



Grant 869580

ArcticHubs

Deliverable title and number: D1.2 Global economic drivers in the development of different industrial hubs in the European Arctic

Work Package: WP1

Type of Deliverable:¹ R

Dissemination Level:² Public

Lead Beneficiary: University of Lapland

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869580.



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Delivery: Due date: 31.3.2022 (M20) Submission Date: 21.3.2022

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Full reference: Suopajarvi L, Nygaard V, Edvardsdóttir AG, Iversen A, Kyllönen KM, Lesser P, Lidestav G, Moioli S, Nojonen M, Ólafsdóttir R, Bergström D, Bjerke JW, Bogadóttir R, Elomina J, Engen S, Karkut J, Koivurova T, Leppiaho T, Lynge-Pedersen K, Paulsen Strugstad M, Rantala O, Rautio P, Siikavuopio S, Skum M, Tuulentie S, Tømmervik H (2022) *Global economic drivers in the development of different industrial hubs in the European Arctic*. ArcticHubs-project, University of Lapland.

Reference: (Suopajarvi, Nygaard et al. 2022).





Executive summary

This project report discusses global drivers affecting the development of key industries in the European Arctic (EA). Aquaculture is important for littoral states in the North, forestry and mining for northern Scandinavia, and tourism throughout the northern regions in the EA, and all are affected by globalization. Globalization is not a homogeneous, uniform phenomenon, but consists of various global megatrends and trends that affect all industries and local communities, even the most remote, in the EA. Global population growth, urbanization, digitalization, which connects the world 24/7, growing environmental concern worldwide, and climate change happening two or three times faster in the EA than elsewhere in the world are all examples of global megatrends and trends that are changing societies and economic activities around the world.

However, these trends are affecting different parts of the world in different ways. “Glocal” is a concept that captures the idea that global megatrends and trends have context-specific local consequences. These trends also have diverse effects on the operation of different industries. Aquaculture is expecting significant growth as the world’s population needs new food production and northern fish stocks are seen as a clean and sustainably produced food source that is welcome on the tables of environmentally friendly consumers. Forestry in the 2020s is defining itself as a bioeconomy pioneer, whose product development allows wood fibres to be used in various products, besides more traditional cellulosic and timber ones. Mining, especially of rare earth minerals, is needed for the green transition in the EU, replacing fossil fuel use with solar panels, wind turbines, and the electrification of transport. Finally, northern tourism destinations are growing in popularity among people from all over the world who long for pristine nature, outdoor experiences, and a stress-free life. In all, intensified economic activities are anticipated in all sectors in the EA.

Key features of globalization are complexity and uncertainty: weak signals, wildcards, and even “black swans” are unpredictable given current knowledge. Even a single phenomenon may have global effects, as illustrated by the COVID-19 pandemic. Climate change effects are already being seen in northern parts of the globe, but probably many more future effects are unforeseen. Actions are required from all actors. Sustainability should no longer be mere political rhetoric, but is a prerequisite for prosperous industrial development and life in the North.





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1. Introduction

Globalization is not a homogeneous, uniform phenomenon but conceals within it a variety of international processes, challenges, and opportunities that influence the different spheres of societies, communities, and individual lives.³⁰ Digitalization and worldwide communication networks have overcome temporal and spatial limitations among people around the world. Climate change is a global challenge, with impacts already seen, but also with threats probably not yet known. Even a single incident may have global effects: one infection in a food market in the Chinese city of Wuhan in December 2019 developed into the coronavirus pandemic, causing over 5.7 million deaths in its first two years around the globe.³¹

Nor is globalization an actor in itself.³² On the contrary, a basic feature of globalization is that the exercise of power is fragmented and decentralized, not held only by states but also by transnational organizations, international companies, as well as regions and local communities obliged to exert control over their own fate.³³

The Arctic is also globally connected via interlinkages and processes, although political discourses and general narratives, for example, in the literature, often describe it as a remote frontier and economic hinterland.³⁴ Seen from the 2020s perspective, especially from the viewpoint of northerners themselves, these narratives have lost their validity. The starting point of the ArcticHubs project and the argument of this project report is that the Arctic of the 2020s cannot be understood without placing it in the context of the global interlinkages and processes that shape its futures and fortunes. Global drivers take different forms in different places, (re)shaping localities and offering varied paths to the future for northern communities. Even the most remote places are now “glocal”, i.e., affected by global processes.³⁵ Climate change is just one, but the most prominent, such process. It will affect all places wherever they are in the coming years and decades.³⁶ Knowledge of global drivers and their local impacts is therefore needed for a transition to a more sustainable future, including the European Arctic (EA).

³⁰ Beck (2000); Urry (2002).

³¹ Number of deaths as of 11 February 2022 according to the World Health Organization (2022).

³² However, in public debate it is sometimes treated as an actor; for example, “globalization is challenging our national competitiveness” is often heard in political discussions. Some scholars argue that globalization will homogenize local cultures, in what is called “Macdonaldization”; see discussion in, e.g., Lash et al. (1995).

³³ Beck (2000); Urry (2002).

³⁴ See, e.g., Shields (1991); Nilsson & Lundgren (2015).

³⁵ Beck (2000); LUKE (2021)

³⁶ Giddens (2019).





This project report presents the results of work package 1 (WP1) in the Horizon 2020 Initiative's ArcticHubs project, with the overall objective of identifying and analysing global drivers affecting the development of the main industries in the Arctic. The rationale behind this WP's research is that globalization in the Arctic is not a homogeneous, uniform driving force, but consists of various international economic, political, cultural, and social forces that set the rules for development in Arctic regions. Globally operating companies, investors, political bodies, and international NGOs are all defining Arctic futures. A parallel report about geopolitical tensions and drivers was submitted in January 2022 to the European Commission. Climate change is considered a global driver per se, and its impacts on different industries are studied in more detail as a specific task in WP1 (project report forthcoming in June 2022).

Task 1.1 of ArcticHubs WP1 is to *identify the global economic drivers of the development of different industrial hubs*. In the ArcticHubs project, various key industries are called "hubs" because, even though they have certain locations and places of operation, they are created according to flows of people, goods, capital, information, organizational activities, and power relations. The locations and types of different hubs are presented in Figure 1, below. In ArcticHubs, "key industries" are aquaculture, forestry, mining, and tourism, which certainly differ in importance between our research regions. Forestry has been one of the key industries in northern Finland and Sweden since the late nineteenth century, whereas it is not important in Greenland, the Faroe Islands, or Iceland; instead, aquaculture is central in these countries, as well as in Norway. Mining is "booming" in northern Scandinavia, and tourism is an important industry in all countries involved in the ArcticHubs project.

Task 1.1 consists of the following subtasks: statistical analyses of global investments in different hubs in the North; interviews at the global, national, and regional levels about global drivers setting the frame for the development of different industries and hubs; analyses of the corporate social responsibility (CSR) reporting of the main international companies operating in different hubs; and quantitative and qualitative analyses of China in the Arctic. There is one exception in the subtasks: analyses of CSR reporting – or sustainability reporting, as it is now called – became quite an extensive effort in terms of data, analyses, and reporting, and will therefore be published as a separate project report. Also, statistical data about foreign investments in different industries in our studied locations (i.e., hubs) were unavailable, at least in open-access formats. The limitations of quantitative data are discussed in more detail in section 2.





Figure 1. Locations of all hubs in the ArcticHubs project. The industry that a hub represents is indicated by colour. Blue: aquaculture hubs, violet: tourist hubs, red: mining hubs, green: forestry hubs, yellow: indigenous hubs.³⁷

³⁷ Hubs in Russia (16 and 17) were reflected on, but are not discussed in this report due to limited data.





Our research question is: *How do the identified global drivers impact different key industries in the European Arctic?* By “global drivers” we are referring to global megatrends, trends, weak signals, and wildcards that have an impact on different hubs. Certainly, there are different kinds of driving forces, factors, and even sudden incidents affecting future developments, but in this study, we are interested only in those that have an impact on key industries in the EA. For example, the mining boom in Fennoscandia is a result of growing global demand for raw materials and European Union (EU)-level desires for self-sufficiency in mineral products. On the other hand, global driver also refers to a global trend, for example, a regional phenomenon, that is global in its nature. For example, outmigration from rural areas in the Arctic is an example of a global urbanization trend or even megatrend.

In studying global drivers and their impacts, we use a foresight approach in an attempt to identify important forces of change, as well as long-lasting processes and sudden and unexpected events. The research questions were accordingly structured to identify the following themes:

- 1) *Megatrends* are prevalent patterns as well as enduring and influential processes. Megatrends are often global in nature, have been recognized for a very long time, and are believed likely to continue in the same direction. Often-cited examples of megatrends are global population growth and urbanization, but megatrends also include issues such as technological development, technology becoming embedded in everything, and ecological sustainability crises.³⁸
- 2) *Trend* is the general pattern of a given phenomenon over a long period. It is a line of development, already seen in the past, evident today, and very likely to continue in the future. Megatrends and trends are often used as synonyms, but the difference is that megatrends are large and global patterns of change, whereas trends are more sectoral or phenomenal. Identified examples of trends are the shift to digital technology, increased environmental concern and consciousness, as well as population aging.³⁹
- 3) *Weak signals* are new, emerging signals in the present-day situation that have potential to develop into trends later. They represent first signs and innovations related to early developments, for example, in technologies, or indicate paradigm shifts and future trends. For example, concerns about global warming first emerged and gained

³⁸ Dufva (2020a, 2020b); Saritas & Smith (2011).

³⁹ Rubin (2021); Saritas & Smith (2011). In this project report, we are not going to discuss theoretical differences or definitions of megatrends and trends more deeply.





publicity in the 1980s; two decades later, “climate change” is part of everyone’s vocabulary.⁴⁰

- 4) *Wildcards* are events that are not expected to happen, but if they do, may have considerable impacts.⁴¹ The COVID-19 pandemic emerging in early 2020 is an example par excellence, as were the September 11 attacks in 2001, which widened the gap between the Western and Islamic worlds with all the associated consequences. Furthermore, the global financial crisis of 2008 may be seen as a wildcard.⁴²

For the purposes of this study, we interviewed 60 informants and asked them to identify megatrends/trends, weak signals, and possible wildcards affecting the future of aquaculture, forestry, mining, and tourism in EA.

1.1. The ArcticHubs project for sustainable solutions in the European Arctic

As a multi-disciplinary research group, and also as northern dwellers, we are interested in the future of the European North, not least because of climate change and its impacts. The chosen approach in the ArcticHubs project has been to analyse global drivers and their local consequences, and to strive to understand alternative pathways to the future for Arctic communities. In the following WPs of the project (i.e., WP2 and WP3), local impacts will be studied quantitatively and qualitatively from the natural and social science perspectives. At the end of the project, responses and solutions for local sustainable development will be defined and developed collaboratively (i.e., WP4 and WP5). Figure 2 below illustrates the workplan of the whole project.

⁴⁰ Saritas & Smith (2011); Arbo et al. (2013).

⁴¹ Arbo et al. (2013, p. 3).

⁴² Saritas & Smith (2011).



