the steel industry are part of Leoben citizens' identity and that Leoben district still thrives only because of the mining and steel industry (1, 2, +4). The iron ore mountain has a long

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history in the mining industry and the basis of iron production in Leoben. Mining has been a very important industry in Upper Styria for generations and is also part of the culture. They even support that the mining area should be a UNESCO World Heritage Site because of its sculpt mountains rather than being reforested (12; -3). Advocates also believe that the local community benefit from the infrastructure investment of the industries and are in harmony with the local community (4, 16, +3; 6, +2). They believe that nature-based tourism can coexist with forestry operations (26, 25, -4). Advocates noted that these industries can coexist in Leoben. Industries have a very good relationship with the community, and has a lot of investment on how the companies can go hand in hand with local communities. For instance, the mining and steel industry created infrastructures like distance heating and for heating of buildings/ houses and public buildings. This increased good relation and community involvement between the local people and the industry.

2. **Factor 2: Responsible nature-based tourism.** Like the mining legacy perspective, advocates of this perspective also believe that mining and the steel industry are part of Leoben citizens' identity (1, +4) yet they believe that alternative economic activities including nature based-tourism and forest recreation is needed to avoid outmigration of young people (10, +4). As the mining sector is slowly phasing out, advocates noted a need for other job opportunities for the young people to stay and for the municipality to have a stable population structure. As such, they strongly disagree that Leoben district still thrives only because of the mining and steel industry (2, -3). They are even sceptic that the industries develop in harmony with the local community (6, -2) noting that out-migration is imminent with the mechanization and modernization of the industries. However, advocates don't deny the benefits the community receives from the mining and forestry sector e.g., new infrastructures and forest roads (4,3, +3).
   Advocates believe that tourism is the future of the region and if they do not focus on tourism, the region will die out. As such, they believe that nature-based tourism can coexist with forestry operations as well as local people's recreation in the forest are not limited by forestry (26, 20, -4). Advocates noted that they see no reason why forestry, tourism and nature recreation cannot coexist together. However, participants are doubtful of the transparency of the forestry sector when it comes to increasing awareness of the local people in resolving conflicts and policy formulation (8, 15, -1; 7, -2; 18, 11, 0).

3. **Factor 3: Sustainable forestry**. Advocates strongly believe that the forestry sector is actively working to create sustainable forests and supply chains adaptive to future conditions (28, +4) and the regional media helps forest owners in raising awareness on forest operations (15, +4). Authorities and forest associations have have been actively working on this for years. While this perspective is more focused on forestry industry, advocates also supports mining and tourism, as they are sceptic that mining industry affects local inhabitants with noise and dust pollution (27, -4); or that trails in the Alps are already exploited (23, -4) for tourism purposes. Advocates agree that locals and tourists benefit from forest roads (3, +3) however, forestry operations are restricted because of safety concerns for tourists (25, +3). Hence, they agree that nature-based tourism cannot coexist with forestry (26, +2) which is the opposite of mining legacy perspective. Statements ranked negatively also supports that tourism and forestry is in conflict (5, -3; 16, 9, -2). However, advocates don't deny that there can be benefit from tourism (22, -1) or that local people oppose the industry (24, -3), but they are not certain if local people opinions and ideas are considered in policy making (11, 0).

All participants across Leoben's three different perspectives agree that the local community benefit from the new infrastructures (distance heating) provided by the mining and steel industry (4); There is

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low-quality infrastructure and low investments which constrains tourism development in the area (14) and that the local workforce in Leoben is not enough for the demand of the local industries (17).

Table 28. Leoben statements and the scores per perspectives

Statement	Factor 1	Factor 2	Factor 3
1.Mining and the steel industry are part of Leoben citizens' identity.	**4**	**4**	2
2.Leoben district still thrives only because of the mining and steel industry.	**4**	-3	-2
3.Tourists and local recreation seekers benefit from forest roads built by forest companies and forest owners.	0	3	3
4.The local community benefit from the new infrastructures (distance heating) provided by the mining and steel industry	3	3	2
5.All municipal councils in Leoben district actively supports recreational projects in the forest (e.g. ski tracks, cross country, tree top walk).	2	1	-3
6.Forestry, mining and tourism develop in harmony with the local community.	2	-2	-1
7.The industries coexist because management plans of municipalities and industries are coordinated with local communities.	1	-2	-1
8.Waldverband Leoben aims to foster understanding and resolve land use conflicts in the community through information and education campaigns	-1	-1	1
9.The growing interest in tourism and recreation in the forest increases awareness of the public for forest ecosystems and their management	2	-1	-2
10.Alternative economic activities including nature based-tourism and forest recreation is needed to avoid outmigration of young people.	-2	**4**	0
11.The opinions and ideas of the local population are heard in formulation of local policies for the development of the area.	1	0	0
12.The mining area should be reforested rather than becoming a UNESCO World Heritage Site	-3	2	1
13.Landowners feel economic and social pressure to invest in renewable energy.	0	2	1
14.There is low-quality infrastructure and low investments which constrains tourism development in the area.	1	1	0
15.The regional media helps forest owners in raising awareness on forest operations.	0	-1	**4**
16.Tourists are able to do recreational activities without paying fees to landowners for enjoying nature.	3	0	-2
17.The local workforce is not enough for the demand of the local industries.	1	2	0
18.The forestry sector is actively working to create sustainable forests and supply chains adaptive to future conditions.	0	0	**4**
19.Lack of cooperation between hunters and forest managers hinders the natural regeneration of forests and might disrupt the essential forest functions	0	1	-1
20.Local people oppose forestry operations because forest is an area to enjoy the landscape and for their sports and hobbies.	-1	**-4**	1
21.Forests are restricted for public and forest operations for nature conservation.	-2	0	0

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22.Landowners do not have any benefit from tourism.	-1	1	-1
23.No more trails are developed because the Alps are already exploited.	-3	-2	**-4**
24.Inhabitants opposes tourism development because it disturbs the people living in the area.	-1	0	-3
25.Forestry operations are restricted because of safety concerns for tourists and recreationists	**-4**	-3	3
26.Nature based tourism does not coexist with forestry operations.	**-4**	**-4**	2
27.Mining industry affects local inhabitants with noise and dust pollution.	-2	-1	**-4**

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 29. Leoben distinguishing statements per factor or perspective

Levels of agreement	Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
	-4 to -2	-1 to +1	+2 to +4
1. Mining legacy	10(-2;-0.96)*;21(-2;-1.25) 12(-3;-1.26)*	11(1;0.55); 7(1;0.35)* 3(0;-0.03)*; 13(0;-0.27) 20(-1;-0.36)	1(4;2.32)*;2(4;1.41)* 16(3;1.11)*;6(2;0.92)* 9(2;0.9)*
2. Responsible nature-based tourism	20(-4;-1.52)*	19(1;0.55); 22(1;0.39) 16(0;0.18)*	10(4;2.39)*
3. Sustainable forestry	16(-2;-0.96)*;5(-3;-1.16)* 23(-4;-2.2)	8(1;0.63);20(1;0.55) 10(0;0.41)*	15(4;1.65)*;18(4;1.59)* 25(3;1.18)*;26(2;0.69)*

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.2.8. Val Germanasca - mining and tourism hub in Italy

We found three perspectives that explains 64% of the variance of the sample, factor 1 explains 19%, factor 2, 21% and factor 3, 24%, see table 30 - factor matrix with defining sorts flagged. The statements and the scores per perspectives are available in table 31 while the distinguishing statements are indicated in table 32. The description of the perspectives containing the most important points and distinguishing statements are detailed below:

Table 30. Val Germanasca's Factor Matrix with Defining Sorts Flagged

Participant No.	Q-sort	Factor 1	Factor 2	Factor 3
1	University of Turin	**0.8573***	0.051	0.3243
2	Municipal Office	0.4279	0.283	**0.6305***
3	Tourist Board	**0.674***	-0.0776	0.524
4	Tourism expert	0.2011	**0.7871***	-0.319
5	Local Action Group	0.3857	0.0916	0.0776
6	School Teacher	-0.0685	**0.6097***	0.3041
7	Local citizen	-0.0559	**0.8184***	0.1177
8	Waldesian church	**0.8233***	0.1127	-0.0932
9	Politician	-0.0667	0.0031	**0.869***
10	Local citizen	0.1794	0.2223	**0.7548***
11	Local citizen	0.1039	**0.7853***	0.087

