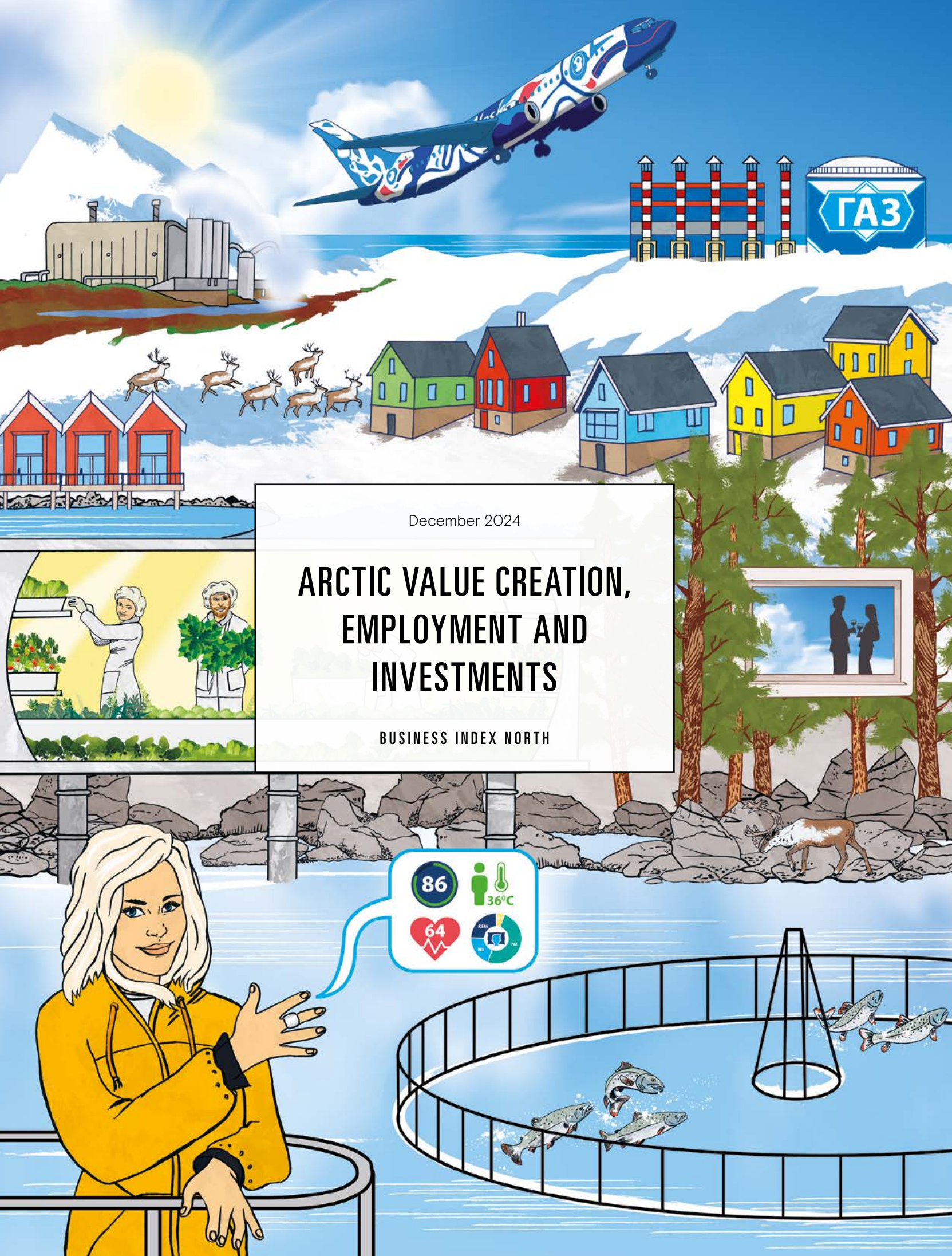

December 2024

ARCTIC VALUE CREATION, EMPLOYMENT AND INVESTMENTS

BUSINESS INDEX NORTH

Arctic Value Creation, Employment and Investments

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Front cover illustration:

Visionary One Arctic with hope for a better future
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Implementing partners

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What is BIN-Arctic project?

The Arctic region is of global importance for sustainable development in the 21st century. On the one hand, the region has vast natural resources and economic opportunities. On the other, the region's ecosystems and local communities are particularly vulnerable to climate change, where regional rises in temperature are four times that of the global average. Not least, the livelihoods of people living in the Arctic are decisively influenced by both climate change and economic development. This raises questions such as: ***How*** do we ensure sustainable development of the Arctic? ***What*** kind of policies, approaches, and investment decisions are needed? ***How*** do we stimulate bottom-up initiatives for sustainable development and include indigenous knowledge in this development? ***How*** do we overcome dependency on the extraction of non-renewable resources and through innovations develop the Arctic as a home of green transition? The project BIN-Arctic aims to contribute to informed, knowledge-based debate about these issues.

The main objective of the project is to raise awareness of the opportunities as well as the challenges for sustainable development in the Arctic. To accomplish this goal, we develop reports and analytical tools and contribute to dialogue arenas for Arctic stakeholders such as international bodies, national and regional authorities, investors, educators, media, and students.

The BIN reports published in 2017–2022 covered developments in the European part of the Arctic (the North Nordic part and the Barents Euro-Arctic Region). Since 2023 we have been expanding the geographic scope of the analysis to cover the Arctic in its entirety. The analysis has so far covered the topics of sustainable development, socio-economic resilience, innovations, transportation, telecommunication, energy, and socio-economic value creation.

The topic of this annual report is "Arctic Value Creation, Employment and Investments". The report covers development in 22 Arctic regions from all eight Arctic states (map below) in the period 2017–2022.