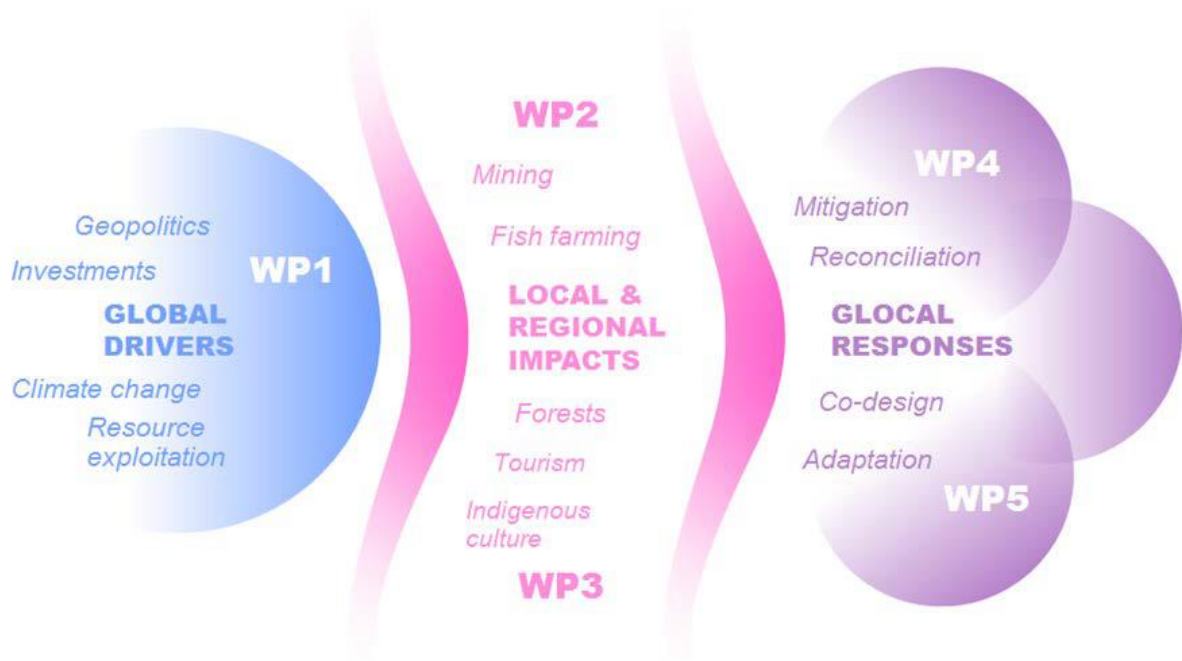


Figure 2. ArcticHubs maps and analyses the main global drivers that cause local and regional impacts on various livelihoods and on local communities and cultures in the European Arctic. ArcticHubs aims to provide global and local – “glocal” – solutions for mitigating and adapting to the local impacts caused by global actors.⁴³

⁴³ LUKE (2021).





2. Data and method

The material for this project report consists of four types of data: (1) future-oriented policy papers at the national or EU levels; (2) national industry-specific strategies and industry-relevant EU strategies; (3) interviews with informants, such as political representatives and authorities, specialists in one of the four target industries (i.e., aquaculture, forestry, mining, and tourism), and stakeholders having a special interest in the Arctic at the national and international levels; and (4) statistical analyses of foreign investments. Full lists of the policy papers, industry-specific strategies, and interviewed organizational representatives appear in Annexes 1 and 2. In total, the data consist of 59 policy papers and 60 interviews.

Interviews were conducted in all studied industries, in all involved countries as well as at the EU level, and, if possible, in the native languages. Also, policy makers (including NGOs) with a general interest in EA-relevant issues were included in the study. Before gathering any data, the research group discussed the processing of the material. It was decided that only the relevant organizations and interview dates would be recorded in the informant list. Also, full transcripts of the interviews were not loaded on the “Tiimeri” platform, in order to ensure informant anonymity. Hence, only the researcher conducting an interview knew who the informant was, and no names in any form were published in the project’s digital platform.

The joint interview guide was planned in meetings of the researchers in autumn 2020, and the interviews were conducted in 2021. Due to the pandemic, most of the interviews were conducted online. Informants were first asked about COVID-19 and its impacts on the industry in question; they were then asked to identify megatrends, trends, weak signals, and wildcards affecting the industry or EA as such; and, finally, sustainability and its meanings were also discussed. If China was not mentioned in the interview, its meaning and presence were also asked about. The special interest in China was because, in 2018, during the design and writing phases of the project in the late 2010s, China published its Arctic policy paper and its role in the EA’s economy and politics was projected to grow⁴⁴ (the interview guide is presented in Annex 3).

The researchers who conducted the interviews summarized the results according to the aforementioned themes, and shared them with the research group via the common platform. After all the data were available, research groups for different industries were formed based on their interest fields and expertise. The data were discussed and analysed by the research groups for the different industries, after which the groups gave their input for the report.

⁴⁴ See, e.g., Koivurova & Kopra (2020).





The method used for the policy paper and interview analysis was qualitative thematic analysis (TA),⁴⁵ because the data corpus was large, comprising hundreds of pages. As forecasting was our research approach, we identified and thematized megatrends, trends, weak signals, and wildcards. Sustainability and its three pillars, as well as themes related to indigenous people and COVID-19 as a world challenge in the early 2020s, were addressed in the summaries of transcribed interviews. The TA of the data in the project report was initially theory driven, meaning that a forecasting approach was applied, as it was the approach specified in the project application. After reading the contents of the data in light of the different themes, however, we applied an inductive approach in the TA in which the analysis proceeded in terms of the data.

We experienced some challenges related to qualitative data collection and processing. First, not all the originally invited informants responded to our invitations. Second, as the summaries of interviews were published only after receiving approval from the informants, some of the materials could not be used. Reasons for not getting approval varied: some informants could not be reached after the summary had been made, and some perhaps thought that they had already given their approval when agreed to an interview. In such cases, the summaries were not included in the data and study. Third, Chinese informants were hesitant to give interviews, and informants from private-sector organizations working with China were clearly reluctant to have their interviews recorded, transcribed, and summarized on the project's digital platform. Therefore, the researcher responsible for China conducted ten interviews and added the results of the Chinese data directly to the relevant sections of the project report.

There were also problems related to the compilation of statistical data to assess global investments in different hubs in the North (subtask 1.1.1). The purpose of the subtask was to establish a baseline analysis covering investments in the different industries and hubs, using existing documents and recent regional statistics. There were two main problems. First, publicly available foreign direct investment (FDI) statistics exist only at the country level and not at the regional level. Given the specific Arctic focus of the project, national data cannot provide information as to how local industries and hubs are affected and were thus excluded. The second problem was that, even at the country level, FDI statistics are neither broken down by industry nor is there any standardization of the type of information collected, so there is no way to make meaningful comparisons of the effects of global drivers on localities. The statistics used were compiled from multiple online sources and, to the extent possible,

⁴⁵ Braun and Clarke (2006); Nowell et al. (2017).





provide information on inward FDI, specifically foreign investments in the four industries targeted in the ArcticHubs project. The online sources include official statistical reports at the country level, reports from research institutions, and newspaper as well as professional journal articles.

In December 2021 and February 2022, the lead editors compiled texts; after copyediting and proofreading, the research groups had a second opportunity to check their parts of the text in March 2022. The project report is thus very much based on the collaborative work of scientists conducting studies in their areas of expertise in different EA states.

The project report is organized as follows: In the next section, we present three general themes relevant to all target industries: intensification of economic activity, climate change, and sustainability. The impacts of COVID-19 are discussed towards the end of section 3. In sections 4–7, megatrends, trends, and existing development paths relevant to the different industries are described, starting with illustrative quotations from strategy papers on each industry and statistics about foreign investments. In section 8, weak signals, wildcards, and potentials for change are briefly considered, and the report ends with a short summary.





3. Main global drivers of the economic development of the European Arctic

The ongoing revolution in information and communication technologies, globally networked trade and financial markets, polycentric world politics, and global concern for the environment (particularly regarding climate change) are all examples of global processes that also affect the EA.⁴⁶ Impacts of global drivers differ from industry to industry and from location to location, but according to our interviews, certain general themes are relevant to all studied industries. First, growth is expected in all four industries, i.e., aquaculture, forestry, mining, and tourism. Second, climate change is a complex phenomenon that appears above all to threaten northern nature and thus also northern communities; paradoxically, it may also strengthen some industries, as described in our interviews and in the following text. Third, sustainability is a prerequisite for successful business development in the early 2020s and especially in the future, due to pressure from consumers, financiers, and policy makers. The COVID-19 pandemic is a global challenge, and its impacts on different industries are discussed at the end of the chapter.

3.1. Intensification of economic activity

One general theme throughout the interviews in all studied industries was that global population growth and rising living standards are driving economic activity in many parts of the world. This includes the need for increased food production, more construction and technological development, more energy production, and furthermore, more people with the financial means to travel long distances to experience other cultures and landscapes. One general theme repeated in the interviews is that the EA is rich in nature and natural resources. Industries based on natural resources, such as mining, forestry, and aquaculture, are location dependent as resources can only be extracted where they are located. Also, northern nature and landscapes are unique assets for tourism in the Arctic. For all four industries, growth in economic activity in the EA is expected.

The economic driving force for aquaculture is increased demand for tasty and healthy food for a growing world population – in Europe, the Americas, and for the growing Asian middle class. Consumers have also become more environmentally aware and prefer low-carbon-footprint food production in clean waters. Besides customers' growing demand for fish products, traditional fisheries are unlikely to grow as fish stocks are a limited resource, just as

⁴⁶ Beck (2000).





land is for agriculture. Aquaculture in the EA is now based mainly in coastal areas, where the industry must compete for sea space with both established interests, such as transportation and coastal fisheries, and new industries, such as tourism. The growth potential might have to be realized offshore in the future, in closed-containment production at sea or on land.

In the case of forestry, the transition from a fossil-based to bio-based economy, i.e., the bioeconomy transformation, constitutes both an opportunity and a challenge. In mainstream forestry (i.e., timber production), automation and digitalization offer new opportunities for cost-efficient (lean) production. Increased demand for timber entails the intensification of silviculture and harvesting operations in our study areas in northern Finland and Sweden. Also, more uses of wood-based products are being developed, for example, in the textile industry. Therefore, in all respects, the transition from fossil-based to bio-based products entails the intensified use of forests, and the major challenge is how to exploit forest resources in a sustainable manner.⁴⁷

In mining, besides the mineral potential of northern parts of Europe, especially in Northern Scandinavia, the driving forces are climate change and the need to shift towards carbon-neutral societies, which will require, for example, the electrification of transport and renewable energy production by wind turbines and solar panels. Minerals are also needed for the growing technology industries. The growth of the middle class, especially in Asia, is related to increasing power and technology consumption. Increased urbanization also requires metals for the construction of buildings and infrastructure.

The tourism industry is growing globally and, despite the unexpected and severe interruption related to the COVID-19 pandemic, is predicted to continue to grow in the future. The Arctic region is experiencing tourism industry expansion too, for example, when it comes to cruises and increasing numbers of travellers from Asia (particularly China). Simultaneously, as reported by most interviewees, mass tourism is undesirable in Arctic destinations, since the major assets making them attractive to tourists are their remoteness, quietness, and wildness, and their value could drop if travellers find themselves trapped in crowds. As well, Arctic tourism is mostly nature based, so it relies on well-preserved natural environments that could be damaged by uncontrolled flows of visitors.⁴⁸ The intensification of tourism activities should therefore follow other paths, such as extended seasonality, the development of year-

⁴⁷ Government Offices of Sweden (2018); Widmark et al. (2020).

⁴⁸ Ólafsdóttir et al. (2020).





round tourism, and high-quality and luxury services, as noted by the interviewed actors in the field.⁴⁹

3.2. Climate change with predicted and unpredicted impacts

Climate change does not “fit” a single forecasting conceptualization, but is a complex phenomenon that permeates life and its possibilities in the Arctic. The EA is experiencing the impacts of climate change before other parts of Europe and it is estimated that the Arctic is warming up two or three times faster than other parts of the globe.⁵⁰ This is a warning of what can be expected in the future, and this concern was often repeated in the interviews.

The impacts of climate change are multifaceted, a fact described in Finland’s 2021 Arctic strategy as the “paradox of climate change”:⁵¹ Climate change is recognized as a force destructive to Arctic nature and to local people and their livelihoods, yet it may also be a force enabling industrial and economic growth, the opening of the Northern sea route being an often-cited example.

The aquaculture industry, for example, recognizes that climate change could benefit the industry, as previously inaccessible fish transport routes from the EA to Asian markets might increase in importance in the near future. These Arctic routes could shorten distances and therefore transportation times to Asian markets. Simultaneously, the industry informants discussed the fact that warmer seas, caused by climate change, might affect the industry. Areas on the west coast of Norway and on the Faroe Islands may become less suited for aquaculture, due to high temperatures in summer, while Northern Norway and Iceland might become more attractive, due to both more suitable temperatures and lower levels of sea lice.