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12	Mining company	0.4159	**0.6622***	0.4626
13	Local citizen	-0.2718	0.1314	**0.6118***
14	Waldesian church	0.4113	-0.1081	**0.6748***
% Explained Variance		**19**	**21**	**24**

***Flagged sorts** - represents defining sorts for the factor

1. **Factor 1: Industry critical.** Advocates agree that summer tourism in the Germanasca Valley is increasing because tourists are looking for places with cooler temperatures (7, +4), likewise, winter tourism in the Valley is in danger due to climate change (10, +3). Advocates believe that the tourism development in Germanasca is inclusive (15, +3) and an important engine of development (3, +2). Advocates also believe that tourist facilities are adequate to cater for the increasing number of tourists (13, -3) since there is a mutual support among stakeholders (12, -1). They are nevertheless aware that the increasing number of tourists congest local traffic (19, +1) and they are sceptic that Waldensian religion, culture and history are the reasons why tourists visit the Val Germanasca Valley (5, -3) instead it maybe well the skiing opportunities available in winter and the hiking and the cool weather in summer. Additionally, they also noted that existing policies lack environmental and social sustainability (18, +2). Nonetheless, investing in tourism is preferred than investing in mining (11, +2).

   Advocates are very sceptic that working in the mines convinced many young people to stay and live in Val Germanasca (6, -4) since the mines are closing. They are also doubtful that the mining tourism provide a stable income for the local community (4, -2). Advocates are uncertain whether there is no common vision on how tourism should be developed (16, 0) or if Germanasca's nature and biodiversity is at risk due to tourism (21, 0).

2. **Factor 2: Tourism lacks direction.** Unlike the first perspective, this group believe that there is no common vision on how tourism should be developed in Germanasca Valley (16, +4) since the common strategic vision on tourism was completely lost due to local administrative changes; that could be the reason why this group believe that mine tourism presently does not provide stable income for the local community (4, -1). Advocates believe that winter tourism is in danger (10, +3) and there is a lack of support among tourism stakeholders in developing tourism activities (12, +3). With Germanasca Valley being almost inaccessible to tourists due to the lack of a reliable transport system (14, +2), the state and regional authorities do not provide any assistance for local development, which is why the Germanasca Valley is underdeveloped (20, +2). Additionally, advocates believe that tourism policies lack environmental and social sustainability (18, +2) and there should be a limit to the development of the Germanasca Valley (23, +1).

   On the other hand, they believe that there is preference for investing in tourism development over mining development (11, -4). But they are sceptic that people choose to return to Germanasca because of cultural tourism providing additional income (5, -3) or that the Waldensian religion, culture and history are the reasons why tourists visit the Val Germanasca Valle (2, -3), noting that the locals doesn't even have a say on how tourism based on their religion will be developed (15, -2). Unlike the first perspective, advocates don't agree that the geodiversity and biodiversity of the Germanasca Valley are at risk due to tourism (21, -2)

3. **Factor 3: Optimistic tourism growth.** Like the 1st perspective, advocates believe that summer tourism in the Germanasca Valley is increasing because tourists are looking for places with cooler temperatures (7, +1). In contrast to the 2nd perspective, advocates believe that the decision making in Germanasca Valley is inclusive (15, +3), and tourism is the engine of development in the area (2, +2); strengthens the sense of community and helps preserve the area's culture and language (1,

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+2). And, at least as a perspective, mining tourism could provide a stable income for the local community (4, +1). They also agree that the town have adequate facilities to cater for the increasing number of tourists (13, +1) and that Waldensian religion, culture and history are the reasons why tourists visit the Val Germanasca Valley (2, +1). Likewise, they disagree that skiing is the only reason why tourists visit Val Germanasca (8, -3) or that some inhabitants of the Germanasca Valley feel offended because their culture is being exploited and 'staged' for economic purposes to attract tourism (22, -3).

On the other hand, they are very sceptic that the Germanasca Valley is almost inaccessible to tourists due to the lack of a reliable transport system (14, -4). They also don't believe that the increasing number of tourists congest local traffic (19, -2) or that the authorities are only interested in generating income from tourism (17, -2). They are also sceptic that there should be a limit to the development of the Germanasca Valley (23, -1); that tourism policies lack environmental and social sustainability (18, -1) and that tourist should have limited access to biodiversity and geodiversity conservation sites in the Germanasca Valley (24, -2).

All participants across Germanasca Valley's three different perspectives agree that tourism is the engine of development and growth in the Germanasca Valley (3) yet all of them disagree that Skiing is the only reason tourists visit Germanasca Valley (8)

Table 31. Val Germanasca statements and the scores per perspectives

Statement	Factor 1	Factor 2	Factor 3
1. Tourism in Val Germanasca strengthens the sense of community and helps preserve the area's culture and language.	1	0	2
2. Waldensian religion, culture and history are the reasons why tourists visit the Val Germanasca Valley.	1	-3	1
3. Tourism is the engine of development and growth in the Germanasca Valley.	2	1	2
4. Mining tourism provides a stable income for the local community.	-2	-1	1
5. People choose to return to live in the Germanasca Valley because cultural tourism is seen as a good source of income.	-3	-3	-1
6. Work in the mines convinced many young people to stay and live in Val Germanasca.	**-4**	0	0
7. Summer tourism in the Germanasca Valley is increasing because tourists are looking for places with cooler temperatures.	**4**	1	**4**
8. Skiing is the only reason tourists visit Val Germanasca.	-2	-2	-3
9. There is no planning and enhancement of tourism activities.	-1	1	0
10. Winter tourism in the Germanasca Valley is in danger due to climate change.	3	3	2
11. There is a preference for investing in tourism development over mining development.	2	**-4**	0
12. In the development of tourism activities there is a lack of mutual support between local tourism enterprises, each working on its own.	-1	3	1
13. Tourist facilities (such as hotels and shops) are inadequate to cater for the increasing number of tourists.	-3	0	1
14. The Germanasca Valley is almost inaccessible to tourists due to the lack of a reliable transport system.	0	2	**-4**
15. The inhabitants of the Germanasca Valley have a say in how Waldensian culture should be valorised.	3	-2	3
16. There is no common vision on how tourism should be developed.	0	**4**	3
17. The municipal administration is only focused on how to increase tourist flows.	0	-1	-2

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18. Tourism policies lack environmental and social sustainability.	2	2	-1
19. The increasing number of tourists congest local traffic.	1	-1	-2
20. State and regional authorities do not provide any assistance for local development, which is why the Germanasca Valley is underdeveloped.	1	2	0
21. The geodiversity and biodiversity of the Germanasca Valley are at risk due to tourism.	0	-2	-1
22. Some inhabitants of the Germanasca Valley feel offended because their culture is being exploited and 'staged' for economic purposes to attract tourism.	-2	-1	-3
23. There should be a limit to the development of the Germanasca Valley.	-1	1	-1
24. Tourists should have limited access to biodiversity and geodiversity conservation sites in the Germanasca Valley.	-1	0	-2

Factor score (+4 to -4) is the average score given to a statement by everyone who sorted it within that factor. Bold values are the most agree and the most disagree statements.