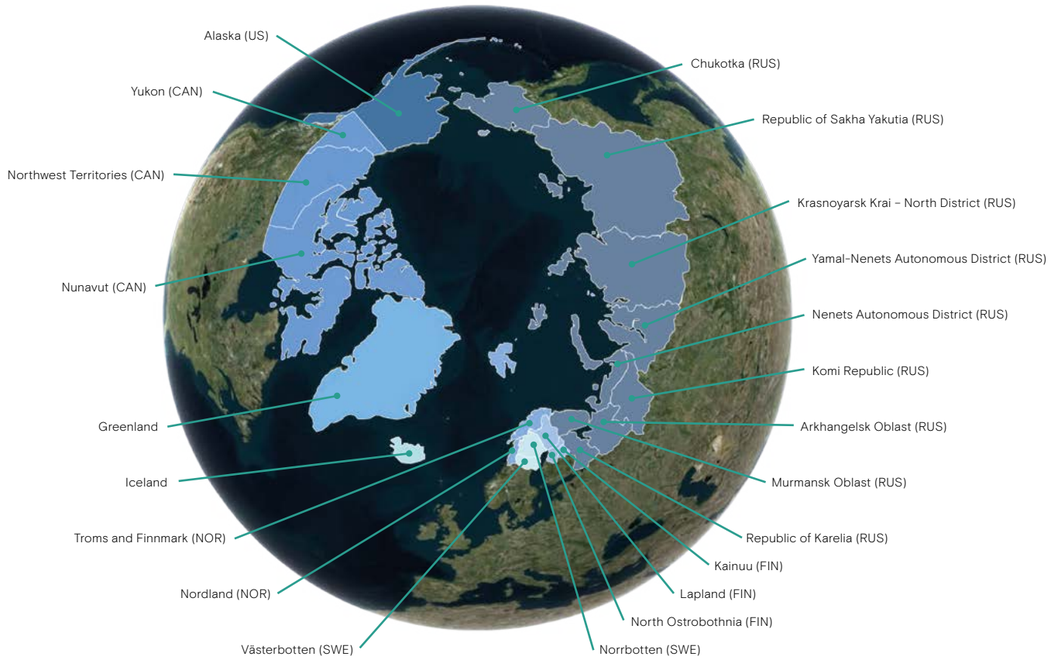
In addition to the main annual report, several times a year we publish specific reviews and analytics focusing on topics of importance to our strategic partners and stakeholders. These publications include regional reviews, case studies, and industry analyses. Project results are distributed via social media, the project website, printed materials, as well as via conferences and seminars. The project team moreover participates in educational activities with dedicated workshops and lectures. In 2024 we developed a student workshop concept "Data storytelling for socio-economic analysis of the Arctic".

The BIN project is developed through a circumpolar network of academic and research institutions, authorities, commercial partners, individual experts, and NGOs. The project administrator is the High North Center for Business and Governance at Nord University Business School (Norway).

Project website

Project linkedin page

Figure 0.1 Map — Arctic regions included in this report



Executive summary

The report covers the Arctic areas (22 regions in total) of eight countries: Norway, the United States, Sweden, Finland, Canada, Iceland, Greenland (Denmark), and Russia. The main objective of this report is to give an overview of the Arctic regional economies with a focus on value creation, employment, and investment trends, as well as basic demographic trends.

Demography

The Arctic is home to approximately 5.3–5.5 million people. Almost half of the total Arctic population (around 45%) resides in Russia. The population dynamics have varied significantly across the Arctic regions. The highest growth of total population (more than +10%) between 2011 and 2023 was in Iceland, Yukon, and Nunavut (both in Canada). The most significant decline (more than -10% for the period) was in the Republic of Komi, Arkhangelsk Oblast, the Republic of Karelia, Murmansk Oblast (all Russia), and Kainuu (Finland). Total population change was less significant in the rest of the Arctic, ranging between -10% and +10% in the period 2011–2023.

Most of the Arctic regions (except Murmansk, Karelia, Arkhangelsk, and Komi in Russia) are experiencing population ageing, and at the same time a decrease in the share of working age population.

This trend is mostly evident in areas where younger people have migrated away, leaving a higher proportion of older adults and a lower proportion of children. This presents a risk of a negative feedback loop. The declining number of young people and children leads to a smaller base of future working-age individuals. In contrast to the dominant trend, Iceland, Yukon, and Nunavut demonstrated significant growth both in working age population and in the population of children (0 to 14 years old).

Employment trends

From 2017 to 2022, labor markets in the Arctic region developed due to a combination of resource extraction, demographic changes, and Covid-19. The highest growth in employment was registered in Nunavut (5.2% increase in average per year). Many regions of Arctic Russia and Alaska (US) experienced a slight but steady decline in employment (between -0.5% and -2.1% per year). Resource-based industries, such as mining, oil, gas, and fisheries remained the principal drivers of employment, especially in regions like Arctic Russia and Greenland, and experienced steady growth in employment in Canada. The public sector, particularly in education, healthcare, and administration services, remained the key employer for Greenland, Sweden, Finland, Norway, and saw growth in employment in Canada and Iceland. Most of the Arctic regions' tourism industries recovered after a decline in 2020 due to Covid-19.

Employment in construction saw growth, namely in Russia (Nenets Autonomous Okrug, Sakha Yakutia) and Canada (Yukon), particularly due to energy projects. The trade, transportation, and storage sectors mostly experienced a decline, as much as -5%–7% in employment on average per year in some Russian and Canadian regions. The business services sector grew mostly in Sweden, Norway, and Finland.

Our analysis reveals significant differences in employment in the business services sector, ranging from 21.1% of total employment (Iceland) down to 6.4% (Greenland), while other parts of the Arctic stay in between. This sector includes professional, scientific and technical activities, ICT, financial and insurance services, real estate activities, administrative and support service activities. In general, the share of employment in business services is significantly lower in the Arctic regions than nationwide. A higher share of employees in business services means better potential to develop a knowledge-based economy and overcome dependence on natural resources in the Arctic.

Competitive spots of the Arctic labor markets

Covid-19 posed many challenges to Arctic economies and labor markets. However, some industries and regions coped with Covid better than others, even increasing the number of jobs between 2019 and 2022. Overall, the labor markets of Nunavut, Yukon, North Ostrobothnia, and Sakha Yakutia went through Covid-19 better in terms of employment development than the average for their respective countries. Iceland performed better than the average for all Arctic countries. North Ostrobothnia demonstrated perhaps the most balanced industrial mix — here employment development in most industries was better than in Finland as a whole. The report identified competitive spots of the Arctic labor market — industry/regional segments where employment development was positive and stronger than the national average. These spots include Accommodation and Food services in Greenland, Troms and Finnmark, and Västerbotten, Business Services in Västerbotten and North Ostrobothnia, Construction in Greenland, Kainuu, Iceland, Lapland, Education, Health and Administrative services in Iceland. In all these segments employment growth exceeded 7.5% for the period 2019–2022. In many Arctic regions employment growth in producing industries was compensated by employment decline in other industries.