Climate change affects forests and forestry in two different ways. On one hand, it is an aggravating circumstance and a threat to current forest management practices, regarding both the need for frozen ground for harvesting operations on some soils, and forests’ ability to withstand extreme weather conditions. In these respects, climate change becomes a driver of adaptation action, searching for more robust and resistant tree species as well as early-warning technologies for detecting pest and insect outbreaks. On the other hand, the entire

⁴⁹ On the other hand, luxury tourism with high-end travel quality and facilities is not necessarily environmentally sustainable; see, e.g., Lynch et al. (2019).

⁵⁰ IPCC (2021).

⁵¹ Finnish Government (2021, p. 48).





forestry sector is primarily considered a mitigator of climate change, through its ability to absorb and store carbon dioxide in growing trees and long-life-cycle wood products, and by replacing petroleum-based products.⁵² According to Sweden’s strategy for the Arctic region,⁵³ “effective, active and sustainable forestry plays a crucial role in enabling Sweden and Europe to reach climate and energy objectives since forests with good growth bind large quantities of carbon dioxide”.

In the mining industry, climate change is seen as a global driver of the more intense mining of critical minerals and rare earth elements in the EA. This is connected to the European Green Deal and particularly to the need to develop batteries for private electric cars and other electrical means of transport that mainly use components currently produced in China, for example. Minerals are also needed for wind turbines, solar panels, and other alternative energy sources needed to develop carbon-neutral societies. This is important in EU policy on the Green Deal and for nation states’ fulfilment of Paris Agreement commitments to cut carbon emissions.

Climate change is an ambiguous driver when it comes to impacts on the tourism sector. On one hand, habitat and species loss, a higher probability of extreme events, more unstable weather conditions, and associated risks such as mudslides and insecure ice greatly challenge the Arctic nature-based tourism industry, especially winter tourism. On the other hand, new opportunities are arising as a consequence of a warmer climate, for example, a longer summer tourism season and easier access to previously isolated areas. In any case, many tourism interviewees agree that adaptation measures are needed.

3.3. Sustainability required of all industries

Sustainable development has been present in political rhetoric since the late 1980s, but in the 2020s, the pressure for sustainable practices and products is also coming from the end-users, customers, and financers of different industries as well as from intergovernmental and nongovernmental organizations. This was the prevailing message and main theme brought up throughout the interviews. When it comes to defining what sustainability is, however, the answer is dependent on the respondent. In the academic literature, the concept is also discussed and disputed, but as suggested by Steve Connelly,⁵⁴ sustainability should in any

⁵² Government Offices of Sweden (2018); Widmark et al. (2020).

⁵³ Government Offices of Sweden (2020).

⁵⁴ Connelly (2007).





case be an ideal and a goal worth striving for. Usually, sustainability is divided into three pillars, i.e., economic, environmental, and socio-cultural sustainability, but even when applying this division, sustainability remains both context specific and ontologically open.⁵⁵ This is even more true of indicators developed for sustainability, the most important being the United Nations sustainable development indicators. Although probably relevant to many developing countries, criteria such as sanitation facilities, the nutritional status of children, and the under-five mortality rate are today not relevant to the EA, where they were fulfilled a long time ago.⁵⁶ The political dimension of sustainability is evident in the EU's contested⁵⁷ taxonomy that enables investors to reorient investments towards more sustainable technologies and businesses. These measures will be instrumental in making Europe climate neutral by 2050.⁵⁸ The EU Taxonomy Compass is intended to make the contents of the EU Taxonomy easier to access for a variety of users within different industries. It enables users to check what activities are included in the EU Taxonomy (i.e., taxonomy-eligible activities), to what objectives they substantially contribute, and what criteria they must meet.⁵⁹ Hence, how to define criteria is a matter of political debate and definition in decision making.

In aquaculture, the dominant perceptions of sustainability are linked to the environmental pillar of the sustainability concept. The informants stated that fish are cultivated in the most environmentally friendly way and that sustainability criteria are being met. Indexes measuring the sustainability of food production, such as Farm Animal Investment Risk & Return (FAIRR), show aquaculture production to have a small carbon footprint, with aquaculture companies ranking first, second, and fourth according to this index. Still the industry has unresolved sustainability issues, such as controlling waste (e.g., faeces and feed), parasites, escapes, and disease. Economic sustainability is defined by profitability and growth, whereas social sustainability concerns job opportunities and population growth, especially in rural communities in coastal areas of Norway, Iceland, the Faroe Islands, and Greenland.

In forestry, since the adoption of the Forest Principles at the 1992 Earth Summit,⁶⁰ the principles of sustainable development have been incorporated in the concept of Sustainable Forest Management and further expressed in national legislation as well as in forest certification schemes, strategies, and policies at the company and organizational levels. However, the interpretations of the concept and associated implementations differ, as do

⁵⁵ For a more detailed discussion, see Purvis et al. (2019).

⁵⁶ United Nations (2007).

⁵⁷ Muilu (2021).

⁵⁸ European Commission (2021c).

⁵⁹ European Commission (2021d).

⁶⁰ United Nations (2012).





perceptions of the extent to which forestry has met the principles and goals of sustainability. A main issue evoking opposing views is whether forestry and environmental sustainability really are compatible, or whether parts of forest lands should be left untouched.

In mining, sustainability is a controversial concept, although invoked in annual reporting by mining companies operating in the EA. For example, involvement in host communities in order to earn local acceptance, often called the Social License to Operate (SLO), is integral to industrial practices in the early 2020s but is not always accepted as genuine. Some informants outside the industry argue that mining can never be truly sustainable, as it has large, negative, and irreversible environmental impacts and changes the landscape, although it can be a more responsible industry. The industry itself tends to focus on economic sustainability and the ability to provide work for local people, the ripple effects for local subcontractors, and building community capacity. The mining industry is also a contributor to national wealth through taxes.

The tourism industry in the Arctic has many and sometimes ambiguous relationships with sustainability discourses and regulations, in relation to all three pillars. From an environmental point of view, tourism still contributes significantly to global emissions, especially from air travel and cruise ships.⁶¹ From a social sustainability perspective, cultural tourism presenting indigenous ways of life can offer new income opportunities to local communities; simultaneously, if not properly managed, it may create land-use conflict and, through excessive arrivals, increase resource exploitation without providing proportionate local benefits.⁶² Furthermore, Arctic tourism mostly targets quite specific consumer niches characterized by high income, high education, and a love of nature. Consequently, the “ideal” visitor that most interviewees referred to is environmentally and culturally aware and demands that the industry be accountable in its efforts for sustainability. This creates an opportunity for the industry to increase service value through the adoption of sustainability labels and certifications. On the other hand, this same consumer awareness also makes the tourism business vulnerable to different forms of boycott, for example, the avoidance of air travel, on which many Arctic destinations are dependent, or to opposition to local practices such as whaling.

⁶¹ For example, international tourists visiting Norway were responsible for 3273 kt CO₂ in 2018, equivalent to 7.2% of the Norwegian national CO₂ emissions (Grythe & Lopez-Aparicio, 2021).

⁶² See, e.g. CBI (2021), also e.g. Saari et al. (2020).





3.4. COVID-19: Various industries in pandemics

The COVID-19 pandemic illustrates how even a single incidental case may eventually have effects around the world. The starting point of the pandemic has been located in the Chinese city of Wuhan in December 2019, and in the following months the epidemic spread around the world. In Finland, for example, the first case diagnosed was in a Chinese tourist travelling to Finnish Lapland in January 2020, representing the ninth COVID-19 case in the EU by that time.⁶³ At the beginning of 2022, the pandemic is still present, and the virus continues to mutate. When discussing COVID-19 with informants, most of them argued that it was predictable that there would be global pandemics, but that when, how, and with what symptoms and impacts could not be foreseen. Therefore, preparedness for the pandemics was deemed low.

Regarding how COVID-19 has affected the aquaculture sector, the informants all agreed that the pandemic has affected the industry, as restaurant and food-service markets closed temporarily. The industry adapted well, though, producing more for retail markets. Products also changed somewhat, with a greater emphasis on processed and more consumer-ready products. For instance, Bakkafrost in the Faroe Islands increased their volume of value-added products from 30% to 50% of production.⁶⁴ Production was upheld, and even increased in Norway, during the COVID-19 pandemic, although profitability suffered⁶⁵ from lower prices and more expensive (air) transportation. The market for salmon products is quite flexible, and seems to be among those most resistant to shocks such as COVID-19.

The pandemic has affected forestry only slightly. According to interviewees, the demand for forest products has increased rather than decreased – for example, demand for packaging products has increased and a construction boom has increased demand for roundwood. Forestry informants reported that the production chains, including timber procurement, have been operating almost normally throughout the pandemic, and that entry restrictions for foreign seasonal workers in afforestation and pre-commercial thinning have been dealt with and resolved at the national level. Yet the most significant impact is the growing demand for sawn timber because people have spent much more time at home, in turn increasing interest in renovating existing housing and constructing new detached houses and cottages. As the increased demand was unexpected, it resulted in an overall increase in prices and in retailers

⁶³ Kajander (2020).

⁶⁴ Bakkafrost (2020).

⁶⁵ Fiskeridirektoratet (2022).





running out of construction lumber. On the other hand, there has also been increased use of forests for recreation purposes, as people are visiting forests and national parks for their wellbeing, an impact seen as positive by some informants.

Informants from the mining sector commented that mining operations in the EA were only slightly affected by COVID-19. Existing mines kept producing as normal, and some even produced more as market demand and prices increased during the pandemic. However, exploration activity and some mines under planning or in the start-up process experienced delays due to travel restrictions affecting movements of key personnel, machinery, and technology. Some producing mines had to halt deliveries to processing industries at the receiver end due to temporary production halts further along the supply chain. Few companies experienced long-term shutdowns due to infected workers, as the industry introduced strict hygienic precautions and promoted vaccination. Mines dependent on fly-in, fly-out workers are more vulnerable to infections and travel restriction than those with local workforces.

An almost complete ban on travelling followed by rapidly changing restrictions on mobility have had a severe impact on the tourism industry. On top of the obvious absence of visitors, a major negative consequence has been workforce scarcity, since the industry often relies on seasonal workers from elsewhere. Simultaneously, the visitor gap has been at least partially filled by domestic tourists. Furthermore, Arctic tourism is mostly nature and outdoor activity based, allowing for easier safety measures and even a potential competitive advantage compared with other destinations: some localities, such as the Faroe Islands, have developed specific certifications to market themselves as “safe to visit”.

The next sections discuss in more detail the industry-specific impacts of global megatrends and trends. Each section starts with a quotation from one industry-specific national strategy that illustrates the current situation or describes future opportunities. After that follow statistics about foreign investments or ownership structures that describe the domestic–foreign nexus in the industry in question. Finally, in every industry, four to six main themes are raised for discussion.





4. Aquaculture: Growing production within limited space?

The aquaculture industry has in later years been the largest contributor to value creation in the seafood industry, mainly due to high prices on salmon. The Norwegian salmon and trout farming industry comprises about 100 companies... . The industry consists of many large and small businesses distributed all over the coast, where some large players have also established operations in other countries. Many players are fully integrated and control the entire value chain from production to sale.⁶⁶

4.1. Foreign direct investment and ownership in aquaculture

Fisheries, aquaculture, and related industries are the largest components of the Faroese economy. Faroese fisheries and aquaculture are the basis for the production and export of high-quality Faroese fish products, representing 95% of merchandise exports and 20% of total Faroese GDP as well as employing 15% of the workforce. A legal limitation in the Aquaculture Act states that each foreign investor can only own up to 20% of an aquaculture company. Faroese authorities have also imposed the restriction that no company can control more than 50% of the archipelago's farming licences.⁶⁷

Fisheries has been the largest industry in Iceland, exporting around 600 thousand tonnes of fishery products, with a value of ISK 270 billion in 2020. That is ISK 10 billion less than in 2019. At the same time total fish farming production in Iceland is increasing, in 2021 it was 46,000 tonnes, 90% exported, with a value of ISK 36 billion. The main species produced is Atlantic salmon. Salmon farming is a rapidly growing industry in Iceland with 34,000 tonnes produced in 2020, and 25 tonnes in 2019. Arctic char is another important species, with 5.5 tonnes being produced in 2021 and 5.4 tonnes in 2020 which is around 60% of the total world production.⁶⁸

The Norwegian salmon and trout farming industry comprises about 160 producers of salmon⁶⁹ and hundreds of suppliers of equipment and services. The industry consists of many small businesses distributed all over the coast, with a few large players that also have operations established in other countries. Many players are fully integrated, controlling the entire value

⁶⁶ Norwegian Ministry of Trade, Industry and Fisheries & Norwegian Ministry of Petroleum and Energy (2017, p. 20).