Table 32. Val Germanasca's distinguishing statements per factor or perspective

Levels of agreement		Distinguishing statements for each perspective (number of statements with normalized and z-factor scores in brackets)		
		-4 to -2	-1 to +1	+2 to +4
1.	Industry critical.	4(-2;-0.97); 13(-3;-1.32)* 6(-4;-2.14)*	17(0;0.05); 16(0;-0.01)* 14(0;-0.05)*; 12(-1;-0.61)*	11(2;0.87);19(1;0.72)*
2.	Tourism lacks direction.	15(-2;-0.86)*;2(-3;-1.63)* 11(-4;-1.67)*	7(1;0.69)*;4(-1;-0.12) 19(-1;-0.23)*	12(3;1.34); 14(2;1.31)* 20(2;1.24)*
3.	Optimistic tourism growth	19(-2;-1.24)*;14(-4;-1.6)*	4(1;0.75)*; 12(1;0.72) 11(0;0.14); 5(-1;-0.14)* 18(-1;-0.99)*	-

(p<0.05 : Asterisk (*) Indicates Significance at p<0.01)

5.3.3.Hub comparison

We compared the perspective of the hubs to each other and we found that perspectives centred around three main topics: (1) Community Involvement and Rights: Across many hubs, there is a strong emphasis on involving local communities in decision-making processes, particularly concerning industrial development and resource utilization. (2) Sustainable Development Concerns: Several perspectives prioritize environmental sustainability and cautious industrial development to ensure that economic activities do not harm the local ecosystem; and (3) Economic Development vs. Environmental Conservation: Many perspectives exhibit a tension between economic development (through industries) and environmental conservation.

We also found differences among the perspectives that centred around: (1) Economic Priorities: Some perspectives strongly advocate for industrial expansion as a means to secure livelihoods and promote local economic growth (e.g., perspectives favouring mining in Gällivare and Egersund). In contrast, other perspectives (e.g., those prioritizing reindeer herding or tourism over industrial activities) emphasize preserving traditional lifestyles and the environment. (2) Perception of Industry Impact: Differences are apparent in how positively or negatively industries are perceived across hubs. For instance, in Kittilä, some perspectives see mining and tourism as synergistic, while in Egersund, perspectives are divided on whether industries like fish farming negatively impact the local

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environment and community. (3) Cultural and Social Values: Perspectives vary in how strongly they emphasize the protection of local culture and traditions against the influences of industrial development and globalization.

5.4. Cross comparison Arctic and Alpine

Based on the capabilities approach, we discuss our results by comparing the Arctic and Alpine hubs following the conceptual framework's components: Resources, conversion factors, choices, capabilities, and achieved functioning.

5.4.1.Resources

We employed Gross Domestic Product (GDP) alongside resource rents as a proxy to determine available resources. While we lack data on social capital and privileges (endowments and entitlements), we still find GDP and resource rent as a way to approximate resources available to the people to achieve their functionings, and provides us an overview of their economy and natural capital. As such, a country with high GDP is often correlated to a higher living standard, and higher income available per person to spend on goods and services that can lead to an improved quality of life.

In 2021, all the Arctic and Alpine hubs belong to a high-income group based on their individual GDPs, while the resource rents are of varying degree (The World Bank 2024). All the GDP per capita of the hubs are also above average, with the Arctic countries comparatively higher than the Alpine regions. According to the Arctic Human Development Report (Larsen et al. 2015) this is due to the abundant natural resources in the Arctic such as oil, gas, minerals, fisheries and forestry and the corresponding economic structure in the area.

Arctic regions tend to rely on single industries like mining, fishing, forestry and energy as compared to Austria and Italy with more diversified economies. Most importantly, Arctic region have relatively smaller populations compared to Austria and Italy, and with fewer people to share the economic output, the GDP per capita tends to be higher. The Arctic regions also often have a higher cost of living due to factors like remote locations, harsh climates, and limited infrastructure. While this may seem counterintuitive, it can contribute to higher GDP per capita figures since it takes more economic activity to sustain a comparable standard of living (The World Bank 2024; Nordic Council of Ministers 2014; Arctic Economic Council 2017).

Table 33. Resources and capabilities or the Arctic and Alpine regions. Source: HDI from Human Development reports (UNDP 2023); GDP and Resource rent: World Bank Open data (The World Bank 2024)

Country	GDP (Millions §)	Resource rent (as % of GDP)	GDP per capita
	2021	2021	2021
Faroe Islands	3,655.06	0.0	69,108.21
Finland	296,470.42	0.4483	53,504.69
Greenland	3,235.81	0.0	57,116.13
Iceland	25,595.94	0.0001	68,710.24
Sweden	639,714.96	1.2082	61,417.68
Norway	503,367.99	10.048	93,072.89
Austria	479,295.36	0.1178	53,517.89
Italy	2,155,360.30	0.1120	36,449.26
World	97,153,181.16	3.0296	12,316.10

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5.4.2.Conversion factors

The capabilities approach highlights the importance of various conversion factors that influence individuals' ability to transform resources into valuable functionings and capabilities. These conversion factors include personal, social, and environmental factors. These factors have the potential to either impede or facilitate development, much like catalysts and barriers do. Based on our inductive analysis, we divided the factors into six main themes.

Economic factors. All hubs consider the public and private sectors to enhance individual capabilities because of their economic contribution. These are the local decision makers, state and private companies including the industries. Unlike the Alpine hubs, the Arctic region sees functioning infrastructure, economic opportunities and the cumulative benefits stemming from traditional livelihood and the current industries to be enablers of development. Indigenous and traditional livelihoods often embody sustainable practices that are well-adapted to local ecosystems thereby supporting economic, social and cultural sustainability (Manrique et al. 2018; Berkes 2012).

For barriers, both Arctic and Alpine hubs find lack of capital and poor infrastructure as barriers to development. This involves lack of available educated workforce in the area. Industries cannot expand without proper human resources and proper infrastructure like housing and recreation centres to cater to the young population and to the incoming workforce (Datta et al. 2005). On the one hand, only Arctic hubs found reliance on a single industry as a barrier. Unlike the Alpine hubs with more diverse economic opportunities, most Arctic hubs rely on a single industry therefore hindering the capabilities set of an individual or a community. In addition, reliance on a single industry result to disadvantages due to vulnerability to fluctuations, hinder economic diversification, limiting opportunities for growth in other sectors. Socially, dependence on one industry can also lead to unequal distribution of wealth and resources, as well as limited job opportunities outside of that industry. Environmentally, the intensive focus on one industry can result in overexploitation of natural resources and increased pollution (Awoa Awoa et al. 2024)

Environmental factors: Arctic hubs identified limited space as barriers to development and their ability to achieve their desired functionality. Lack of space refers to the notion that the industries cannot expand anymore, e.g., due to limited space in the fjords, there are no more cages that can be placed, inhibiting production. On the one hand, Alpine hubs did not consider this as a barrier and according to Perlik (2018) Alpine regions refuses to serve the interest of the neighbouring metropolitan cities to intensify their landscape resource use even though this may seem as counterproductive. Additionally, all hubs identify severe weather condition as barriers. This is particular to warmer winters negatively affecting winter tourism and traditional livelihood. Warm winters can lead to diminished snow conditions for alpine and Nordic skiing (Abegg et al.). In Svalbard, warm spells reduced tourism income by closing roads and airports (Hansen et al. 2014). For reindeer herding, warm winters can lead to starvation and catastrophic declines in reindeer and caribou populations by reducing forage availability and limiting lichen availability (Tyler 2010; Moen 2008). There are likely more environmental factors that may inhibit development which is the focus of WP2 (Flick et al. 2022) and WP1 (Lesser und Suopajärvi 2022). Arctic hubs also identified land exploitation to be a barrier to development and this can be particular to Indigenous communities in the Arctic, since land exploitation means less grazing land for the reindeer herders and hunting sites for the Inuit hunters in Greenland (Fohringer et al. 2021; Dahl 2008).

Social factors: The Local community is found by all hubs as catalysts, they perceive that it is the members of their own community who initiates progress and change. Members of the local communities encourage integration, motivation and decision-making that are in favour of the common good hence, contributing to local development (Vera Vera und Romero Chavez 2022). Arctic hubs also

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identified sufficient population as a catalyst because of the need for human resources to fill in the expansion of the industries as well as bring back the vitality of their area. Additionally, they find dialogue among stakeholders as catalysts to development. This implies that social inclusion and transparent processes are given importance by the local stakeholders. According to Ayuso et al. (2006) stakeholder dialogues generate innovations that are beneficial to the community and the industries. It also promotes effective communication, transparency and appropriate feedback mechanisms.