Economic value creation

The analysis shows that economic value creation activities in the Arctic are diverse and unique. The Canadian territories of Nunavut and Yukon demonstrated strong growth in Gross Value Added (GVA) through strong industries like mining and oil and gas, education, healthcare, and business services. However, the Northwest Territories experienced negative growth. As the largest Arctic Investor, Russia also showed diverse GVA trends. Regions like Yamal-Nenets, Murmansk, Chukotka, Sakha Yakutia, Arkhangelsk, and Karelia stood out and remained positive, mainly due to producing industries (notably Yamal-Nenets and Sakha Yakutia relied heavily on fossil fuel extraction and processing), construction (Chukotka), and business services. In regions like Yamal-Nenets, Chukotka, and Sakha Yakutia, Murmansk's GVA growth was significantly higher than Russia's overall GVA growth. Conversely, regions like Krasnoyarsk, the Komi Republic, and Nenets (the lowest of all) saw a decline in value creation. The Nordic Arctic territories showed significant characteristics and very mixed results. For instance, Sweden's Upper Norrland possesses the main strength in the producing industries, and its regional value creation average was higher than the national country average. Finland's North Ostrobothnia and Kainuu region showed minimal growth, whereas Lapland had a decline. Greenland and Iceland achieved modest growth in GVA thanks to the education, health, and public administration sectors. Norway saw a decline in value creation among its Arctic regions, Nordland and Troms and Finnmark, although they achieved very high labor productivity throughout the period.

Social sustainability

There is a risk of decoupling between economic development and social sustainability in the Arctic. Therefore, we consider economic development together with development in employment and distribution of income in the population. Our analysis found that regions like Troms and Finnmark (NO), Nordland (NO), Northwest Territories (CA), Yukon (CA), Upper Norrland (SE), Nunavut (CA), North Ostrobothnia (FI) exhibited a fair balance between the economic and social aspects of value creation. Other Arctic regions were in a more precarious position. For example, resource rich regions of Chukotka (RU), Nenets Autonomous Okrug (RU), Yamal-Nenets Autonomous Okrug (RU), and Alaska (US) demonstrated rather high economic value added at the regional level combined with considerable income inequality among the population and slight decline in total employment.

Investments

A heavy reliance on natural resources such as oil and gas, minerals, aquaculture and fisheries is common for Arctic economies. Total Arctic investments are estimated at 106.8 Bill USD in Purchasing Power Parities (PPP) per year (average 2017–2021). Russia accounts for 50–60% of all Arctic investments (with Yamal Nenets accounting for about half of the Russian Arctic investments). The remaining 40–50% is distributed among the seven other Arctic nations, where Alaska is the largest in terms of total investments. The aver-

age annual investments index (% difference from the previous year) for the period 2017–2021 shows that the most notable growth in Arctic investments from 2017 to 2021 was observed in Greenland with 14.7% (mainly in fisheries) followed by Upper Norrland (Arctic Sweden). Upper Norrland, which has a large economy, demonstrated remarkable investment growth with an investment index (10.4%), mainly due to investments in mining and manufacturing.

Successful business cases

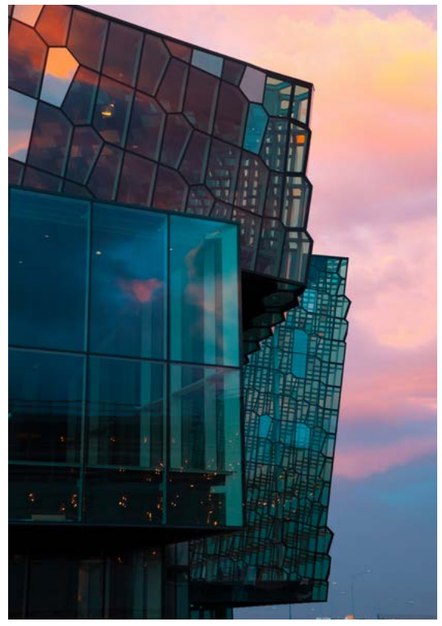
Arctic regions in all eight Arctic countries have remarkable business opportunities. In this report, we take just one case study from each Arctic country, yet examples are plentiful. Based on these case studies, our vision for the future of the Arctic is an area of peace and prosperity with reliable and clean energy, food security, a knowledge-based economy, well developed modern infrastructure, with respect for, and in dialogue with, indigenous and local knowledge systems.

Implications for Arctic stakeholders

Overall, value creation in the Arctic remains closely tied to growing needs for natural resources, environmental issues, and geopolitical concerns. Demographic shortages, harsh climatic conditions and geographic remoteness continue to pose challenges in workforce sustainability, especially in remote communities. Sustainable development of the Arctic would require policymakers, investors, national and regional authorities to set the following priorities: Ensure the social sustainability of business; overcome dependency on extractive industries; accelerate transformation to a knowledge-based economy; reforming education; build a platform for up-to-date open Arctic data; establish international cooperation beyond political borders.

We also encourage academics, educators, and journalists to further engage in reaching out to and informing the public, and especially young people, about the challenges and opportunities for sustainable development in the Arctic as an issue of planetary importance.

Environmental aspects of economic development are beyond the scope of this report, but in the future, we are looking to incorporate them into our analysis.



Contents

Introduction

This is the first Business Index North report to cover all eight Arctic countries. The following 22 regions are included in the analysis: Norway — Nordland, Troms, and Finnmark; the United States — Alaska[1]; Sweden — Norrbotten and Västerbotten (jointly referred to as Upper Norrland[2]); Finland — Kainuu, Lapland, and North Ostrobothnia; Canada[3] — Northwest Territories, Yukon, and Nunavut; Iceland — whole country; Greenland (Denmark) — whole country; Russia — Murmansk Oblast, Arkhangelsk Oblast, Republic of Karelia, Komi Republic, Nenets Autonomous District, Yamal-Nenets Autonomous District, Krasnoyarsk Krai[4], Republic of Sakha Yakutia, Chukotka.