⁶⁷ Berge (2020a); Solås et al. (2020).

⁶⁸ Radarinn (2022).

⁶⁹ Fiskeridirektoratet (2022).





chain from egg and fry production to sales. Aquaculture is one of the biggest export industries in Norway, its value increasing each year. In 2021, the total volume produced was around 1.5 million tonnes, most of which was exported. About 40% of production occurs in Northern Norway. Salmon is the main aquaculture species, accounting for 95% of the production volume, followed by trout. There is also some farming of whitefish (e.g., cod) and shellfish, but these are insignificant compared with salmon in terms of volume and value.⁷⁰

The Faroese aquaculture industry, which began in the 1960s, is well consolidated with only three fish-farming companies – Bakkafrøst, Hiddenfjord, and Marine Harvest Faroes (MOWI ASA) – all of which are primarily or wholly owned by Scandinavians.⁷¹ Bakkafrøst (listed on the Oslo Stock Exchange with a market capitalization of USD 3.7 billion) is the country’s most important company and the seventh largest fish farming company in the world.⁷² MOWI ASA is one of the largest seafood companies in the world and the world’s largest producer of Atlantic salmon. Like Bakkafrøst, it is also listed on the Oslo Stock Exchange. The Norwegian Pension Fund is the largest shareholder in Bakkafrøst, whereas Hiddenfjord is 100% Faroese. The ownership of MOWI ASA is very international, with a range of institutional owners and a few strong industrial owners, but its key people are Norwegians and its headquarters are in Bergen.

Salmon farming in Iceland has faced several challenges. Large investments made in salmon farming in the 1980s ended in bankruptcy. In the early 2010s, entrepreneurs restarted salmon production. Salmon farming is a capital-intensive business, occurring mainly at sea-farming facilities in the Westfjords and Eastfjords. Large Norwegian aquaculture companies have invested in the Icelandic industry. The largest producer of farmed salmon in Iceland, located in the Westfjords, is Arnarlax ehf., followed by ArticFish ehf., also based in the Westfjords Region. Icelandic Salmon AS is the holding company of Arnarlax and is listed on the Oslo Stock Exchange. SalMar AS owns 51% of Icelandic Salmon AS, which in turn owns 100% of Arnarlax ehf.⁷³ Norway Royal Salmon ASA is said to own 51.28% of the shares of Arctic Fish ehf. However, the shareholding structure of these two companies recently changed when

⁷⁰ Arctic Council (2021).

⁷¹ Faroeislands.fo (2022).

⁷² SalmonBusiness (2020).

⁷³ Iceland Monitor (2022)





Norway Royal Salmon ASA bought all the shares of SalMar; these two companies are likely to merge.

In Norway, family-controlled companies own 49% of the total production capacity. Many of these family-controlled fish farms are partially owned by external investors. Adjusting for this external share, we find that the family owners control 38% of total production capacity.⁷⁴ MOWI is still the undisputed largest salmon farmer in the world, producing 422,400 tonnes of salmon annually – over double the volume of the second largest, Leroy Seafood Group. With the third and fourth largest, SalMar and Cermaq, the top four consist solely of Norwegian-domiciled companies. Although Cermaq is Japanese owned by the Mitsubishi conglomerate, the company still has its headquarters in Norway.

4.2. Large internationally operating companies increase aquaculture production in Northern Europe

Aquaculture is an extremely profitable industry, and the informants claimed that aquaculture production will continue to grow, but mostly in northern waters. There are limits to the growth of traditional fisheries and of meat production on land, because wild fish stocks and farmland are limited resources. So there is demand for another type of food resource, but the informants all agreed that the growth of this resource must be guided by strict environmental standards and that the needs of the involved communities must be taken into account – social acceptance is needed for the industry to thrive. Several main growth trends were mentioned in the interviews: traditional open-sea-cage production is growing, new offshore farming technologies are being developed and applied, and closed inshore facilities and land-based farming are expanding. Informants stressed that it will be harder to access new areas in the coastal zone, and that the industry will experience a scarcity of suitable areas in the future. Ownership of aquaculture companies is also changing. Initially, the companies were mostly small, local, and family owned. The current trend is for aquaculture companies in Northern Europe to be owned by fewer companies, with the 10 largest companies in Norway now accounting for 65% of production, and only three companies accounting for all Faroese production. More distant or foreign ownership means that less of the profit created will benefit the local communities where these companies operate. Some informants also mentioned the capacity of these global companies to have strong internal research milieus to

⁷⁴ Berge (2020b); Nyrud & Mikkelsen (2021).





improve production, profitability, fish health, and digitalization. In accordance with this change in ownership, the interviewees raised expectations about population growth and increased job opportunities in the coastal communities where aquaculture is operating. However, some informants feared that this shift from family-owned businesses to big global companies, which focus more on economic sustainability than on social or cultural sustainability, might threaten the viability and resilience of coastal communities.

4.3. Changes in consumer behaviour drive the aquaculture industry

The strategic policy plans of the Faroe Islands, Iceland, and Norway estimate that aquaculture production will increase due to a growing demand for seafood globally, and demand for healthy and sustainable food. Informants stated that customers are becoming more environmentally aware and are demanding high-quality products. As people are starting to eat less meat, they are favouring cultivated fish, especially due to the small carbon footprint of the production. An example raised in the interviews illustrated how one of the world's biggest meat companies, based in Brazil, has invested in the second largest aquaculture company in Australia. The market is sensing that consumer behaviour is changing, moving away from meat to cultivated fish. On the other hand, changes in markets due to changes in people's eating habits and lifestyles, such as the growing number of middle-class customers who tend to prefer vegetarian food, are creating uncertainties regarding the consumption of fish products.

4.4. Environmental and social concerns to be addressed for sustainable aquaculture

The salmonid aquaculture industry in Northern Europe is experiencing significant challenges relating to environmental impacts, fish health, escape from pens, and sea lice. These problems may limit the industry's ability to grow.

Farm Animal Investment Risk & Return (FAIRR), an association based in the UK, assesses the largest animal protein producers in terms of critical environmental, social, and governance (ESG) issues. Their assessment of the biggest food companies in the world from the ESG perspective showed that three out of the four top companies are aquaculture companies, so FAIRR's assessment is important for the industry, as one informant noted. Consumer demand for sustainable production will steer how the industry adapts, and the green energy transition





is one thing the industry is working on, along with minimizing parasites during production. All this helps when marketing the production as sustainable. Governmental regulations are also important, like the Norwegian traffic light system in which increased production quantities are only allowed in regions with minimal sea lice problems. Such policies will direct growth towards areas with lower disease risks.

Biodiversity and pollution are also issues the aquaculture sector must take seriously and address when needed. In relation to this, fish feed production is moving in a more environmentally sound direction. The extensive use of terrestrial ingredients has decreased the content of omega-3 LC-PUFA in Atlantic salmon, compromising the nutritional value of the final product so that more than double the fish portion size is now required to satisfy recommended EPA + DHA intake levels. There is also a desire to utilize the whole fish to contribute to the circular economy and at the same time increase profitability. This move can be traced to the customer demand for fish produced in a sustainable way, and fish feed is a big issue in that context, as salmon farming relies on soy from Brazil.⁷⁵

Some research projects are investigating the use of waste heat and CO₂ from heavy industry in the cultivation of microalgae to increase the content of omega-3 LC-PUFA in Atlantic salmon feed.⁷⁶

All informants agreed that increased production must be in harmony with the environment and communities, as social acceptance is needed for the industry to thrive. The examined strategic policy documents discuss the development and coexistence of different industries in the Arctic. If aquaculture moves offshore, there might be conflicts with offshore fisheries, the oil and gas industry, offshore wind farms, and marine traffic over how to use the marine space, so adaptive management is needed in the EA.

4.4. Integration and diversity in the aquaculture industry

Policy strategies and informants stated that carbon emissions, rising Arctic sea temperatures, and ocean acidification are wildcards that could affect the aquaculture environment. However, there is a strong belief among informants that those challenges will be met by new technology and knowledge, which is constantly developing.

⁷⁵ The Norwegian aquaculture industry now has turned to buying only soy certified as not contributing to deforestation, which in principle should cut the CO₂ emissions attributed to feed production.

⁷⁶ Eilertsen et al. (2021).





Relatedly, the informants stated that this situation could lead to the integration of different forms of aquaculture production. Shellfish and seaweed aquaculture could well become part of salmon aquaculture production. This means that simultaneously cultivating different species in the same location could benefit the industry as sea conditions change. Shellfish, such as mussels, could filter waste from salmon cultivation, and simultaneously nourish seaweed. Aquaculture that seeks to be circular in its production process, producing at multiple trophic levels (e.g., fish, mussels, and seaweed), rather than just a single trophic level (e.g., salmon), can be regarded as more sustainable.





5. Forestry: More of everything?

In the future, successful large companies will provide a platform for a growing number of SMEs in forest-based business and activities. This operating environment offers good opportunities for growth-oriented and competence-centred SMEs to develop their bioeconomy and circular economy business. Large actors together with SMEs will form new industrial production and services networks where wood and production side streams will be processed into end products for various uses and where the value added and resource efficiency of production will increase.⁷⁷

5.1. Foreign direct investment and ownership in forestry

The forest sector in Finland represented 4.3% of the total value of the national economy in 2019, a proportion that is increasing yearly.⁷⁸ Individuals own about 60% of Finland's productive forest land, the government owns 26%, stockholders 9%, and other organizations the remaining 5%. The Finnish forest industry is dominated by three private domestic companies: UPM, Stora Enso, and the Metsä Group.⁷⁹ In the early 2020s, there were four large pulp and bio-product projects in the forest sector and all of them had received Chinese FDI: Boreal Bioref in Kemijärvi (EUR 900 million), Finnpulp in Kuopio (EUR 1600 million), KaiCell Fibers in Paltamo (EUR 900 million), and the Kaidi biorefinery in Kemi (EUR 900 million).⁸⁰ Chinese investors later withdrew from the Boreal Bioref and Kaidi projects, both situated in Finnish Lapland.

In Sweden, the use of northern forest resources transformed the country from an agrarian society into a rapidly developing industrialized nation. As a result of intense exploitation and the absence of reforestation measures, large areas of forest were depleted by the end of the nineteenth century. By the late twentieth century, however, large harvests were again possible. Growing stock has increased by 85% since the first National Forest Inventory in 1923. This growth has been due to a combination of factors: policy, forest science, and the creation of family forest associations based on existing land tenure rights with the aim of strengthening the market power of small forest landholders.

The ownership structure of Swedish forest land, combining family enterprises and widespread corporate ownership, with most of the state-owned forest being managed commercially, contrasts sharply with the ownership structure of forests in the rest of continental Europe. The state company Sveaskog owns 14% of all forest land. There are some 50 pulp and paper

⁷⁷ Ministry of Agriculture and Forestry of Finland (2019).

⁷⁸ Peltola et al. (2020).

⁷⁹ Miettinen (2020, p. 28).