For barriers, all hubs consider competing/conflicting human land uses as barriers to development. This is because overlapping land uses results to conflict (Živojinović et al. 2022)negatively affecting community cohesion and can result to lack of trust and procedural deficiencies (Kaya und Erol 2016). Additionally, local's reluctance to adapt to changes and expansion of industries are considered to be a barrier, as resistance from local residents results to conflict and operation constraints (Farris 2001), However, local resistance may also be considered as a catalyst of change, e.g., land claims by Indigenous peoples have resulted in the transfer of land tenure and resource management from the government to the residents of Finnmark thereby creating change (Broderstad et al. 2020).

Political/legislation factors: Only the Arctic hubs found to have barriers and catalyst on this aspect. They say that legislation can be a catalyst but at the same time a barrier to development especially when these legislations that enables economic growth are used of other purposes like increasing forest protection thereby inhibiting industry expansion and making licensing procedures more complex. Biases influencing rules and regulation are also found to be barriers especially when unfair rules to local stakeholders are developed because of injustices. In particular, the indigenous peoples' opposition to industry expansion are overridden and the Arctic is locked into an extractive industry pathway (Sidortsov et al. 2022).

Cultural factor: For Arctic hubs, traditional hunting in Greenland and reindeer herders are seen as catalysts of development because they continue traditions and culture that may otherwise be extinct. Reindeer herding is seen as a catalyst for development because it not only sustains livelihoods and preserves cultural heritage but also fosters environmental stewardship, social inclusion, and resilience in the face of environmental and socio-economic challenges (International Centre for Reindeer Husbandry 2023). Arctic and Alpine hubs agree that cultural centres are also catalyst to development because they preserve indigenous practices and enhances individuals' personal capabilities by fostering a sense of identity, belonging, and cultural expression (Cooper 2020). It follows that also all hubs found losing identity and culture as a barrier to development, when traditional practices, languages, and cultural norms are eroded or suppressed, it can have profound social, economic, and psychological impacts, hindering overall development progress (United Nations Development Group 2008).

Technological factors: research, social media, and digitalization serve as catalysts for development by fostering innovation, knowledge sharing, social connectivity, economic empowerment, and governance effectiveness. Research drives innovation and technological advancements, which are essential for economic growth and societal progress (Mazzucato 2013). Social media platforms facilitate communication, collaboration, and information sharing on a global scale (Kaplan und Haenlein 2010). They enable individuals and organizations to connect, engage, and mobilize around common interests and causes, fostering social cohesion and civic participation (Rheingold 2002). Social media also serves as a powerful tool for knowledge dissemination, education, and awareness-raising, amplifying voices and perspectives that were previously marginalized or silenced (boyd und Ellison 2007). Digitalization refers to the integration of digital technologies into various aspects of economic, social, and political life. It enhances efficiency, productivity, and transparency across sectors such as finance, transportation, and governance (Brynjolfsson und McAfee 2014). Digitalization also expands

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access to services and opportunities, particularly in underserved and remote areas, bridging geographical divides and reducing inequalities (ITU 2020).These are aligned with the findings of Kleine (2008) who mentioned that information and communication technologies prove useful tools in achieving functionings since they increase knowledge easier communication, more income and time saved.

On the one hand, while mechanization is profitable for the industries in the case of mining and forestry, Alpine hubs find that it affects the local communities because of job displacement, mechanization in mining and forestry often leads to a reduction in the demand for labour, as machines replace human workers in various tasks such as extraction, transportation, and processing. The loss of jobs can have negative ripple effects on local economies, including decreased consumer spending, lower tax revenues, and increased social welfare costs. Mechanization also tends to benefit capital-intensive firms and investors while exacerbating income inequality within communities (Hilson 2002).

Other factors that are not part of the global themes are risks, uncertainty and wildcards. These themes refer to events that are difficult to foresee and expect but will nevertheless bring catastrophic changes to current development trends e.g., pandemic, war, etc. Risks, uncertainty and wildcards can deter investments and can contribute to financial instability (IMF 2010).

Finally, all hubs find climate change as a barrier because it poses a significant limitation to development due to its wide-ranging impacts on ecosystems, economies, and societies. Rising temperatures, extreme weather events, sea-level rise, and disruptions to rainfall patterns threaten food security, water resources, infrastructure, and livelihoods, particularly in vulnerable regions (Lesser und Suopajärvi 2022; Flick et al. 2022)

5.4.3.Choices

Choice refers to individuals' ability to make meaningful decisions. According Alsop und Heinsohn (2005) to make effective choices, there should be an existence of choice. But this is dependent on the framing and availability of information (Robeyns 2005). In this particular component, we introduce the synergies and trade-offs analysis as an analytical tool to evaluate the existing choices in land use. For example, in order for a decision maker to decide which project to establish, i.e., wind farms or cultural centre, the person has to weigh the pros and cons of both projects. But in order to do so, all information such as environmental impact, social impact, etc. should be available. How impacts are framed or discussed also matters to the decision i.e., wind farms will benefit majority of the population while cultural centres are only for a few who have access to it (Lienert und Burger 2015). In line with this, the presentation of the synergies and trade-offs and how it is discussed by the interviewees and written in reports affects individual and collective choices.

Due to our learning cases only focusing on forestry, mining and tourism, we are limited in comparing other industries. But the synergies found between mining and tourism offers insight into how differently these industries are perceived in different regions. In Alpine areas, tourism and mining are synergistic due to the transformation of mining sites into recreational spaces (Modica, 2019). Conversely, in the Arctic, tourism and mining present both benefits and trade-off. Depending on individual stance on economic, environment, socio-cultural sustainability, preferences reveal the willingness to sacrifice certain outcomes to attain others. However, the main difference between Arctic and Alpine hubs lies in the stage of development. In Austria and Italy, where mines are closing, repurposing the land is crucial, with narratives emphasizing the close relationship between mining and Styrian identity (UNESCO, 2018). Conversely on the Arctic, the mines are still operating and expanding and even though studies have already proven the negative impacts of mining on the environment (Flick et al. 2022) and to traditional livelihood (Zachrisson und Beland Lindahl 2023), the narrative of the

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mining sites as the highest contributor to employment and development prevails (Haikola und Anshelm 2020; Nygaard et al. 2022). In addition, mining companies are using 'green growth' and 'green transition' as one of the reasons to expand their operations (Cambou 2020; Ward et al. 2016). All of these narratives contribute to the dominant extractive development path in the Arctic.

5.4.4.Capabilities.

To determine capabilities, we used the Human Development Index (HDI) (UNDP 2024), see table 24. HDI is a composite index measuring average achievement in three basic dimensions of human development: a long and healthy life (measured in years of life expectancy at birth), knowledge (measured in expected and mean years of schooling), and a decent standard of living (measured in gross national income per capita) (*ibid* 2024). All the countries in the Arctic region belong to the top 15 countries with the highest HDI in the world and considered to have very high human development. Austria and Italy at 22nd and 30th place, respectively are still considered to have very high human development, even though they are considerably lower than of their Arctic counterparts. Focusing on their similarities, all countries report high level of development because of several factors: (1) High level of education and literacy - all countries prioritize education and relatively offers free education at public schools including primary, secondary, and higher education levels. (2) Healthcare - all the countries have well-developed healthcare systems and high life expectancies. (3) Arctic countries tend to perform well in measures of gender equality, including gender parity in education and workforce participation. (4) All countries have robust social welfare systems that provide support for healthcare, education, childcare, and other social services. These policies contribute to overall human development. (5) All countries typically have well-developed infrastructure and high quality of life indicators, such as access to clean water, sanitation, and housing (UNDP 2024; The World Bank 2024).