The main objective of this report is to give an overview of the Arctic regional economies with a focus on value creation, employment, and investment trends during the period 2017–2022.

The report uses open data from multiple sources: Statistics Norway, Statistics Sweden, Statistics Finland, the Federal State Statistics Service — Rosstat, the US Bureau of Economic Analysis, the US Census Bureau, Statistics Greenland, Statistics Iceland, Statistics Canada, OECD, the World Bank, Eurostat.

The report starts with a brief overview of the demographic situation in the Arctic and the longer-term population trend for 2011–2023. It provides a comparative analysis of employment and value creation (measured as gross value added) trends for 2017–2022 in eight basic industrial sectors[5]: Accommodation and food services; business services; construction; education, health and administrative services; other services; producing industries; trade; transportation and storage. Further, we discuss the issue of social sustainability comparing the development in employment and economy indicators in combination with the income inequality indicator (measured as GINI). Furthermore, we present an overview of the Arctic investments for 2017–2021, albeit at rather general level due to open data limitations (only figures for total investments could be provided with no specifications of source of the investment). The indicators explored throughout the report are summarized in a table of Arctic economic profiles, where the indicator values can be considered in combination for each region and can be compared to the "Arctic average".

Throughout the report we highlight examples of successful businesses in the High North regions of the Arctic countries. These successful examples are also reflected on the frontpage illustration made by Finnish artist Ilpo Koskela for the BIN Arctic project as a visionary for "One prosperous Arctic" with hope for a better future.

The report concludes with a section where we provide implications for its intended users: international cooperation institutions, development agencies, national and regional authorities, investors and entrepreneurs, academia, and media.

[1] All five regions of Alaska are included and considered as a whole.

[2] Some Swedish data are available only for these two regions in combination.

[3] Canadian Arctic technically also includes Nunavik and Nunatsiavut, but no data are available for these as they are for the territories.

[4] Whenever possible, we show numbers for Krasnoyarsk-North which is the Northern Macro-district of Krasnoyarsk Krai (only Krasnoyarsk-North is included in the Arctic Zone of the Russian Federation). Yet, most of the figures show numbers for Krasnoyarsk Krai as a whole since access to more detailed statistics is limited.

[5] Aggregation of data into these sectors was driven by data constraints, as granular data for all traditional Nomenclature of Economic Activities (NACE) sectors was not consistently available and reliable across all regions analyzed. The eight sectors were selected to enhance comparability across regions that use similar sectoral breakdowns in their data. The categorization used by BIN is the most detailed (yet rather superficial) way to compare industries of the eight Arctic countries based on the official statistics. Employment and gross value added with more detailed industry specifications are available at the national level for some Arctic countries.

Table 1.1

Producing industries
A Agriculture, forestry and fishing; B Mining and quarrying; C Manufacturing; D Electricity, gas, steam and air conditioning supply; E Water supply; sewerage, waste management and remediation activities
Construction
F Construction
Trade
G Wholesale and retail trade; repair of motor vehicles and motorcycles
Transportation and storage
H Transportation and storage
Accommodation and food services
I Accommodation and food service activities
Business services
J Information and communication; K Financial and insurance activities; L Real estate activities; M Professional, scientific and technical activities; N Administrative and support service activities
Education, Health and administrative service
O Public administration and defense; compulsory social security; P Education; Q Human health and social work activities
Other services
R Arts, entertainment and recreation; S Other service activities; T Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use; U Activities of extraterritorial organizations and bodies

Specification — The eight basic industry sectors used in this report for the analysis of employment and gross value added.

Power BI

This report has a digital addition — three interactive online dashboards for the analysis of employment, gross value added, and investments. These dashboards are made in MS Power BI and the links to Power BI icon can be found beside main figures for Employment, Gross Value Added, Investments. Please access the dashboards to further explore the report data and make your own figures. We intend to continuously update the dashboards as new data are published.

Photo: Treehotel media kit

Harads, Swedish Lapland: Treehotel

Treehotel, located in the heart of Swedish Lapland, proudly operates with sustainability at its core. The hotel is dedicated to reducing its environmental impact through various green initiatives, including the use of eco-friendly building materials and energy-efficient practices. Treehotel sources local ingredients and collaborates with local producers to support the regional economy, ensuring guests enjoy fresh, locally sourced products. This commitment to sustainability not only enhances the guest experience but also helps preserve the pristine natural environment that surrounds the unique treehouse accommodations.

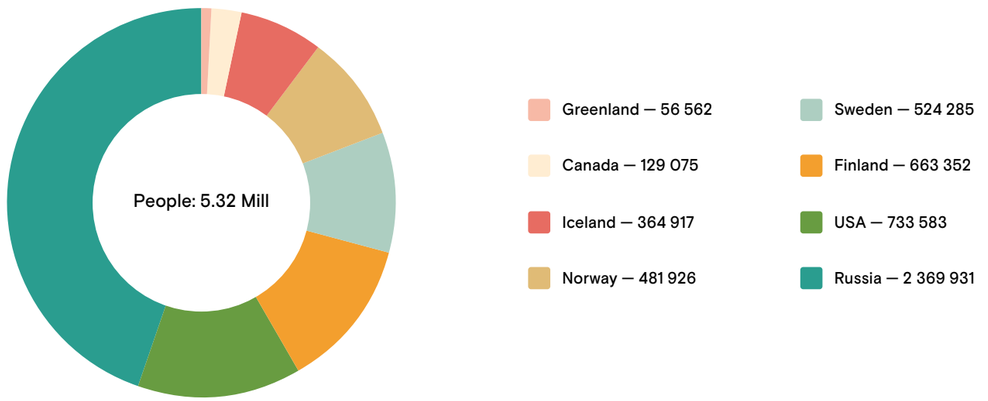
Overview of regional demographics

The Arctic is home to approximately 5.3-5.5 million people living in 22 regions of eight Arctic countries. Compared to the geographically vast Arctic region, this represents only 0.67% of the world's population. In terms of land area, the Arctic is comparable to the area of Russia (approximately 11% of the world's total landmass). In terms of population, the Arctic in its entirety is comparable to countries like Norway or Finland. Most of the Arctic communities are concentrated in larger urban centers with smaller settlements often facing population decline.