⁸⁰ Ibid. (2020, p. 29).





manufacturers owned by 23 corporate groups, and 115 sawmills owned by 60 groups/companies in Sweden. All of these companies are Swedish owned. The six largest mills account for close to 60% of the total capacity. Södra Cell (the second largest in the world after International Paper) is the largest market pulp producer with three mills: Värö, Mörrum, and Mönsterås. Södra is Sweden's largest private forest owner association with 53,000 members. The other big players are: Stora Enso (Finnish–Swedish), with the Skutskär and Norrsundet mills; Rottneros, with four mills producing ground wood, sulphate, sulphite, and CTMP pulp; and finally Korsnäs with the Gävle mill. Stora Enso and Rottneros are listed on the stock exchange, and Korsnäs is owned by Kinnevik, one of the biggest forest owners in Sweden.⁸¹ Arctic Paper, a Swedish company, is the majority shareholder of Rottneros.⁸² Kinnevik is an interesting model as the general public, who are usually individual investors, hold a 43% stake in it; Verdere S.A.R.L. (a Luxembourg company) is the largest shareholder.⁸³

5.2. Making the most of a limited resource

Growing interest in climate-friendly products worldwide is driving the increased demand for forest-based materials, as does the growth of online shopping worldwide, which is boosting the demand for packaging materials made from wood. Considering overall sustainability, the forest ecosystem of the EA can meet only a fraction of the increased global demand for forest-based raw material. Although forest production can to some extent be increased through more intensive management (e.g., speeding up stand establishment, selecting more productive species, and reducing rotation periods), the value-creating potential instead lies in more advanced utilization of the timber, i.e., the innovative refinement of forest raw materials, including residues and side streams used for climate-smart alternatives. According to interviewees in the industry, structural, fibre, and molecular components from trees have great potential to replace fossil-based chemicals, energy, and components in, for example, concrete, electronics, and batteries. Added to that, trees provide a great source of functional food and medicine components that can be utilized through extraction.

⁸¹ Pulp & Paper Canada (2002).

⁸² Rottneros (2022).

⁸³ Kinnevik (2022).





5.3. Sámi indigenous people question mainstream forestry in northern Sweden and Finland

In national and international debates, the relevance of indigenous issues has become more prominent, and is expected to grow at both the national and EU levels. According to our informants, there is also now internal pressure to address indigenous issues in mainstream forestry, particularly in Sweden where all major forest companies are certified according to the Forest Stewardship Council (FSC) standard. As reindeer husbandry is carried out on about half of the forest land in Sweden, disputes between Sámi reindeer herder communities and the forest industry are expected in the future as well. The clear-cutting of forests deprives the reindeer of their most important fodder, lichen, which grows in unmanaged forests. In Finland, 90% of the Sámi homeland in the northern parts of Finnish Lapland is state land controlled by Metsähallitus, the state forest enterprise. In December 2021 it announced that felling would not be done without permission from reindeer herding cooperatives. Simultaneously, Metsähallitus also announced that wind power and mineral exploration are unacceptable in the state-owned Sámi homeland area.⁸⁴ From the perspective of Sámi informants, the concept of “sustainable forestry” and the labelling of forestry as “green” are questionable as long as forestry is done at the expense of indigenous culture and reindeer husbandry. Therefore, building alliances with environmental NGOs and tourism organizations to preserve natural forests has become a strategy to deal with the “inbuilt structural racism in questions regarding reindeer herding”, as expressed by a Swedish Sámi informant concerning the right of Sámi people to live in their homelands.

5.4. Sustainable development: A concept with different interpretations

Sustainable development is the key to all economic uses of forests. Definitions of sustainable development are also embedded in forestry legislation and, for example, in forest certification requirements. However, interpretations of the concept seem to differ. From the forest industry’s point of view, a balance between the different sustainability dimensions would be desirable, and the forestry sector is seen as creating well-being for local communities in the form of employment and income. Further expansion of protected forest areas or other restrictions would therefore, according to forestry informants, interfere with social sustainability, i.e., employment and local economic conditions, in northern Finland and Sweden.

⁸⁴ Lavia (2021).





Informants confirm that the political rhetoric expressed in official documents on sustainability issues now also correlates with changing trends and behaviour among customers and financiers. Parallel to the taxonomy proposed by the EU Commission, aiming at sustainable investments, the forestry sector is developing sustainable reporting standards and measures for the evaluation of businesses. At the other end of the value chain, end consumers are becoming increasingly aware of and concerned with sustainable production and consumption issues. Manufacturing industries such as IKEA and Tetrapak therefore ask for certified goods and products from certified forest land and forestry operations. The interviewees generally claimed that the environmental impacts of the mainstream forest industry are becoming an increasingly important issue.⁸⁵

5.5. New technologies are economically efficient: Reducing use of energy and human resources

Wood supply is one of the most significant costs for forest industries, including the cost of harvesting and transport. In Sweden, and with similar trends in Finland, costs of harvesting operations have not increased significantly over the last decade and prices have remained relatively constant. However, to maintain or increase forest industry competitiveness, cost reductions in the supply chain are crucial as, for example, labour and diesel costs are increasing. New technologies for energy-efficient and less labour-intensive operations are therefore being sought. Such technologies include hybrid drive lines, electrified drive lines, semi-automation and automation of control, and tele-operation. The full automation of forestry machines will mean completely different designs as, for example, ergonomic issues can be ignored. This in turn may lead to both lighter vehicles causing less harm to the forest floor and more cost- and time-efficient systems than those currently in use. The extraction and subsequent transportation of logs using GPS-guided systems are likely to be the first robotic operations that can be achieved with modest R&D, and timber transport and terminal work will be performed fully or semi-autonomously in the future. Other forest operations such as scarification and planting also seem likely to be relatively easy to automate. Such operations will be aided by the current low-cost ability to map terrain using, for example, LiDAR⁸⁶ mounted on mobile terrestrial or aerial platforms in combination with sensors for real-time

⁸⁵ See also Nilsson (2021).

⁸⁶ LiDAR is a method for determining ranges (variable distance) by targeting an object with a laser and measuring the time needed for the reflected light to return to the receiver (see, e.g., National Ocean Service, 2021).





coordination attached to the prime movers. It can be expected that digitalization will support sustainable forest management practices, and that forest harvesting, for example, will become more efficient and have less impact on the soil and tree stands.

5.6. Lack of human resources: A problem now and in the future of northern forestry

Informants say that forestry professions are considered less attractive than they used to be as young people tend to move to urban centres. The supply of trained people is also hampered by the fact that education for forestry degrees is concentrated in a few locations in Finland and Sweden, mostly outside the northern parts of the countries. Forestry work is currently not attractive to young people, as the work environment often entails working alone in rural areas, far from colleagues and other social contacts. The work itself can both be physically and mentally exhausting. For example, working full time with brush saws in pre-commercial thinning or manually planting seedlings requires personnel in good physical condition, while operating advanced harvesters and forwarders requires high cognitive ability. To secure silvicultural operations, for example, workers are imported from the Baltics and other Eastern European countries. If this trend strengthens, it may also lead to local questioning of the acceptability of large-scale forestry.





6. Mining: Is the green shift legitimizing the mining boom in Northern Scandinavia?

Sweden's mineral assets are to be exploited in a long-term sustainable way, with consideration shown for ecological, social and cultural dimensions, so that natural and cultural environments are preserved and developed.⁸⁷

6.1. Foreign direct investment and ownership in mining

The development of mining and other resource-based industries is among the key drivers of economic development in the Arctic.⁸⁸ Finland mainly mines base metals, gold, and platinum-group metals as well as industrial minerals.⁸⁹ Finnish law does not impose any restrictions on foreign ownership as foreigners may acquire Finnish enterprises, their business operations, or become partners in existing enterprises.⁹⁰ A foreign firm can apply for an exploration and a mining license if it establishes an affiliate in Finland; if it belongs to the European Economic Area, it must set up a branch in Finland as a minimum requirement.⁹¹

Most of Norway's industrial mineral production is concentrated in the north, while metal production only takes place at one mine in the north and another in the south of the country. Coal production in Svalbard will be phased out completely by 2023. The access to relatively cheap hydropower has, over the decades, led to the development of a raw mineral processing/metallurgy industry, for instance, for aluminium and silica products. Foreign ownership/investment – for example, via the firms Boliden (Swedish), Elkem (Chinese), Alcoa (American), Glencore (Anglo-Swiss), and Eramet (French) – is common in most of the metallurgy industry, but Norwegian Hydro is also a significant investor. Ongoing exploration activities are dominated by foreign exploration companies or use foreign investment capital. A promising recent discovery is the vanadium deposit in southern Norway.

Sweden's mineral industry is dominated by the mining of metallic minerals and the manufacturing of downstream products. For over a century, Norrbotten has been dependent on a successful mining and steel industry. Sweden is the EU's leading producer of iron ore and its mining industry also produces copper, gold, lead, molybdenum, silver, and zinc. Its production of industrial minerals includes limestone and feldspar.

Only two of Finland's active metal mines are under Finnish ownership: the Kemi chrome mine, which is controlled by Outokumpu, in which the Finnish state holds a stake, and the

⁸⁷ Government Offices of Sweden (2013, p. 4).

⁸⁸ Tolvanen et al. (2019, pp. 832–844).

⁸⁹ Kurkkio et al. (2014).

⁹⁰ Invest in Finland (2015).

⁹¹ OECD (2017, pp. 40–49).





Talvivaara nickel mine, in which Outokumpu also has a stake, together with the Finnish state and a mix of private entities. The lack of domestic investment in Finland's mining sector is mainly accounted for by the absence of available financing.⁹² Three Swedish companies own controlling stakes in Finnish mines: the Laiva gold mine is owned by Nordic Mines, the Pampalo gold mine is owned by Endominex, and the Kevitsa nickel-copper-platinum mine was purchased by Boliden in 2016.⁹³ The remaining Finnish mines are mainly controlled by either Australian or Canadian companies.

Northern Norway has two large metal mines/producers: Rana Gruber, which operates the Kvannevann iron mine and satellite deposits, is owned by the Norwegian private company LNS; and Tacora Resources, which is a US company that recently purchased the Sydvaranger iron ore mine in Kirkenes.⁹⁴ This second mine has been dormant since 2016. The Titania mine, located at the southern tip of Norway, has produced ilmenite for 120 years and is owned by the American company Kronos.⁹⁵ Mineral mines in Norway are mainly foreign owned; for example, Elkem, owned by the Chinese state through Bluestar, runs two quartzite mines and two industrial facilities in Northern Norway. The Belgian company Sibelco owns a nepheline mine in Alta in Northern Norway and an olivine mine in the western part of the country (50% of global olivine production is from Norway).⁹⁶ Permits have recently been awarded to two new mines that will extract rutile in Engerbo in Western Norway and copper at the northern Kvalsund. These initiatives are Norwegian, but shares are now also owned by foreign entities.

The main mining companies that operate in Sweden include: LKAB, the major state-owned iron ore producer, which has mines in Kiruna, Malmberget, and Svappavaara; and Boliden,⁹⁷ which operates mines at several locations in Sweden, including the open-pit Aitik copper mine in Gällivare (with secondary production of gold and silver), Garpenberg, where Boliden mines zinc, copper, lead, gold, and silver, and the so-called Boliden Area (in the Skellefteå field), where the company currently operates four mines that produce zinc, copper, lead, gold, and silver.

Two foreign companies own active gold mines in northern Sweden: Dragon Mining (of Australia) owns the Svartliden Mine and Elgin Mining (of Canada) owns the Björkdal Mine.

⁹² PwC (2012).

⁹³ Staalesen (2020).

⁹⁴ Kurkkio et al. (2014).

⁹⁵ Nilsen (2021).

⁹⁶ Direktoratet for mineralforvaltning med Bergmesteren for Svalbard (2020).

⁹⁷ A Swedish public limited company, 34% of whose shares are owned by Swedish shareholders.





Foreign companies must commence operations through a Swedish subsidiary. The remaining mining companies are the privately-owned domestic companies Lovisagruvan, Dannemora Mineral, as well as Kaunis Iron AB, which owns the iron ore mine in Pajala in northern Sweden.⁹⁸ Ongoing exploration is dominated by the three majors: Boliden (base and precious metals), Lundin Mining Corp. (zinc), and LKAB (iron ore).

6.2. Mineral exploration and the mining boom in Arctic Europe

According to our interviews, the mining boom experienced over the last two decades will continue, as the area holds vast raw material deposits not yet fully exploited. The Fennoscandian Shield covering parts of Northern Scandinavia and extending over to the Murmansk region in Russia contains valuable metals and minerals for present and future industrial development.