Table 34. Human development index per country

Country	HDI world rank	HDI	Life expectancy at birth	Mean years of schooling	Gross national income (GNI) per capita
	2022	2022	2022	2022	2022
Faroe Islands*	5	0.952	81.9	13.0	62,019
Finland	12	0.942	82.4	12.9	49,522
Greenland*	5	0.952	81.9	13.0	62,019
Iceland	3	0.959	82.8	13.8	54,688
Sweden	5	0.952	83.5	12.7	56,996
Norway	2	0.966	83.4	13.1	69,190
Austria	22	0.926	82.4	12.3	56,530
Italy	30	0.906	84.1	10.7	44,284
World	-	0.739	72.0	8.7	17,254

*HDI for the kingdom of Denmark that includes Greenland and the Faroe Islands, which are autonomous with similar political structures and legal rights.

5.4.5.Achieved functioning – perspectives of development.

To be able to compare achieved functioning or the various states of being and doing, we used the different perspectives from our Q-method studies, focusing on four key aspects: economic growth, social inclusion, environmental sustainability and cultural conservation. These four aspects emerged from the analysis of the Q-surveys and the interviews which implies that these are the functionings that our participants value and have reason to pursue. (1) Economic growth which reflects the focus on expanding economic opportunities and growth through industries. (2) Social Inclusion is concern with the degree of community involvement in decision-making processes. (3) Environmental

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Sustainability pertains to the emphasis on conservation and the sustainable management of natural resources. And (4) Cultural conservation which refers to the focus on continuing culture, traditions and ways of life. See table 35 for the summary of perception of development as linked with functionings, Arctic and Alpine regions.

The hubs and the local perspectives of development presents a very complex case and no single pattern can be discerned. Nonetheless, we observe that some perspectives strongly aligned with environmental sustainability exhibit low alignment with economic growth, with the exception of perspectives that are critical with the industries (Egersund's industry critical perspective; Nuuk's Inclusive evidence-based tourism growth; Suduroy's two facets of industries perspective, Westfjords perspectives and Leoben's Responsible Nature-Based Tourism and Sustainable Forestry perspectives and all of Val Germanasca's perspectives). This means that for other hubs, participants that believe that nature should be prioritized (Kittilä's Strong sustainable consumption, Reindeer herding and nature conservation; Gällivare's Reindeer and Nature First; Egersund's Increase Shoreline and Sea Protection; Nuuk's Upholding indigenous rights; Suduroy's Prioritize nature and people) agree with participants who believe that economic growth should be prioritized (Kittilä's Weak sustainability and Promoting Green energy development; Gällivare's Ambivalence to growth and Industry Growth is Community Growth; Egersund's Communities Develop because of Industries; and Leoben's Mining Legacy) in terms of the impossibility to reduce environmental impacts while economic growth continues. This is akin to the concept of decoupling and as Ward et al. (2016) and Pulselli et al. (2015) argued, there is no country that have achieved absolute decoupling in the last 50 years and this is apparent in our findings that participants also do not believe that it is possible to achieve both environmental sustainability and economic growth without sacrificing one. Invertedly, perspectives that are critical to the industries believe that high environmental sustainability can be achieved only when there is moderate economic growth or vice versa, which is considered as weak decoupling by Ward et al (2016) and only implies that there is an increase in the efficiency of use of resources. However, this still means that economic growth is prioritized. Interestingly, we find Val Germanasca's perspectives: Tourism Lacks Direction and Optimistic Tourism Growth to be unique, as participants believe that economic growth and environmental sustainability can be weak due to the lack of planning and management on the side of the responsible actors and decision makers. While pure optimism on tourism growth believe that it is possible to have both and as studies have shown that this is difficult to obtain unless there is a careful balance (Lavrinenko et al. 2019; Aznar-Márquez und Ruiz-Tamarit 2016) or de-growth (Alier 2009; Hueting 2010).

Exploring economic growth and cultural conservation presents an interesting case as some perspectives that are strongly aligned with high cultural conservation are weakly aligned with economic growth or vice versa. This includes Kittilä's Weak sustainability, Reindeer herding and nature conservation, and Promoting Green energy development; Gällivare's Reindeer and Nature First and Industry Growth is Community Growth and; Egersund's Increase Shoreline and Sea Protection and Communities Develop because of Industries, Nuuk's Upholding indigenous rights and all Suduroy's perspectives. These perspectives believe that economic growth comes at the expense of continuing cultural ways and traditions or the other way around. One possible explanation for this, which is particular for Kittila, Gällivare and Nuuk is that reindeer herding as part of Sámi culture; and hunting which is part of Greenlandic culture, appears to be limited with the expansion of the industries. For Egersund and Suduroy, they believe that the industries and large companies can bring about change in the structure of communities and their everyday life, whether it is good or bad depends on the perspectives. This is aligned with the findings of Frederking (2001) who argued that economic growth and cultural conservation are not necessarily endogenous and that separating social identity from economic activities is more successful in preserving culture. However, there are also some perspectives that are moderately aligned with cultural conservation but strongly aligns with economic growth.

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These are Gällivare's Ambivalence to growth, Egersund's Industry Critical and all of Westfjords perspectives. Alternatively, we have perspectives that are strongly aligned with both economic growth and cultural conservation: Nuuk's Locally based growth, Leoben's Mining Legacy and Val germanasca's Optimistic Tourism Growth. These perspectives believe that culture and their identity is partly the reason why tourist visit their areas and therefore bring additional jobs and income. Bowitz und Ibenholt (2009) supported that investments in cultural heritage projects can contribute to economic growth with increased employment and income. Though some may argue that this is similar to commodifying culture (Viken 2022). Lastly, we have Leoben's Responsible Nature-Based Tourism and Sustainable Forestry perspective and Val Germanasca's Industry Critical perspective where economic growth and cultural conservation are moderately aligned, this may be due to their identity and culture being deeply rooted in the industries that have operated in the area, i.e. Austria where the cultural legacy of miners, characterized by unique dances, songs, and traditional attire for festivities, has evolved over centuries along the Steirische Eisenstraße (Styria's segment of the Central European Iron Trail). This heritage persists in the present-day mining region near Styria's Erzberg (Ore Mountain) and serves as a reflection of the region's identity (UNESCO 2018).

In terms of social inclusion, some perspectives believe that there is an inversely proportional relationship with economic growth. This is true for Kittilä's Weak sustainability, and Reindeer herding and nature conservation perspective; Gällivare's Reindeer and Nature First; Egersund's Increase Shoreline and Sea Protection, Nuuk's Upholding indigenous rights, Suduroy's Prioritize nature and people and all Westfjords perspectives. This implies that there are no transparent processes in the development of their communities and participants doubt that people's voices are heard and considered in decision making. According to Sidortsov et al. (2022) participation and inclusion are perceived as limited as the industries seeks to achieve their goals with minimal effort with non-democratic deliberation. On the other hand, there some perspectives that are moderately aligned with social inclusion and strongly aligned with economic growth and vice versa. This includes Kittilä's Promoting Green energy development; Gällivare's Ambivalence to growth and Industry Growth is Community Growth; Egersund's Communities Develop because of Industries; Nuuk's Inclusive evidence-based tourism growth and locally based growth; Suduroy's Two facets of industries, Leoben's Mining Legacy and Responsible Nature-Based Tourism and Val Germanasca's Industry Critical perspective. Some participants of these group (Kittilä, Gälliavare, Egersund, Nuuk and Leoben) have trust with the economic industries and the government that the decision they make are for the benefit of the whole community. On the one hand, perspectives that are moderately aligned with social inclusion and weak economic growth are critical about their role in economic development. Studies agree that while social inclusion is necessary for sustainable economic growth (Walby 2018) it is complex and involves a multitude of factors e.g., social and gender equality, socio-economic opportunity, and cultural tolerance (Lloyd und Ramsay 2014).

For cultural conservation and social inclusion, some participants believe that they are directly proportional to each other. They believe that cultural conservation can only successfully happen when there is social inclusion. This is aligned with UNESCO (2021) call that culture fosters social unity. Its myriad practices, locations, and expressions serve as catalysts for promoting inclusivity within society. The significance of engaging with and partaking in cultural activities has long been recognized as fundamental to improving overall welfare and cultivating a feeling of belonging and collective identity. Moreover, culture possesses significant potential to actively involve local communities of all ages in communal affairs, thereby stimulating their effective participation in public life (UNESCO 2021). However, there are also perspectives that are weakly aligned with cultural conservation and moderate social inclusion, these appears to be present on perspectives that are mainly supportive of industries (Kittilä's Promoting Green energy development; Gällivare's Industry Growth is Community Growth; Egersund's Communities Develop because of Industries and Westfjords perspectives). Only Leoben

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have perspectives that are strongly aligned with cultural conservation yet with moderate social inclusion vice versa.