The distribution of the population among the Arctic countries is uneven. Almost half of the total Arctic population (around 45%) resides in Russia[6], indicating a significant demographic footprint in the Arctic region. In contrast, the populations of Canada's Arctic and Greenland are relatively low, making up only about 2% and 1% of the total Arctic population respectively, even though Canada has one of the largest Arctic territories and Greenland covers a vast land area, but mostly covered by ice. Canada and Greenland together cover about one third of the total Arctic landmass. The figure below shows the distribution of the Arctic population among the eight countries.

The population dynamics in the Arctic regions between 2011 and 2023 has seen moderate growth or remained stable in some areas and declined in others. The highest growth (more than +10% for the period) was in Iceland, Yukon, and Nunavut (both in Canada). The most marked decline (more than -10% for the period) was in the Republic of Komi, Arkhangelsk Oblast, the Republic of Karelia, Murmansk Oblast (all Russia), and Kainuu (Finland). Total population development in the rest of the Arctic ranged from -10% to +10% for the period. The table below shows total population change and contributions to it in three age cohorts: above working age (aged 65+), working age (aged 15–64), and below working age (aged 0–14). Please note that contributions are calculated as percentages of total population change (not as percentages of own age cohort).

Figure 2.1 Population of the Arctic areas, 2022



[6] For Russia, on this figure we show population only of the country's Arctic Zone. According to the official definition, the Arctic zone of the Russian Federation includes parts of Arkhangelsk Oblast, the Republic of Karelia, the Komi Republic, Krasnoyarsk Krai, the Republic of Sakha Yakutia. The regions of Murmansk Oblast, the Nenets Autonomous District, the Yamal-Nenets Autonomous District, and Chukotka are included in the Arctic Zone in their entirety. Below in this report we consider the whole territories of all these regions. Population in all Arctic regions showed on the map in the beginning of this report is about 5 million people.

Table 2.1 Total population change with contributions by three age cohorts, %, 2011–2023

Region	Total change	Above working age	Working age	Below working age
Yukon (CA)	27.2%	10.3%	13.4%	3.4%
Iceland	20.3%	6.1%	13.0%	1.3%
Nunavut (CA)	19.0%	2.3%	11.6%	5.1%
Västerbotten (SE)	6.5%	4.1%	0.3%	2.1%
Troms (NO)	6.0%	5.8%	2.3%	-2.1%
North Ostrobothnia (FI)	4.6%	7.1%	-0.9%	-1.6%
Sakha Yakutia (RU)	4.1%	4.2%	-1.7%	1.6%
Northwest Territories (CA)	3.4%	5.3%	-0.8%	-1.1%
Nordland (NO)	2.2%	5.2%	-0.9%	-2.1%
Alaska (US)	1.5%	5.9%	-3.0%	-1.4%
Finnmark (NO)	0.9%	5.1%	-1.0%	-3.1%
Greenland	0.9%	2.8%	-0.3%	-1.6%
Norrbotten (SE)	0.3%	4.0%	-4.2%	0.4%
Nenets (RU)	-1.7%	4.1%	-5.2%	-0.6%
Yamal-Nenets (RU)	-2.4%	4.8%	-7.8%	0.6%
Krasnoyarsk-North (RU)	-4.0%	2.6%	-6.5%	0.0%
Lapland (FI)	-4.2%	7.1%	-9.5%	-1.7%
Chukotka (RU)	-5.0%	2.6%	-6.1%	-1.4%
Kainuu (FI)	-10.4%	6.2%	-13.7%	-2.9%
Murmansk Oblast (RU)	-17.0%	-0.7%	-16.0%	-0.4%
Karelia (RU)	-17.9%	0.1%	-16.0%	-1.9%
Arkhangelsk Oblast (RU)	-18.5%	-0.2%	-16.4%	-1.9%
Komi (RU)	-19.2%	1.5%	-18.1%	-2.6%

As can be seen, all Arctic regions except Murmansk, Karelia, Arkhangelsk, Komi (all in Russia) experience ageing population. This cohort is growing. Regarding the four exceptional regions, our previous report shows that the outward migration of people aged 50-59 southwards is significant in the European part of the Russian Arctic. The growth of the population above working age in the Arctic reflects the global trend of ageing populations. This trend is most pronounced in areas where younger people have migrated away, leaving a higher proportion of older adults.

The share of the working-age population has been diminishing almost everywhere, especially in Arctic Russia. The main reason is the outward migration of young adults. In contrast to the major trend, Iceland, Yukon, and Nunavut demonstrated significant growth in the working-age population. Declining or not growing population of children and young people (0-14 years old) is a pervasive problem for the Arctic, again with the exceptions of Iceland, Yukon, Nunavut, and Västerbotten in Sweden. The most likely reason for this problem is the apparently diminishing number of working-age population, especially young adults — they establish families elsewhere after they leave the Arctic. Young families with children leaving the Arctic are also a known phenomenon. This creates a negative feedback loop. The declining number of children and young people leads to a smaller base of future working-age individuals. Decreasing birth rates are another significant reason for the declining populations of young people.

The demographic situation in the Arctic varies between urban centers and rural areas. Urban centers are seeing gradual growth due to better access to services, infrastructure, and employment opportunities, while rural areas are experiencing population decline, driven by outward migration and limited economic prospects. For a more detailed analysis, please refer to BIN report 2022 on rural and urban population trends in the European Arctic (pp.14–16). In Russia, the challenges are not confined to rural areas; many urban centers, especially in the Arctic, are experiencing "urban shrinkage." This phenomenon refers to a decline in population and economic activity in cities, driven by factors such as economic restructuring, harsh living conditions, and the outward migration of younger generations seeking better opportunities in southern regions. This trend is explored further in this research on urban shrinkage in Arctic regions.

Photo: Alaska Airlines media kit

Alaska, USA: Xáat Kwáani aircraft

Alaska Airlines' Xáat Kwáani aircraft, adorned with a bright design by Alaska native artist Crystal Worl, honors the profound connection between the Tlingit people and the natural world. The name, Xáat Kwáani, meaning 'Salmon People' in the Tlingit language, reflects the deep spiritual and environmental relationship between the indigenous community and the salmon that sustain them. This livery, the first of its kind to feature an Alaska Native name, is a powerful tribute to the cultural heritage and enduring bonds between the people, land, and wildlife of Alaska.