The neoliberal economic system of mining opened the EA region to global companies and reduced state ownership in the mining sector. Only a handful of companies operating in the EA are still under state ownership (i.e., LKAB in Sweden, Store Norske at Svalbard in Norway, and Suomen Malmijalostus at the Sokli mining area in Finland), making the region more important as a raw material supplier for multinational companies with activities further along the value chain. The most important global drivers of this industry, according to several informants, are increasing raw material demand and prices on the global market.

6.3. The role of minerals in decarbonizing the European economy

We are witnessing a general drive to decarbonize the European economy. Energy production must be more sustainable, more efficient, and be accompanied by better storage capacity to reach the goals of a green energy transition. Resource mapping of the EA reveals that the area contains important metals and minerals needed for the “green shift”. In addition to these critical raw materials being of great economic importance, these materials also face large supply risks.⁹⁹ These risks are connected to possible demand increases and to production being concentrated in unstable countries or in the hands of a few producers. Proponents of the mining industry see minerals as the solution for a decarbonized energy system and a

⁹⁸ Kaunis Iron (2022).

⁹⁹ Eilu et al. (2021).





prerequisite for a sustainable energy transition – the green shift as a megatrend for the industry.

Electrification is one of the main trends affecting the mining industry, according to the informants. This subject is relevant for two reasons. First, the mining industry operating in Northern Europe is itself increasingly taking responsibility for using less fossil fuel in the production process and is joining in a race to operate the first fully electrified mine. Considerable attention is being paid to reducing diesel and oil use in construction and excavation machinery, often operated by sub-contractors. Second, the electrification of, for example, transportation, private cars, offshore installations, and industry, including the construction of wind turbines and battery factories, will require an enormous amount of minerals. Not only companies but also countries are striving to take control of mineral resources, and the EU has made a list of critical raw minerals strategic for technologies and sectors.¹⁰⁰ Many informants are concerned about China's aggressive policy of accessing mineral resources in the EA, and the EU's Green Deal¹⁰¹ accordingly emphasizes the need for more self-sufficiency in mineral production within Europe.

6.4. Seabed mining: Norway in the forefront

Increasing global demand for new mineral resources and opposition to new land-based mining activities are stimulating interest in seabed mining, particularly by coastal states with jurisdiction over parts of the continental shelf. Seabed mining has potential for the extraction of much-needed rare minerals, and Norway has a mineral-rich portion of the Mid-Atlantic Ridge as part of its continental shelf. Many decades of petroleum extraction have put the nation in the forefront of geological and technological knowhow, and transferring this knowledge to seabed mining will be useful in a period when Norway is phasing out petroleum activity. These drivers form the backdrop for an active national seabed policy that includes the adoption of a law on mineral activities on the continental shelf (Seabed Minerals Act) and a programme for an impact assessment. The draft programme prompted criticism for being unrealistic concerning the timeframe and the extent of the vast area affected.¹⁰²

The exploration and extraction of seabed minerals is disputed globally as public debate on the adverse effects and unknown consequences of seabed mining is increasing. Different laws and

¹⁰⁰ European Commission (2020).

¹⁰¹ European Commission (2021b).

¹⁰² A map of the area included in the impact assessment can be found in Olje- og energidepartementet (2021, p. 18).





rules regulate mineral extraction in areas of national jurisdiction and in international waters. Governments and civil society voted in favour of a moratorium on deep seabed mining during the world congress of the International Union for Conservation of Nature (IUCN) in September 2021, with Norway being among the few states voting against the moratorium. The European Commission continues to be very divided on the issue of deep-sea mining.¹⁰³

6.5. Mineral exploration and mining in indigenous peoples' homelands critically challenged

A megatrend facing the mining industry is the continuous, and not always successful, effort to win the acceptance of the people living on and using the land where mining activity takes place. Social licence to operate – SLO – is a prominent theme in the research literature on the relationship between mining companies and their stakeholders. As host communities are important stakeholders, SLO refers to the local community's acceptance or approval of a project or a company's ongoing presence, beyond formal regulatory permitting processes.¹⁰⁴ The industry is involved in several initiatives addressing acceptance, one being Towards Sustainable Mining (TSM), which originated in Canada.¹⁰⁵ The subject of SLO was often mentioned in the interviews as among the biggest challenges to the further growth of the industry in Northern Europe. The fact that most of these northern areas are inhabited by the Sámi people adds an additional layer to SLO efforts, as indigenous people have extended rights to practice their livelihoods on their traditional land. International and national law regulate this.

The mining industry lacks good tools and practices for consultation with indigenous people and for implementing the principle of free, prior, and informed consent.¹⁰⁶ A recent ruling from the Norwegian Supreme Court regarding licenses for wind power development in Fosen was ruled invalid, as the construction violates Sámi reindeer herders' right to enjoy their own culture. This ruling may influence all industrial development on Sámi land in Norway, as well as in Sweden and Finland, as such initiatives might violate the International Covenant on Civil and Political Rights.¹⁰⁷

¹⁰³ European Commission (2021a).

¹⁰⁴ See, e.g., Prno (2013); Moffat & Zhang (2014); Lesser et al. (2017).

¹⁰⁵ The Mining Association of Canada (2022).

¹⁰⁶ Food and Agriculture Organization of the United Nations (2022).

¹⁰⁷ Norwegian Supreme Court (2021).





Indigenous people, on the other hand, lack trust in southern/global industrial actors based on previous experiences of decision making in extractive industries, and often view new initiatives as “green colonialism”, questioning the role of mining in the green shift.¹⁰⁸ Informants from the mining industry said that they expect indigenous people to contribute to the green shift as they also need cell phones and motorized vehicles. Indigenous informants said that they have been practicing sustainability and the circular economy in their own way for centuries, through traditional livelihoods and living in nature without leaving traces. One informant interpreted this antithesis as reflecting different understandings of sustainability: proponents of the mining industry often understand their activity as sustainable when they follow legal obligations set out in the permit for a certain period of time, while indigenous people only consider a mine sustainable if it contributes to the survival of traditional livelihoods for future Sámi generations.

6.6. Customers’ and financiers’ demands for sustainability may hamper individual projects

Customers are concerned about the sustainability of the products they buy, and want to know where they come from and under what circumstances they are produced. The mining industry of Northern Europe presents itself as operating within stable national frameworks with high ethical and environmental standards. One interviewee summed up the general idea: It is better to extract the mineral under the strict environmental standards of Northern European countries, when the alternative is unregulated mining conditions in Congo where child labour is used. Such rhetoric is no longer accepted in the market, as sustainability must be met in all its forms. Promises of new jobs and ripple effects in the local community are not enough if the area is polluted, reducing the quality of life of those living on and using the land and negatively affecting other livelihoods. For example, weak social sustainability was suggested as the reason why the German-based Aurubis company terminated a letter of intent to buy copper from the planned Nussir mine in Norway, because social aspects of the project needed greater consideration.¹⁰⁹

Opening new mines, as well as transforming mine production to be more environmentally friendly, requires huge investments. Investors will search for projects that are rated highly according to the EU Taxonomy criteria of sound investments. Informants mentioned the

¹⁰⁸ Nikolic et al. (2021).

¹⁰⁹ Aurubis (2021).





Taxonomy as a possible threat to the mining industry, as it can stop future investments. Other informants stressed the need to use research to support the trustworthy documentation of real changes in environmental indicators throughout the value chain, in order to avoid accusations of greenwashing.

Some informants mentioned the weak signal of environmental challenges in relation to mine waste deposits and increasing public resistance to huge landfills and fjord deposits. The revegetation and restoration of open-pit mining areas were often mentioned. The industry is not prepared to look for alternative uses of waste rock and other residues as long as wastes can be disposed of “free of charge”. Better economic incentives – or rather punishments/fees for waste deposits – were mentioned as possible measures that could be taken by the authorities issuing licences. There is a need to consider the waste rock and residues as valuable materials that can be used for other purposes, and extracted with new technologies.

6.7. Automation and robotization

Automation in the mining industry has many positive effects, as the mine can be run more cost efficiently, reduce its energy usage, lower its carbon emissions, and replace dangerous manual work with mechanized processes. Technological improvements can also reduce operational risks in the harsh Arctic climate. On the negative side, the fear is that this development will reduce the need for workers, as fewer people will be needed to work in the mines, again changing the employment structure from dominant blue-collar work to white-collar work. Informants were concerned about finding people with the needed qualifications and willingness to become permanent residents in mining communities. There is also the question of whether these automated mines will be more attractive places to work. A modern mine might need other qualifications than those needed for previous manual work. Informants were also concerned about the gender balance. Will automation attract more females to find work in the industry? The education and recruitment of qualified workers, preferably from the north, are among the main challenges facing new and expanding mining activities in the EA.





7. Tourism: Is northern exoticness sustainable?

With this growth comes the responsibility to preserve our fragile nature and strengthen our distinctive culture. While the economic benefits of tourism are desirable and a goal in itself, tourism is not solely about numbers; it is also about adding non-material value to a society and its people, and about ensuring that our country continues to develop as an interesting place to live, both for those already here and for those living abroad who are considering to move home. Growth is only a good thing if it happens sustainably, with the unique nature and culture of the islands, and the needs of the Faroese people, as its principal beneficiaries. Instead of trying to halt an inevitable development, tourism should be used as a tool to create a better society for all Faroe Islanders.¹¹⁰

7.1. Foreign direct investment and ownership in tourism

There are no publicly available data on foreign investment in or ownership of tourism operators in Greenland. However, as cruise ships are among the main sources of tourism there, it is at least possible to provide an overview of the ownership of cruise line companies travelling to and from Greenland. Many companies offer both small ship and large ship services. Ownership of cruise ship companies is very international, as headquarters are located in countries such as France, Netherlands, Norway, the UK, Cyprus, the USA, and Australia. Statistics Greenland provides information on the number of cruise passengers and ports of call, flight passengers, and overnight stays, but the number of hotels was impossible to determine.¹¹¹ When there was information available about hotels and their ownership, it seemed that they were mainly in the hands of Greenlandic companies.

In Iceland, FDI has been a key contributor to the country's economic revival since the 2008 financial collapse. As part of its current investment promotion strategy, the Icelandic government operates a public-private agency called "Invest in Iceland" that facilitates foreign investment by providing information to potential investors and promoting investment incentives. Key sectors for investment include tourism, algae culture, data centres, and life sciences. Tourism has been a growing driving force of Iceland's economy during the past decade, with opportunities for investors in high-end tourism, including luxury resorts and hotels. The number of tourists in Iceland grew by more than 400% from 2010 to 2018, reaching more than 2.3 million in 2018, which is more than six times Iceland's population. The number of tourists began to decrease in 2019 to almost two million but collapsed to half a

¹¹⁰ Official Tourist Board of the Faroe Islands (2019, p. 10).

¹¹¹ Statistics Greenland (2021).





million in 2020 due to COVID-19.¹¹² Hence, the pandemic has had drastic effects on tourism and the overall economy in Iceland. The Icelandic government has announced measures to bolster the tourism sector and has committed to building tourism-related infrastructure.

The number of hotels in Iceland steadily increased between 2015 and 2019, from 1331 to 1949;¹¹³ however, due to the pandemic, the number of hotels fell to 570 in 2020. While publicly available data on the ownership of each hotel was impossible to find, most of the hotels appear to be Icelandic owned,¹¹⁴ although several large US hotel chains such as Hilton Worldwide,¹¹⁵ Marriott International,¹¹⁶ and Radisson Blu¹¹⁷ operate in Iceland. The situation is completely different from that of the Faroe Islands, where hotels are primarily located in Torshavn and appear to mainly be owned by the Faroese.