With regards to environmental sustainability and cultural conservation, some perspectives believe that they develop together (Kittilä, Gällivare, Egersund, Westfjords): high environmental sustainability means high cultural conservation and vice versa. This is because the environment, forests and the landscape are part of the identity and everyday life of the local communities, particularly the indigenous communities. Forests are also seen not only for its provisioning services but also the regulatory and recreational services it provides (Myntti et al. 2022; Živojinović et al. 2022; Lidestav et al. 2022). Contrastingly, there are perspectives that are strongly aligned with environmental sustainability and moderate cultural conservation (e.g., Nuuk, and Leoben). One possible explanation for this is the perspectives prioritizes the environment than the cultural function of the landscape, in the case of Leoben.

Like the previous, perspectives find environment sustainability and social inclusion to be directly proportional to each other. This includes perspectives from Kittilä, Gällivare, Egerduns, Nuuk, Suduroy, Leoben and Val Germanasca. As social inclusion also means that members of society have equal opportunities to participate in decision-making processes and access to resources, including those related to environmental sustainability (UNDP 2024). Additionally, research in fields such as environmental justice highlights how marginalized and vulnerable communities often bear a disproportionate burden of environmental harm, underscoring the importance of social inclusion in environmental policymaking and implementation (Schlosberg 2004; Sidortsov et al. 2022). Additionally, there are also perspectives that are moderately aligned with social inclusion and have low environmental sustainability and vice versa (Kittilä, Gällivare, Egersund, Wetsfjords and Leoben).

Table 35. Perception of development as linked with functionings, Arctic and Alpine regions

Hub	Perspective	Environmental Sustainability	Cultural conservation	Social Inclusion	Economic growth
Kittilä, Finland	Strong sustainable consumption	↑ High	→ Moderate	→ Moderate	↓ Low
	Weak sustainability	↓ Low	↓ Low	↓ Low	↑ High
	Reindeer herding and nature conservation	↑ High	↑ High	→ Moderate	↓ Low
	Promoting Green energy development	↓ Low	↓ Low	→ Moderate	↑ High
Gällivare, Sweden	Ambivalence to growth	↓ Low	→ Moderate	→ Moderate	↑ High
	Reindeer and Nature First	↑ High	↑ High	↑ High	↓ Low
	Industry Growth is Community Growth	↓ Low	↓ Low	→ Moderate	↑ High
Egersund, Norway	Industry Critical	↑ High	↑ High	↑ High	→ Moderate
	Increase Shoreline and Sea Protection	↑ High	↑ High	↑ High	↓ Low
	Communities Develop because of Industries	↓ Low	↓ Low	→ Moderate	↑ High
Nuuk, Greenland	Inclusive evidence-based tourism growth	↑ High	→ Moderate	↓ Low	↑ High
	Upholding indigenous rights	↑ High	↑ High	↑ High	↓ Low
	Locally based growth	→ Moderate	↑ High	→ Moderate	↑ High

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Westfjords, Iceland -	Improve local infrastructure to support tourism and aquaculture	→ Moderate	→ Moderate	↓ Low	↑ High
	Insufficient investment hampers local growth	→ Moderate	→ Moderate	↓ Low	↑ High
Suduroy, Faroe Islands	Prioritize nature and people	↑ High	↑ High	↑ High	→ Moderate
	Two facets of industries	→ Moderate	↓ Low	→ Moderate	↑ High
Leoben, Austria	Mining Legacy	↓ Low	↑ High	→ Moderate	↑ High
	Responsible Nature-Based Tourism	↑ High	→ Moderate	↑ High	→ Moderate
	Sustainable Forestry	↑ High	→ Moderate	→ Moderate	→ Moderate
Val Germanasca, Italy	Industry Critical	↑ High	→ Moderate	↑ High	→ Moderate
	Tourism Lacks Direction	↓ Low	↓ Low	↓ Low	↓ Low
	Optimistic Tourism Growth	↑ High	↑ High	↑ High	↑ High

Finally, as this study aim to explore the effects of the industries on the achieved functioning of the communities to live the life they prefer, so as to say they are truly developed based on the capabilities approach of the human development theory. We found that industries undoubtedly bolster economic development within all the hubs, but they concurrently pose challenges to other functionings such as social inclusion, environmental sustainability, and cultural conservation. We presented the complexity of determining development through the use of local perspectives on development and reflect local realities as opposed to universal knowledge. All of the hubs considered in this study are all considered to have very high human development (i.e., GDP, resource rents, etc.), yet the participants perceive it differently. Participants who prefer for stronger environmental sustainability, cultural conservation and social inclusion definitely feels that their freedoms and capabilities are impeded, hence they would not say that their quality of life is higher than those of others, contrary to what national indices says. This is more particular for indigenous communities (Mumford 2021; Österlin und Raitio 2020; Siri Ulfsdatter Soreng 2008; Živojinović et al. 2022). However, it is quite the opposite for participants who support high economic growth. Currently, economic growth is still the dominant mode of development particularly in the Arctic even though it is disguised in the form of 'green growth' (Cambou 2020; Ward et al. 2016; Sidortsov et al. 2022).

Using the capabilities approach and linking it with perceived development, we can say that the Arctic and Alpine region are considered to have abundant resources. Local stakeholders and citizens are faced with limiting and inhibiting factors, some more than others, which we presented here as barriers and catalysts for development. Furthermore, based on the multiple perspectives that we have identified in this study, local citizens have a sense of choice (i.e., local community comes first, nature and reindeer first, etc.). The presence of multiple perspectives on development exhibits the presence of multiple paths to pursue their desired quality of life. However, if the local citizens have an opportunity to choose or have their choices realized is a different matter (Alsop und Heinsohn 2005). We also have to take in consideration the framing and availability of information in the regions with regards to the positive and negative narrative about the industries as this affects decision making and current discourses.

We have mentioned in the beginning of this report the difference between achieved functioning and perceived development and how they are different yet inevitably linked. One matter that needs to be

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discussed further is that the objective measure of achieved functioning, wellbeing and quality of life fails to capture the nuances of local realities, particularly in the case of the Arctic hubs and Alpine regions. On the other hand, human development theory did not impose on a single measurement for human development, but it is the current assessments being used nowadays that provides an incomplete picture. As mentioned by several studies, HDI is not a good indicator of success or failure of achieving development however, it is still the best indexes we have today to determine human progress and growth (Sever 2013; Ravallion 2010; Herrero et al. 2012). We however suggest, that examining local subjective perspective of development is crucial in determining quality of life, and determining if their choices are realized therefore achieving their valued functioning.

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6. Conclusion and policy recommendations

This study aims to understand the development of the different economic activities, and their effects on socio-cultural aspects and quality of life in the European Arctic. It further aims to provide a broader perspective, compare selected Arctic hubs to Alpine hubs so as to generate learnings and find matching, overlapping, and contradictory issues concerning all hubs and countries. We used the capabilities approach of the human development theory as an evaluative tool to compare the hubs and explore achieved functioning of the local stakeholders and citizens by exploring their perspectives on local development. Although the capabilities approach of human development theory provides a useful framework for understanding development, including sociocultural effects and quality of life, it has its critics and requires refinement. Nevertheless, the capabilities approach helped us identify similarities and differences between European and Alpine hubs. Through it, we were able to map out a complex network of relationships between economic activities and how local communities perceive development. In addition, we were also able to find that there is a significant emphasis on balancing economic growth with environmental sustainability, cultural conservation and social inclusion which are also parallel to the valued functionings of the local communities and stakeholders.