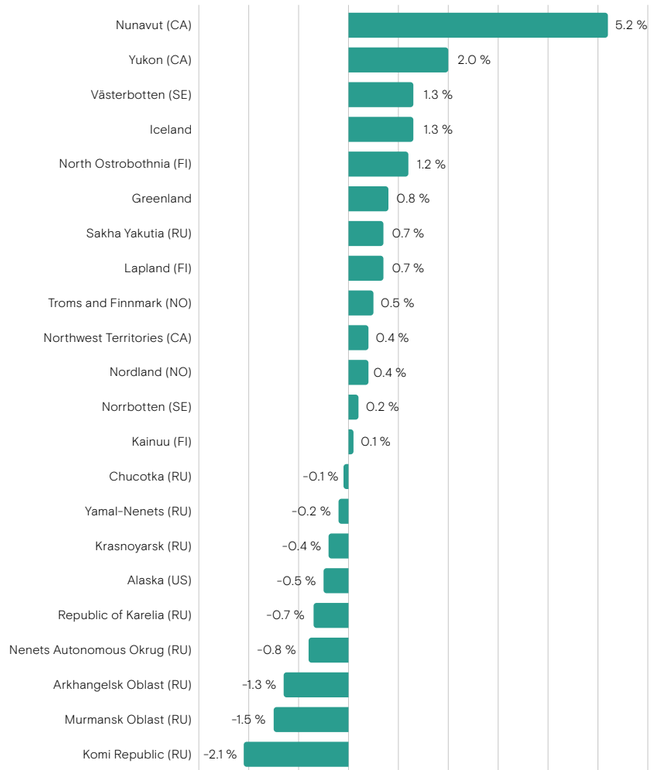
Sources: Salmon Livery — Alaska Airlines

Employment trends

The employment situation is an important indicator of value creation, both for people and legal entities. Work brings purpose to human life and creates financial security. On a country level, employment contributes to economic growth. In regional development, the number of new jobs (job creations) is an indicator of the utmost importance. It concerns the attractiveness of the region for people and the development of industries. Employment data are interesting because they correlate with both the economic and demographic situation.

Labor market trends in the Arctic regions reflect both opportunities and challenges shaped by the unique environment and evolving economic landscape. Key industries such as production (with higher reliance on mining), construction, education, health, and public administration continue to dominate employment. The graph below shows the trend in employment across the Arctic regions from 2017 to 2022. Basically, this indicator shows if the regional industry generates economic opportunities for people in terms of jobs.

Figure 3.1 Employment change, 2017–22 (annual average change)



The figure shows annual average change in total employment for 2017–2022.

Please go to MS Power BI online tool to further explore employment statistics

Power BI

Our analysis presenting the annual average change in total employment for 2017–2022, shows that Nunavut (CA) demonstrated significant growth, where producing industries grew steadily by 31.2%, and the trade sector had a growth of 4.3%. On average, Nunavut experienced a total of 5.2% employment growth, which is the highest among the Arctic Regions studied.

The second position in the graph belongs to the Yukon region, likewise from Canada, displaying positive employment growth with an average of 2.0%. In Yukon, employment increased in most of the sectors except accommodation and food services, transportation and storage.

Västerbotten (SE) demonstrated visible employment growth, which grew by 1.3% per year on average, thanks to the producing industries as the primary driving factor behind the growth. Employment in the transportation and storage sector was likewise stable in Västerbotten.

On the other hand, Iceland had the same average growth of 1.3% on average per year for the period 2017–2022. The education, health, administrative, business services, and producing industries remained essential for creating employment in Iceland and experienced moderate growth. However, the construction sector expanded significantly and saw a steady annual growth of 3.9% on average for the period 2017–2022. Growing employment in construction was associated with steady growth of the Icelandic economy before Covid-19 and recovery afterwards driven by infrastructure projects, tourism, and housing demand. Employment in the trade sector experienced stable growth of 0.2% and in the transportation and storage sector moderate growth after a significant decline from 2018 to 2021 with an annual average of -2.1%. Accommodation and food services employment showed a significant decline in 2020 (likely attributable to the Covid-19 pandemic); however, in 2022, the sector began to recover.

According to the statistics available, North Ostrobothnia (FI) was in fifth position with an average of 1.2% growth. The business services sector created employment in this region, with a growth rate of 2.9%, and education, health, and administrative services had a growth of 1.8%. Other sectors remained moderate, except the other service sectors, were employment experienced negative growth.

From 2017 to 2022, Greenland's labor market increased moderately by only 0.8%, attributable to the contribution of the construction, accommodation, and food services sectors. Public sector employment remained a critical source of jobs for job seekers, with a growth of 4.4% in this period. Accommodation and food services, trade, and transportation and storage showed a commendable growth, namely of 3.5% and 1.8% respectively. However, the business service and other services showed an alarmingly sharp decline of over 2%, which affected overall economy and employment growth.

From the Russian Arctic region, Sakha Yakutia was the only region to achieve positive, yet moderate employment growth, albeit only 0.7% annual growth on average. The construction sector was the main driver of employment development (annual average of +7.1%), while the relatively large sector of trade experienced decline (annual average of -2.2%). Employment in the largest sectors of education, health, public administration and producing industries remained stable in this region.

Lapland in Finland has maintained its positive slight employment growth with an average of 0.7% per year. For Lapland, accommodation and food services, business services, construction, and education and healthcare services created job opportunities, ranging from a maximum 3.5% growth to a minimum 1.5% growth. However, the producing industries and transportation sector failed to achieve any growth, with a decline from previous years, which may be attributable to a high level of automation in producing industries, and also in the transportation and storage sector. For Lapland, the trade sector remained unchanged.

In the Norwegian Arctic, Troms and Finmark had an average growth in employment at 0.5%. The construction sector and the accommodation and food services labor market experienced moderate growth, particularly crucial for Troms and Finmark after some decline in 2020. The sector with the largest employment — Education, Health and Public Administration grew on average with 0.5% per year. Producing industries and Business services grew by 1.2% and 1.3% per year. Employment in Trade and Transportation and storage showed a decline in the Troms and Finmark region, at a rate of -0.3% and -1.0% in average per year between 2017 and 2022.