During 2019, there were 110.5 million registered overnight stays in Norway. Norwegians accounted for 90% of these overnight stays and 86% of the expenditure on short-term accommodations.¹¹⁸ Hotel stays in Northern Norway accounted for 12% of the total hotel stays in 2019. That year, before the onset of the Covid-19 pandemic, visitors stayed 2.8 million hotel nights in Northern Norwegian hotels, with foreign visitors accounting for 31% of these nights. German nationals were the biggest group of international visitors.¹¹⁹

It has been impossible to find data on FDI in Norwegian tourism; however, public information on the largest tourism companies operating in Norway is available via the website Nordic Market Data.¹²⁰ When looking at the ten largest tourism operators in Norway, five are fully domestic and two are owned partially by Norwegians. There are 627 hotels and 13 hotel chains in 23 cities in Norway.¹²¹ It is difficult to ascertain how many hotel chains operate in Northern Norway; however, many or most good-sized northern towns have Scandic, Radisson Blu, Nordic Choice, and/or Thon hotels. This mirrors the situation in the rest of Norway, as seen from the market share statistics for the whole country: Scandic has 19.8% of the market, Radisson Blu 7.6%, Nordic Choice 20.5%, and Thon 12.6%. Collectively, these chains

¹¹² Icelandic Tourism Board (2021).

¹¹³ Statista (2021).

¹¹⁴ Personal contact with the Icelandic Tourism Board and Business Iceland, 8.3 2022.

¹¹⁵ CNN Business (2021).

¹¹⁶ Marriott International (2022).

¹¹⁷ Radisson Hotels (2022).

¹¹⁸ Innovasjon Norge (2019).

¹¹⁹ Statistikknett (2019).

¹²⁰ HotelChains (2022a).

¹²¹ Ibid.





account for 60.5% of the total hotel market in Norway. It is notable that Nordic Choice and Thon are Norwegian owned. Also, many family businesses operate hotels in Norway.

In 2019, Finnish Lapland had 3.6 million overnight visitors.¹²² There were 221 hotels with 10,000 rooms there, representing a 2.8% increase in the number of rooms from 2018 to 2019.¹²³ Thirteen hotels and three hotel chains (i.e., Lapland Hotels, Scandic Hotels, and Sokos Hotels) operate in Rovaniemi, the capital of Lapland.¹²⁴ Scandic is the biggest chain and Sokos the second biggest. Whether chain affiliated or independent, these hotels all appear to be owned primarily by Finns, with the exception of Scandic Hotels, which is Scandinavian owned. Also, around Lapland there are several privately owned boutique hotels or accommodations providing, for example, stays in glass igloos. In Rovaniemi, Nova Roi Oy operates one hotel, representing the first Chinese investment in Lapland in the tourism sector.

7.2. The target groups of tourism are increasingly diverse

Population dynamics and change patterns are among the main forces driving industry development and transformation, since they determine the type of consumers making use of tourism services and products in the EA.

The global megatrend of urbanization means that more and more people are moving from rural settlements to cities, which can often be crowded, polluted, and lacking convenient access to well-preserved nature nearby. This makes Arctic destinations highly attractive to well-off urban consumers looking for an opportunity to escape city chaos, since they are perceived as peaceful, isolated, sparsely populated, and surrounded by wilderness.

A major demographic change is population aging, especially in the developed countries. Most interviewees agreed that elderly people are a growing target group, because they can travel year-round and many of them reach retirement age in good physical condition, allowing them to enjoy outdoor activities. They represent a promising group for tourism and specific services for them could be profitable to develop. Furthermore, family patterns are also changing, with increasing numbers of single people or small households without children: they too represent a specific target group that the industry considers attractive for specific investments.

Regarding socio-economic variables, two major aspects were reported as significant by many interviewees: increased wealth and the opening of new markets. An increasing number of

¹²² Hotel Investment Guide Lapland (2019, p. 17).

¹²³ Hotel Investment Guide Lapland (2019, p. 16).

¹²⁴ HotelChains (2022a).





people, especially from Asia (China in particular), can afford long-distance and expensive travel, for example, to the Arctic region. High income often means a demand for high-quality, luxury, and customized services for unique experiences in the EA. Practically all interviewees estimated that future investments would specifically target high-quality and customized services for quality-demanding tourists. A high educational level is a further characteristic desired in the “ideal” Arctic tourist, as noted by both the interviewees and national strategies. This characteristic means that tourism offerings should focus on cultural experiences, for example, related to traditional livelihoods and indigenous cultures, and that an accurately preserved environmental landscape is critical, since high education also implies environmental sensitivity.¹²⁵

7.3. Balancing between growth and sustainability

The main assets of Arctic tourism are pristine nature, quietness, and authentic traditional livelihoods. To preserve the value of these assets, it is necessary to plan for sustainable tourism development that both protects the environment and local communities and simultaneously allows for satisfactory revenues. All the actors interviewed agreed that mass tourism should be avoided, as it poses a major threat to environmental and cultural conservation and to the opportunity for visitors to experience the expected peace, isolation, and wilderness far from city crowds. Businesses can be made more profitable in many ways other than simply increasing the number of visitors: high-quality and luxury services can be sold at higher prices, and the tourism season can be extended with the provision of year-round opportunities, allowing more visitors while avoiding unmanageable peaks. The cruise industry, for example, could offer more sustainable products, as already seen in the Svalbard Islands, where there is a shift from traditional mass cruise ships to small expedition cruises.

Another effective strategy is to adopt labels that certify destination and/or business sustainability: this practice both increases the value and profitability of the tourism product and helps realize social and environmental protection. This is increasingly being done, as suggested by the interviewees, through green labels granted by international certification agencies and by meeting sustainability standards such as those identified by the Global Sustainable Tourism Council (GSTC). Since green certifications usually allow for higher service and product prices, their introduction also has the advantage of helping to select the responsible and committed customers explicitly sought by the interviewees.

¹²⁵ Gifford & Nilsson (2014).





Furthermore, high quality is not always enough to achieve sustainable development, even when the number of visitors is small. “Last-chance tourism”, in which travellers want to see endangered species and ecosystems, is putting further pressure on the already fragile environment and speeding up its own destruction.

7.4. Local acceptance is needed for the tourism industry

Excessive tourism is already a problem in some localities, especially in coastal destinations visited by big cruise ships. Local community involvement is the best way to obtain full access to valued resources and localities: as the case of the Faroe Islands shows, reluctant local communities could make it difficult for the tourism sector to establish itself in a certain area.

The tourism business is increasingly carried out by big companies with headquarters outside the destinations. For instance, the aviation industry is making alliances with international hotel groups, creating huge economic power that is difficult for small local businesses to compete with. Such market power may challenge the fair distribution of profits and benefits within local communities. To maintain SLO, i.e., acceptance among locals and other stakeholders, the tourism industry should at least avoid negative impacts on, for example, the availability of accommodations, prices, and access to services. The tourism industry can trigger potential land-use conflicts with other actors and their livelihoods, especially traditional and indigenous ones. However, if properly managed, the industry can provide an opportunity for local and indigenous people themselves to integrate their livelihoods with tourism activities, sharing and spreading their cultural heritages and handicrafts.

7.5. Digitalization makes direct marketing to customers possible, but involves security risks

Many interviewees stressed the importance of digitalization for growth in their sector. It is generally seen as a positive factor that increases accessibility, directly opens up market destinations to an unlimited number of potential customers, and offers opportunities for small business to create independent niche markets. Digitalization further allows longer stays thanks to the possibility of combining remote work and leisure time for travellers. Tourists have access to more information, options, and power to choose services and experiences according to their own expectations and tastes. The sharing economy also has potential to facilitate





increased efficiency and value creation. Interestingly enough, the interviewees did not mention any risks or possible negative feedbacks that increased reliance on digitalization could create for the tourism industry. However, some of them are described in the literature, which notes, for example, that third parties may manipulate or disable marketing websites. Also, consumers may be exposed to fraud and digital payments in destinations may be vulnerable, leaving consumers and shops without critical services. Tourism products are under increasing pressure from online reviews, which can determine the success or failure of businesses. Furthermore, sharing economy platforms are not easy to regulate and manage, for example, when levying taxes.¹²⁶

7.6. Climate change altering the tourism industry in the European Arctic

Northern ecosystems, unique nature, and traditional livelihoods are facing severe challenges from climate change, leading to severe degradation or even destruction of these main assets of the industry. Important winter tourism is already threatened in many parts of Scandinavia as snow seasons are shorter and snow conditions are uncertain.¹²⁷ Extreme events and structural changes, such as thinner and weaker ice, more wind and rain, and associated higher probabilities of avalanches, mudslides, sudden storms, etc., constitute serious safety issues. Furthermore, the increased instability and unpredictability of weather conditions make outdoor activity planning and implementation much more difficult for operators; this was reported mostly by Greenland and Svalbard interviewees. Conversely, warmer temperatures could enable better accessibility and a prolonged tourism season, and in some destinations, such as Greenland, unpredictable weather conditions are already being reframed as an “authentic experience” in tourism marketing. These last examples show, in turn, that adaptation measures are needed in the tourism industry too.

Considering indirect effects, the main points raised by interviewees concern the possibility of stricter environmental regulations, for example, the introduction of taxes on or the restriction of air travel. An interviewee from Svalbard mentioned a heavy oil ban, that is believed will completely stop older large cruise ships from visiting the area. Finally, climate change is becoming increasingly important as a criterion affecting travel choices made by environmentally aware people, as Arctic travellers often are. This could lead to the avoidance

¹²⁶ Bahja et al. (2019); Bennett & Iaquinto (2021); Gavilan et al. (2018); Gössling et al. (2018); Pourfakhimi et al. (2020).

¹²⁷ Kietäväinen & Tuulentie (2013); Saarinen (2014).





of polluting activities, such as air travel, significantly reducing the flow of visitors to some particularly remote destinations.

7.7. COVID-19 showed the vulnerability of the tourism industry in the North

Of all studied industries, tourism has been hit the hardest by the COVID-19 pandemic. The almost complete stop of travel and continuous changes in regulations and restrictions differing from one state to another have severely challenged the industry, the interviewees noted. It was not only the absence or very small number of tourists that negatively impacted the industry, but also that mobility restrictions affected the availability of workers, since the tourism sector often relies on seasonal workers from outside tourism areas. According to the interviewees, the greatest impacts have been experienced by small, family-run businesses that lost a significant part of their income but still had to cover expenses and lacked big capital reserves. The cruise sector was also severely affected, since big ships are costly to maintain but their activity was almost completely stopped for a whole year. This also had strong negative effects on local businesses such as souvenir shops and restaurants, especially in localities where cruise ships are the main source of tourist arrivals. Other indirect effects have been the delays and increased costs of infrastructure development due to lack of workers and construction material shortages. Simultaneously, a few positive factors should be considered when describing the effects of the COVID-19 pandemic on the industry. First, in some cases, domestic visitors at least partially filled the gap left by international travellers. This could be considered especially positive because local tourism is considered more sustainable, since it does not need long-distance air travel. Second, tourism in the Arctic is mostly nature based and features outdoor activities, so simpler health safety measures are needed. Nature-based activities could thus be seen as competitive assets compared with activities in more crowded destinations: one interviewee mentioned, for example, that the Faroe Islands are developing a “safe-to-visit” certification.





8. Weak signals and wildcards as basic features of globalization

Weak signals, i.e., new emerging phenomena that may become trends in the future, and *wildcards*, i.e., unexpected happenings that may have significant impacts in the future, are features of globalization. Globalization is perhaps best described in the words of John Urry, who argued that globalization is “disordered, full of paradox and the unexpected”.¹²⁸

A weak signal can be predicted because it is known, its possible occurrence being based on existing information; for example, risk assessments rely on the idea that there is enough knowledge to predict the potential risks of a given business operation.¹²⁹ A wildcard is surprising, as it is something about which there is currently not enough information and that is therefore not predictable. Nassim Nicholas Taleb used the metaphor of the “Black Swan” to refer to what is not known, arguing that unpredicted, highly improbable occurrences may change the future very profoundly.¹³⁰ Perhaps the most obvious Black Swan in recent history was the 9-11 attack on the United States, changing safety measures and the sense of security in the Western world and resulting in barriers being put in place against the Islamic world.