The similarities and differences we observed between the European Arctic and Alpine regions highlight the need for tailored approaches to development that account for the unique socio-cultural contexts of each area. Moving forward, prioritizing the balance between economic growth, environmental sustainability, cultural conservation, and social inclusion will be crucial for fostering healthy and thriving communities in these regions. This study sheds light on the complexities of local development. These insights can guide strategic development in the European Arctic regions and offer a model for integrating sustainable practices in similarly sensitive environments. Recommendations of this study could be divided in six broad areas of action:

1. **Promote Integrative Development Focused on Sustainability**: Studied hubs and activities in this project showed that there is significant emphasis on the need to balance economic growth with environmental sustainability. This is particularly prominent in Arctic hubs like Nuuk and Gällivare, where there is a strong push to integrate indigenous rights and environmental considerations into development policies. Lessons from Leoben and Val Germanasca, which are transitioning towards sustainable forestry and tourism, respectively, highlight how traditional industries can adapt to modern sustainability demands. These examples can inspire Arctic hubs to explore diversification strategies that reduce reliance on extractive industries and promote ecological resilience.
2. **Adopt Adaptive Locally-Fitted Management Practices**: Policymakers should adopt flexible and adaptive management practices that can respond to environmental changes and market dynamics. This includes creating policies that support sustainable development and economic diversification, much like the adaptive strategies seen in Leoben and Val Germanasca. For the European Arctic, diversifying away from heavy reliance on oil, gas, and mining towards renewable energy, sustainable tourism, and perhaps digital economies could offer alternative sustainable growth paths that also preserve the unique environmental and cultural landscapes of the region. However, it is crucial to recognize that these strategies cannot be applied uniformly across all locations. They must be locally fitted to each place, considering local social and environmental conditions. Tailoring these approaches to the specific needs and capacities of individual communities will ensure that development is both effective, sustainable and fosters resilience and growth in harmony with the unique characteristics of each area.
3. **Foster Inclusive Growth**: Social inclusion is a critical aspect in all regions, with many perspectives advocating for increased community participation in decision-making processes. This approach is crucial in ensuring that development initiatives are culturally sensitive and broadly supported by local populations. In the future, development strategies should prioritize

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inclusivity, ensuring that all community members, especially indigenous groups, are involved in the planning and implementation phases. This involvement is essential for fostering a sense of ownership and responsibility towards development projects. By actively engaging diverse voices, particularly those of traditionally marginalized groups, we can create development plans that reflect the true needs and aspirations of the community. This will also enhance social cohesion but also ensures that development benefits are equitably distributed.

4. **Invest in Sustainable Infrastructure**: Investment in sustainable infrastructure that supports both current needs and future growth is crucial. This includes enhancing connectivity, communication, energy and resource use efficiency, research and development, to support broader economic activities beyond traditional industries. Many communities we researched have expressed a need for improved infrastructure, as they see their future development and existence tied to better connections, such as roads and other transportation networks. Therefore, we cannot advocate for strict protection measures that isolate these communities, nor can we support extensive resource extractions that compromise environmental integrity. Instead, we must aim for sustainably supported and balanced development. This approach will ensure that these communities can thrive while maintaining their cultural and environmental heritage, fostering an environment where economic growth and ecological preservation coexist harmoniously. By addressing the infrastructure needs, we can promote sustainable development that aligns with the aspirations of local populations, ultimately contributing to the long-term viability and resilience of these communities.
5. **Promote Environmental Stewardship**: Environmental protection should be a cornerstone of all development activities in the Arctic. With the accelerating impacts of climate change and the alarming rates of biodiversity loss, this becomes an unquestionable necessity. This involves stringent environmental regulations, conservation efforts, and practices that minimize the ecological footprint of human activities. While development cannot and should not be halted, it can be strategically planned to support and harmonize with natural ecosystems and ecological limits. By integrating sustainable practices and innovative approaches, we can ensure that development in the Arctic not only coexists with but also enhances the resilience of the environment. This balanced approach will help preserve the unique and fragile Arctic ecosystem for future generations while allowing for responsible and sustainable development.
6. **Leverage Local Knowledge and Science**: Integrating scientific research with local knowledge can lead to more effective and context-specific solutions, particularly in managing natural resources and adapting to climate change. In the European Arctic, the decreasing population in small localities poses a significant challenge, making it essential to tailor solutions to the unique needs of these communities to halt migration. By incorporating traditional knowledge and scientific insights, we can develop innovative strategies that not only address environmental challenges but also create sustainable economic opportunities. Promoting new and innovative jobs, along with other attractive offers, can draw people to these areas, revitalizing local economies and communities. This holistic approach ensures that local populations are supported and engaged, fostering resilience and growth in the face of environmental and demographic changes.

In conclusion, the European Arctic regions stand at a pivotal point where they can integrate lessons from both Arctic and non-Arctic areas to forge development paths that are sustainable, inclusive, and economically viable. The insights from this analysis provide a roadmap for achieving these objectives, emphasizing the importance of environmental sustainability, community involvement, and economic diversification.

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Appendix I. List of expert interviews used to develop concourse

Country	Hub name	Field of expertise	Interview code
Faroe Islands	Island of Suðuroy	Aquaculture and local/traditional	I1
		Aquaculture and tourism	I2
		Tourism and local/traditional	I3
Finland	Inari	Sámi culture and reindeer herding	I4
		Forestry	I5
		Sámi parliament	I6
		Livelihood	I7
		Tourism	I8
		Nature conservation	I9
		Tourism and nature conservation	I10
	Kemi	Forestry	I11
		Municipality	I12
		Tourism	I13
		Tourism	I14
		Forestry	I15
	Kemijärvi	Forestry	I16
		Forestry	I17
		Forestry	I18
		Municipality	I19
		Forestry	I20
	Kittilä	Municipality	I21
		Nature conservation	I22
		Forestry	I23
		Tourism	I24
		Mining	I25
Greenland	Nuup Kangerlua	Local hunter and fisherman	I26
		Municipality	I27
		Indigenous	I28
		Tourism	I29
		Tourism	I30
Iceland	Westfjords	Fishery, aquaculture and Tourism	I31
		Fishery and tourism	I32
		Municipality	I33
		Tourism	I34
Norway	Egersund	Fish farming	I35
		Mining	I36
		Tourism	I37
	Svalbard	Tourism	I38
		Tourism	I39
		Mining	I40
		Research	I41
	Varangerfjord	Fish farming	I42
Sweden	Gällivare	Municipality	I43
		Mining	I44
		Forestry	I45
		Forestry	I46

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	Gran	Indigenous	I47
		Indigenous	I48
		Indigenous	I49
		Indigenous	I50
		Indigenous	I51
	Jokkmokk	Municipality	I52
		Indigenous	I53
		Indigenous	I54
	Malå	Municipality	I55
		Local green businesses	I56
		Forestry	I57
		Forestry	I58
		Indigenous	I59
Austria	Leoben	Forestry	I60
		Forestry	I61
		Mining	I62
		Mining	I63
		Tourism	I64
		Tourism	I65
Italy	Germanasca	Tourism	I66
		Tourism and mining	I67
		Public Administration	I68

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Appendix II. Semi-structured Questionnaire

This section guides the interviewer during the whole process of the qualitative interview. It begins with the proper introduction and includes purposeful leading questions (numbered) for the main themes and issues to be asked about. The proposed sub-questions indicate important aspects under each theme and are meant as supplementary questions asked if the relevant content is not told anyway. In addition, during the interview, the interviewers need to act flexibly and add supportive questions such as: Can you expand on this? Can you give an example? Who else? What else? Why? When? How exactly? What exactly? Did this change over time? or similar.

The interviewee might already start talking about topics that are later on asked in this questionnaire. This is fine as we don't need to artificially separate the questions when they already answer the other questions. The interviewer does not have not following strictly the order of questions. It will save time, but the challenge is to keep an ear on what is already said/answered and what not. It is also possible to add additional clarifying questions following the conversation. Because of this, it is important that the interviewer knows very well the questions and this allows him/her to follow and navigate through the interview.