In the Northwest Territories of Canada, total employment rose by only 0.4% annually, with growth in the education, health and administrative sector, construction, and

other types of employment. All other industries experienced a decline, especially the transportation and storage sector with -3.6% and in accommodation and food services -5.3%, which should be regarded as alarming.

In Nordland (Norway), the average employment change was positive, with a 0.4% increase per year in total. Here employment grew in Business services (1.9%), Accommodation and food services (1.5%), Producing industries (1.3%), Construction (0.5%). The largest employer — sector of Health, Education, and Public administration — remained rather stable and demonstrated a slight decline with -0.1% per year. Like Troms and Finnmark, Trade and Transportation and storage demonstrated a slight decline in employment in Nordland as well (-0.6% and -0.3%).

Norrbotten (SE) had an average of a minimum of 0.2% throughout the period 2017–2022. The highest growth occurred in construction with a 2.1% annual increase, followed by other services (1.8%) and business services (1.3%). Accommodation and food services grew by 1.1%, while producing industries saw a modest 0.2% rise. On the other hand, education, health, and administrative services experienced a decline of -0.8%, and transportation and storage saw the sharpest decline at -1.7%.

The smallest positive total employment change occurring in the Arctic was in Kainuu (+0.1%). Producing industries remained a significant employer, although growth was limited to 0.2% in Kainuu. The construction sector experienced a rise in employment after a decline in 2020, particularly in Kainuu, with an annual average of more than 3%. However, in overall annual changes, the trade, accommodation and food services, other services, and transportation sectors all showed a gradually declining trend, at a maximum of -3.2% for the transportation and storage sector.

Chukotka (RU) had an overall decline in employment growth, with a -0.1% change. However, in this region, the most significant and surprising growth was in the accommodation and food services sector, which increased annually by 14.5%. This reflects the practicality of the greatest amount of investment, which has grown over the years in this region. However, in other sectors the growth was either minimal or mostly negative, whereas in a small percentage of producing industries and other services, where the annual growth rates were 0.6% and 0.3%.

A similar overall employment trend change was noticed in the Yamal-Nenets Autonomous Okrug and Krasnoyarsk, with negative average changes, -0.2% and -0.4% respectively. Yamal-Nenets saw the highest growth in accommodation and food services at 2.8% and producing industries at 1.6%, with transportation and storage seeing a sharp decline of -4.6%. In contrast, in Krasnoyarsk, accommodation and food services grew by 2.6%, and transportation and storage by 2.2%, while producing industries declined by -2%. Both regions had producing industries as a dominant employer, with 27% in Krasnoyarsk and 31% in Yamal-Nenets.

In Alaska (USA), the overall annual change showed decline, at -0.5%. However, the transportation and storage sector employment saw a slight rise in Alaska with an annual average of 1.6%, other services were likewise positive, at 0.3%, business services showed neither growth nor decline. On the other hand, accommodation and food services saw the largest decline at -3.1%, followed by trade at -2%.

The bottom five in the Arctic region in employment decline were in Russia — Republic of Karelia (-0.7%), Nenets Autonomous Okrug (-0.8%), Arkhangelsk Oblast (-1.3%), Murmansk Oblast (-1.5%), and lastly — Komi Republic (-2.1%). Russia's Arctic regions are resource-rich, with producing industries (mostly dominated by mining, oil, and gas) and the public sector (education, healthcare, public administration) driving the labor market. Construction employment remained relatively strong, driven by major infrastructure projects, particularly in Nenets Autonomous Okrug, Republic of Karelia, and Arkhangelsk Oblast. This sector demonstrated growth in employment across most of the Russian Arctic, except for Murmansk and Komi Republic. The relatively small but promising accommodation and food services sector (associated with tourism) experienced employment growth in all these regions. A common issue across the Russian Arctic was the decline in public sector employment in all areas (except Sakha Yakutia), alongside a decline in the trade sector (except Krasnoyarsk).

The Republic of Karelia experienced a fairly stable employment situation with a slight annual average decline of -0.7%. Employment in education, health, and administrative services remained stable and continued to be the primary source of employment. The construction industry experienced some growth, up to 2.1%. Producing industries remained a key employer, although the sector showed a slight decline of -0.1%. Employment in trade began to recover after a significant decline in 2021. Business services grew by an annual average of 0.8%. Employment in the transportation and storage sector declined by an annual average of -5%.

In the Nenets Autonomous Okrug, employment in education, health, and administrative services remained relatively small (-0.2% annual average decline), although the public sector remained an important source of jobs. The construction sector experienced significant growth, with an annual average increase of 8.3%. Producing industries, while dominant, saw an annual average decline of -2.9%. Employment in the transportation and storage sector remained stable, with a 1.2% annual average change.

Arkhangelsk Oblast saw a decline of -1.3% in annual average employment from 2017 to 2022. Employment in education, health, and administrative services decreased slowly, by -1.1%. Construction employment grew moderately, by 1.4%. Producing industries remained a key employer despite a slight decline of -1%. Employment in accommodation and food services showed limited growth, at 1%. The trade sector experienced an annual average decline of -4.5%. Employment in transportation and storage remained stable, with an annual average growth of 1.1%.

From 2017 to 2022, Murmansk Oblast saw an annual average employment decline of -1.5%. Education, health, and administrative services, along with producing industries, remained key employers, with relatively stable figures of -0.2% and 0.4% respectively. The construction sector saw a sharp decline in employment, down by -2.9%. Employment in accommodation and food services saw slight growth, at 0.4%. The trade sector in Murmansk experienced a significant decline, with an annual average drop of -6.7% by 2022. Employment in transportation and storage declined by -1.5% per year.

Komi Republic experienced a total annual average decline of -2.1% in employment, the weakest position among all the regions. Education, health, and administrative services, as well as producing industries, remained key employers, although they saw total declines of -1.3% and -1.9% respectively. The accommodation and food services sector remained a stable source of employment, with 2.8% growth. The construction sector, however, experienced a sharp drop, down by -3%. Employment in the trade sector declined after 2019, and employment in the transportation and storage sector steadily decreased by -3.8%.