In our research, the informants interviewed during the COVID-19 pandemic argued that pandemics could be expected, but that no one could know when or how they would hit, or with what impacts on human health, societies, and different industries. Predicted or not, it was clear that the pandemic had not been prepared for in either political decision making or economic planning. Informants discussing the issue more widely also argued that COVID-19 will obviously not be the last worldwide pandemic, mentioning the possibility that a new pandemic could arise from long-trapped viruses released by the melting of permafrost.

Melting permafrost is one result of global warming, but climate change has and may have many other kinds of impacts, predicted or not. Storm damage and drought-induced forest fires are already a reality in northern Russia, as in many other parts of the world. While a longer growing season in northern regions may increase forest yields, on the other hand, various plant diseases and pests, as well as invading alien species, could spread with climate change. Global warming is threatening winter tourism as well as unique natural assets in the North, such as glaciers. Indirectly, climate change may reduce interest in air travel and increase pressure to tax it, for example. Warming sea waters favour parasites such as sea lice, possibly making aquaculture products unmarketable. Especially in relation to climate change, what we do not know at the moment and therefore cannot foresee may have massive future impacts on

¹²⁸ Urry (2002, p. x).

¹²⁹ Aven & Renn (2010).

¹³⁰ Taleb (2007).





livelihoods in the global North. Finally, it is worth adding that all kinds of natural extreme events can pose serious and unpredictable risks to industrial activities, as demonstrated by the 2010 volcanic eruption in Iceland that caused the complete stop of air travel to and within Europe.

Although globalization entails multidimensional governance, this does not mean that power relations have disappeared or will wither away. Intensification of economic activity in the EA has brought international ownership and large transnational companies to the area. Extractive industries run by external companies or wealthy foreign tourists spending “quality time” in the North and using services too expensive for locals may lead to resistance. Even small communities, especially indigenous ones with their legal and moral rights to their lands and waters, can initiate resistance that extends to the international level through today’s media channels. As argued by the informants, sustainability and SLO are also taken seriously by international financiers and consumers, putting economic pressure on different industries.

Long distances, harsh climate, wilderness without people – all these catchwords are part of southern images of the North. The North is described both as mired in the social problems of an ageing population and out migration, leaving the area empty of people and free for natural resource exploitation, and as clean, pure nature offering opportunities for people longing for peace and quiet. These contrasting images are difficult for northerners to challenge, as they usually do not have control over mainstream media and lack both political decision-making and economic power.¹³¹ However, these discourses may limit the economic prospects of the EA, as a bottleneck for positive economic development is not investment but lack of a skilled workforce.¹³²

What is happening elsewhere also impacts the EA and its industries – this is the basic idea of globalization. This was illustrated, for example, in discussions with our forestry informants. Although forestry is essentially a local activity, it is subject to global events and forces. For example, after the storms in Central and Eastern Europe, storm-damaged timber was shipped and sold all the way to the Finnish market. Changes in timber markets are difficult to predict. Environmental shocks affecting markets in distant countries can affect production in the Scandinavia. Also, some tourism-sector interviewees predicted that economic crises would seriously interfere with the tourism business. The possibility of travelling is dependent on the

¹³¹ For example, Shields (1991); Nilsson & Lundgren (2015).

¹³² The Lapland Chamber of Commerce estimated in early February 2022 that the investment potential in the Barents region totals EUR 178 billion, mainly consisting of potential investments in industry, energy, infrastructure, and tourism; see Lapland Chamber of Commerce (2022, only in Finnish).





financial wellbeing of individuals and households, especially when it comes to expensive destinations such as Arctic ones.

Political uncertainty was very much on the agenda in early 2022, when we were writing this report. Russia had started a war in Ukraine and world politics was tense. Although all informants stressed that the EA is an area of peace and international co-operation, they highlighted that political conflicts elsewhere in the globe have spillover effects even on the North and different industries. Also, potential tensions between the EU and its Member States were mentioned with reference to Brexit. Populism, usually referring to extreme right-wing activism, and “super states” run by very nationalistic leaders, were seen as creating political instability even in the North.¹³³

China is another wildcard in the EA.¹³⁴ From the point of view of the Western world, China appears to be a totalitarian nation in which all companies’ activities, perhaps especially their international ones, are in the hands of the state party. It is thus often assumed that all Chinese business operators and delegations enjoy the support of the state. However, this is not the case. The highest-ranked Chinese investment programme, the Belt and Road Initiative (BRI), which was initiated in 2013 and included in the Constitution of the Chinese Communist Party in 2017, has no special organization for scrutinizing investment projects and giving them the official BRI stamp. Many Chinese delegations negotiating investments in the EA, for example, are operating in the “wild West” without legitimacy conferred by the state party. The Arctic and the Polar Silk Road investment programme for the North are not included in recent BRI investment plans (called “Roads”). Also, according to the interviews, in 2022, the EA is not the main target area for Chinese investments.

¹³³ See also a parallel project report, *Geopolitical tensions and drivers of different industries in the European Arctic* (2022), produced by ArcticHubs WP1.

¹³⁴ See, e.g., Koivurova & Kopra (2020).





9. Conclusions

This project report discusses global drivers, mainly global megatrends and trends affecting different industries in the EA. The main general theme in the aquaculture, forestry, mining, and tourism sectors is the expectation of growth. Fish produced in the North has vast and growing markets around the world as a result of global population growth and interest in healthy diets among the wealthier middle class. Forestry and the bio-based economy offer timber and other wood-based products with multiple applications in packaging, construction, clothing, and even pharmaceuticals. The mining boom is already happening in Northern Scandinavia as huge amounts of metals and minerals, including rare earth minerals, are needed for the sustainable transition and the EU's Green Deal. Tourism was flourishing before the pandemic, and the North remains of great interest to wealthy tourists. Economic prosperity seems likely to prevail in the future in different regions in the EA.

As the EA is situated in welfare states and the infrastructure in most of the region is well developed from a global perspective, the main challenge and threat is climate change. Melting permafrost, shrinking sea ice cover, warmer seas, a shortened snow season, loss of native fauna, invasive alien species, and drought-induced wildfires are all already happening. Changes in nature are also changing human lives either directly or indirectly. Hence, the path to the future in different regions in the European Arctic has to be based on sustainability: valuing the environment and communities in the North in addition to opportunities for economic prosperity.





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ANNEX I: List of Interviewed Organizations

Aquaculture

Aquaculture Company in Norway – 1
Aquaculture Company in Norway – 2
Aquaculture company owner in Iceland
Fiskaaling, Aquaculture Research Station in the Faroe Islands
ISFA, the Icelandic Aquaculture Association
Minister of Fisheries and Aquaculture in Iceland
Ministry of Environment, Industry and Trade in the Faroe Islands
Senter for hav og Arktis, Centre for the Ocean and the Arctic, Norway
Troms and Finnmark County Administration, Norway

Forestry

Barents Forest Sector Network (BEAC working group)
Finnish Forest Industries

Maa- ja metsätaloustuottajain Keskusliitto, The Central Union of Agricultural Producers and Forest Owners, Finland
Metsähallitus (State owned forests, Finland)
Metsäkeskus, Finnish Forest Centre
World Forest Forum

Mining

DG Mining, European Commission
ICMM, International Council of Mining and Metals
Industry expert in the committee evaluating the Norwegian Mineral Act
IRMA, The Initiative for Responsible Mining Assurance
Kaivosvastuu, Finnish Network for Sustainable Mining
LO, Norwegian National Labour Union
Ministry of Economic Affairs and Employment, Finland
NGU, Geological Survey of Norway
Norsk Bergindustri, The Association of Norwegian Mineral Industry
Regional geologist, Norway
RMF, Responsible Mining Foundation
WWF Minerals and Metals





Tourism

Business Iceland/Visit Iceland

Greenlandic tourism sector, municipal level representative

Icelandic Tourist Board

Icelandic Travel Industry Association

Joint Working Group on Tourism (BEAC working group)

Ministry for the Environment and Natural Resources, Iceland

Ministry of Environment, Industry and Trade, Faroe Islands

Ministry of Industries and Innovation, Iceland

Tourism companies and authorities in Svalbard (3 interviews)

VFI, Visit Faroe Islands

Indigenous

Sáminuorra, Sami youth organization

Suoma Sámi Nuorat, Finnish Sámi Youth Organization

Svenska samernas riksförbund, Swedish Sámi Organization

General

Barents Press

BEAC, Barents Euro-Arctic Council

East and North Finland EU office/Northern Sparsely Populated areas

Economic Cooperation (BEAC working group)

EEAS, European External Action Service

Finnish Arctic Association

Ministry for Foreign Affairs, Finland

NATO, North Atlantic Treaty Organization

Nordic Council of Ministers

North Norway EU Office

North Sweden EU Office

POP – Bank Sector, Finland

Regional State Administration Agency in Finland (2 interviews)

SITRA, The Finnish Innovation Fund

WWF Arctic Programme

Total: 60 interviews. In some organizations more than one informant was interviewed.





ANNEX II: Policy Papers

AQUACULTURE

Centre for the Ocean and the Arctic (2019) *Sustainable Blue Economy in the Norwegian Arctic. Part 2: Foresight for 2030 and 2050.*

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European Commission (2013a) *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions: A new EU Forest Strategy: for forests and the forest-based sector*. Brussels.

European Commission (2013b) *Commission Staff Working Document: A Blueprint for the EU Forest-Based Industries (woodworking, furniture, pulp & paper manufacturing and converting, printing)*. Accompanying the document *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions. A new EU forest Strategy: for forests and the forest-based sector*. Brussels. SWD (2013) 343 final.

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ANNEX III: Interview guide

ArcticHubs – INTERVIEW THEMES/DEVELOPMENT OF DIFFERENT INDUSTRIES: GENERAL INTERVIEW GUIDE

JANUARY 2021

The main research question(s):

What global drivers are affecting the development of different industries (i.e., mining, tourism, forestry, and fish-farming) in the European Arctic?

How will these global drivers affect the development of different industries in the European Arctic?

We will try to find answers to these questions by asking informants the following questions:

COVID – different scenarios

Before going any further, we are in the midst of the COVID pandemic, an exceptional situation that started last year. We have heard good news that there are vaccines available, but still there are many uncertainties.

1. In your opinion, how has this pandemic affected different industries in the European Arctic, for example, in Northern Scandinavia, Southwest Russia, and Greenland?
2. If the situation becomes worse and constantly growing numbers of people become infected with the virus, how will this affect different industries?
3. What if the situation remains the same as it is now?
4. What if a functional vaccine is made available quickly, even before summer 2021?

Present-day situation of (economic) activity in the European Arctic

Let's now try to leave this pandemic behind and look at the present situation in the European Arctic itself.

1. What are the most important issues for the development in the European Arctic (i.e., strengths and weaknesses)?
2. When thinking about sustainability or sustainable development, how do you understand it from the perspective of the European Arctic? What about the different pillars – i.e., ecological, economic, and socio-cultural – of sustainability?





Global drivers

1. What global drivers are affecting the development of the European Arctic?
2. How will these global drivers affect the European Arctic?
3. How do you see these global drivers affecting the European Arctic?
4. Global drivers take form in local contexts. How do you see this global–local nexus, i.e., connections between the global, national, and local scales?

Forecasting

Megatrend = an important shift in the progress of a society or of any other particular field or activity; any major movement. **Trend** = a general direction in which something is developing or changing.

1. What megatrends and trends are affecting the development of the European Arctic?
2. In your opinion, how could these megatrends and trends affect development in the European Arctic?

Weak signal = an indicator of a potentially emerging issue that may become significant in the future.

1. What weak signals are affecting the European Arctic?
2. In your opinion, how could these weak signals affect the European Arctic?

Wild card = an unpredictable element in a situation.

1. What wild cards are affecting the development of the European Arctic?
2. In your opinion, how could these wild cards affect the European Arctic?

RELEVANT THEMES TO CHECK THAT THEY ARE DISCUSSED: China and climate change

(Introduce these themes if they have not come up in the answers.) In our project we also want to address two more specific questions:

1. How do you see China's presence in the European Arctic?
2. How is one of the global megatrends, climate change, affecting the European Arctic? (This could also be asked in the megatrend/trend section).





This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869580.