The semi-structure interview guideline is structured into four parts: part 1: Introduction of interviewer and interviewee; part 1: introduction of the interviewer and interviewee, part 2: actual interview; part 3: finalisation of the interview.

Part 1: Introduction of interviewer and interviewee

Introduction to interviewer

Hello, I am _____ (name) and I am currently a _____ (position) at _____(office).	*Introduce yourself and tell something about you*
We are currently conducting a study to gain a better understanding of the stakeholder's perceptions of existing and new economic activities in the Arctic;	*aim of the interview*
I am interviewing experts in fish farming, forestry, mining, indigenous culture (e.g. reindeer herding/fishing), and tourism to understand perceptions on the existing and new economic activities in the Arctic hubs. Any questions from your side? If none, I now would like to ask you some related questions and the interview is expected to last about an hour.	*Simple, not controversial explanation of the aim of the interview* *Permission to start the interview.*
I would like to remind you that any information you'll provide is confidential and that no information that you'll disclose will lead to the identification in the reports of the project, either by the researcher or by any other party. However, some comments maybe quoted anonymously as part of the publications of the project and may state your expertise or your background (e.g. fish farmer, forester, indigenous people etc.)	*Anonymity*
As I will not be able to write down everything while we talk, I kindly ask you permission to record our conversation.	*Permission for recording*

Information about the interviewee (this is kept just by the interviewer and not revealed publicly – all personal data are anonymised in further analysis)

Interviewee:	ID (for transcribing):

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Organization:	Country:
Position:	Hub:
Field of expertise:	Date:

Important Notes:

- Texts highlighted in Gray: [fish farming, forestry, mining, tourism and indigenous activities e.g. reindeer husbandry or fishing] means interviewer have to know and choose the expertise or corresponding Arctichub of the interviewee and address/use it in the entirety of the interview e.g. as a forestry expert, or as a tourism and reindeer husbandry expert etc. or What is important to you about Inari, Westfjords?
- *Italic texts* are definition of the terms that can be used by the interviewer to explain the concept

Part 2: Guiding questions for the actual interview

GUIDING QUESTIONS	ADDITIONAL QUESTIONS	REMARKS
The Arctic and its main economic activities today	-	We start with a very general question to make the interviewee at ease
1. This study focuses on the economic activities in the Arctic such as fish farming, forestry, mining, tourism and indigenous activities e.g. reindeer husbandry or fishing. Focusing on your field of expertise, how important is Arctichub to you and the community?	Or: what is important to you about the Arctichub today? (replace with actual hub name e.g. Inari) Importance also in terms of livelihood? culture? economy?	Know the expertise of the interviewee i.e. fish farming, forestry, mining, reindeer husbandry /fishing, and tourism or combination *Community is defined as the people with common interests living in a particular area broadly: the area itself (Meriam Webster, 2022)*
ISSUES AND CONFLICTS		It is important to understand what is the difference between concepts and be able to explain them to interviewees
2. Are there issues surrounding [fish farming, forestry, mining, reindeer husbandry, and tourism]? What are the most important issues regarding it?	Or: What are the current issues on [fish farming, forestry, mining, reindeer husbandry, and tourism]? Can you elaborate further on the issues…	*Issues/problems is a matter of situation considered as unwelcome or harmful and needing to be dealt with i.e. climate change, global warming.*
3. Are there conflicts between [fish farming, forestry, mining, reindeer husbandry, and tourism]? with other sectors? Are these NEW conflicts? How	Or: Who are involved in the conflict? Why does the conflict exist, in your opinion?	*Conflict is a disagreement and may refer to competition for scarce natural resources and land-*

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long have the conflict been going on?		*use/sea-use of two or more parties*
4. Trade-offs. From your point of view, what are the trade-offs between [fish farming, forestry, mining, reindeer husbandry, and tourism] and other economic activities? How are trade-offs dealt with?	Or: Make examples but not too specific or leading e.g. A use of a piece of land/or resource can compete with other uses.	*By trade-offs, we mean hindrances and drawbacks linked to the same set of activities that may be difficult to reconcile (Cook et al 2019)*
5. Synergies. How about synergies between [fish farming, forestry, mining, reindeer husbandry, and tourism] and other economic activities?	Or: Make examples but not too specific or leading e.g. A use of a piece of land/or resource can add value with other uses.	*By synergies, we mean co-benefits, occurring in alignment with the various activities of the other economic sectors (Cook et al 2019)*
ACTORS AND AGENTS		
6. -Who are the influential actors or main stakeholders in the development of economic activities in the Arctichub? -What are their goals? -How do they pursue them (e.g. to what extent they are similar or opposing to the goals of other stakeholders' groups)?	Or: What are the roles of the actors in the development of the Arctichub? Who are important in the decision making? Who have influence in processes? Or: Can you tell me more about these actors? Their goals in terms of developing the Arctichub	For each actor, ask for their specific roles and goals.
7. Which group of stakeholders support the same goals and why?	Or. Why do you think they support each other?	If possible, we want to know the existing coalition
8. Which group of stakeholders opposes them and why?	Or. Why do you think they oppose each other?	We want to see what set the coalitions apart? E.g. beliefs, identity, resource conflict…
CATALYST AND BARRIERS		
9. Catalysts. -What/who plays a supportive role in the development of the [fish farming, forestry, mining, reindeer husbandry, and tourism] in the Arctichub? -What/who enables the establishment of new economic activities and continuation of traditional ones?	Or: Who/what do you think brought about the changes in the Arctichub? What kind of changes and why?	*Catalysts are individuals or organizations that sought to help actors achieve a shared goal. They deploy different capabilities and influence/augment the other people's efforts to achieve population-level change (Hussein et al 2018). Catalyst can also mean a person or thing acting as the stimulus in bringing about or*

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		hastening a result or that causes change (Collins dictionary, 2021).
10. Barriers. -What are the barriers to the [fish farming, forestry, mining, reindeer husbandry, and tourism]? -In developing new ones and in continuing traditional ones? -What hinders/hampers the development of the economic activity?	Or: Who/what prevents the development of the Arctichub and Why?	*Barrier is a problem, rule or situation that prevents somebody from doing something, or that makes something impossible (Oxford 2021). It can also mean constraints to the achievement of a goal. Barriers can be legislations, or even dominant beliefs*
ON CULTURE AND HISTORIES		Interviewers should incite storytelling and probe as much as possible
11. Currently, Indigenous People e.g. Sami are one of the most affected by the development of economic activities in the Arctichub. - From your point of view, what role do indigenous people's culture and history play in the development and/or decision-making of economic activities in the Arctic? - Or how do culture and history constrain or enrich new economic activities?	Or: How are indigenous culture and histories affected by new economic activities? Or expansion of traditional ones?	Can be changed to local knowledge if indigenous culture is not present in the hub
12. How do the present and new economic activities affect the indigenous people's way of life? Their identity, culture and tradition, livelihoods?	Or: How do you think indigenous people cope with the present and new economic activities?	Please, highlight the question about identities and culture and incite storytelling.
13. -Do you see that these economic activities can develop side by side in the local community or indigenous people? -What kind of conditions must be in place to achieve co-existence?	Or: How do you think indigenous people or local community can develop together with these activities?	Conditions can be in any form, as long as it could pave way to the co-existence of different economic activities.
14. Is there anything else that is relevant in the context of our interview that we have not covered but would be important?	Is there anything you would like to add? Or elaborate further from your previous answers?	If there is more time, try to check their previous answers and clarify vague answers
15. Can you please name three persons with a different opinion on [fish farming, forestry,	Or can you refer some people who have a lot of stake in the topic? Or a	We do not need a lot of interviewees however, it'll be great if the interviewees

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	mining, reindeer husbandry, and tourism] that you would suggest that I interview for this study in any case?	unique viewpoint to express?	can refer somebody who have a unique viewpoint or even an opposing viewpoint to them

End of the interview and good bye

- Many thanks for your time. I am really grateful that you have agreed to this interview as I learned a lot- - If you are interested I'd be happy to share the results of our study.		Ending the interview

Please note: sometimes interviewees then start again sharing more information at the end of the interview – that is fine, please let them talk and take note

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