Photo: iStock, Eschenfelder

Town of Nanortalik, Greenland

The town of Nanortalik, known as the "Place of Polar Bears," serves as a hub for fishing, tourism, and transportation. This is a key port in southern Greenland, which operates seasonally from August to May, as the summer months bring large amounts of polar ice, which can hinder navigation.

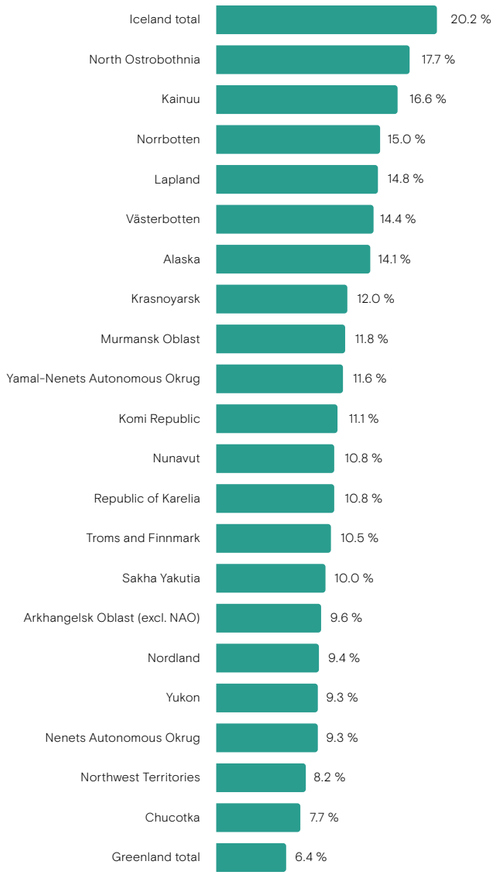
The port is essential to the local economy, supporting industries such as commercial fishing, which is a primary source of income for many residents. Additionally, the port facilitates tourism, attracting visitors eager to explore the stunning fjords, glaciers, and wildlife of the region. The port can accommodate vessels with a maximum length overall (LOA) of 90 meters and a draught of up to 6.5 meters. Facilities at the port include berths for break bulk, containerized cargo, liquid cargo, and passenger services.

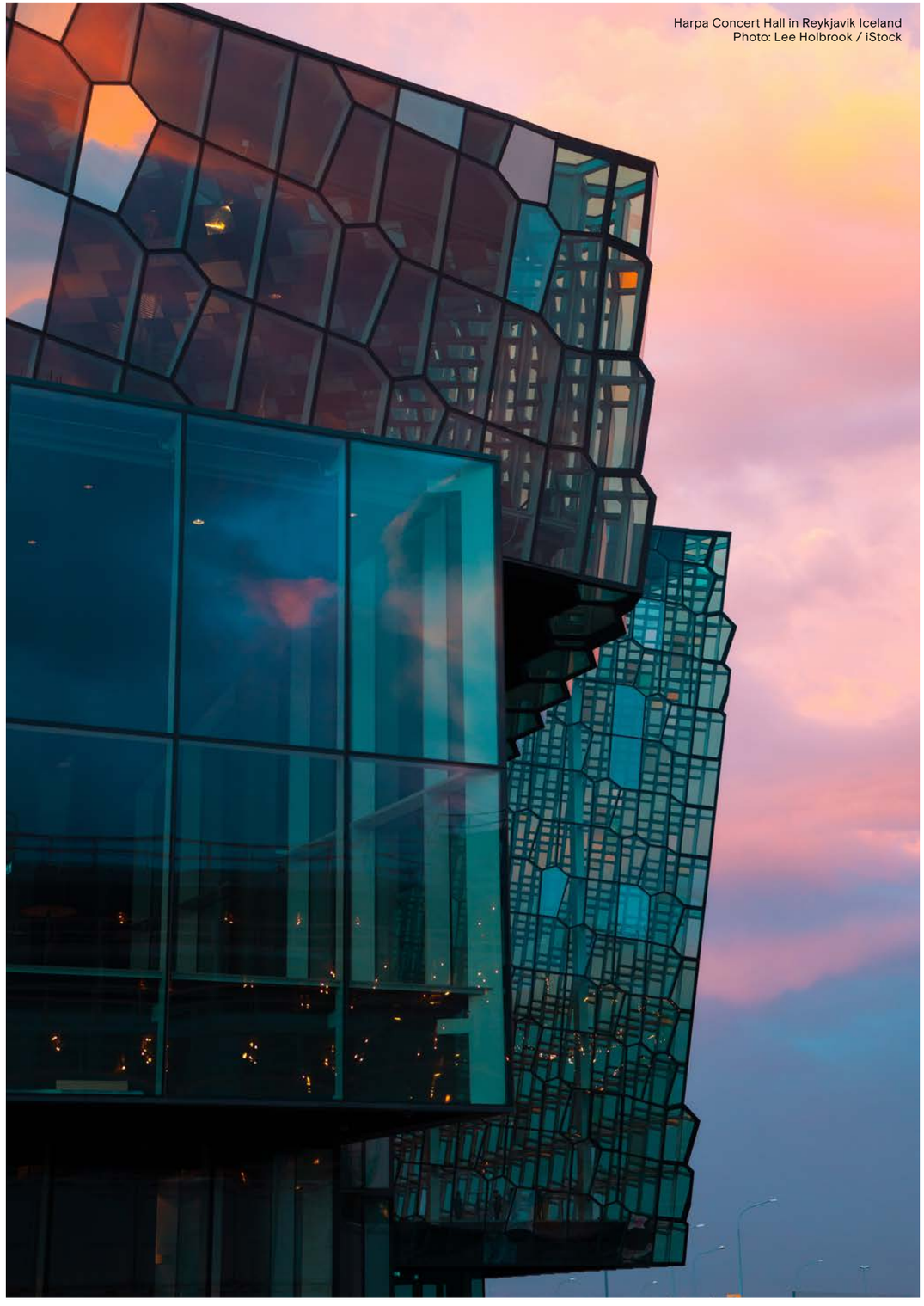
Importance of the business services sector

Our analysis reveals significant differences in employment in the business services sector right across the Arctic. Share of employment in business services ranges from 20.2% in Iceland down to 6.4% in Greenland, with other parts of the Arctic in-between. The business services sector is one of the most important contributors to cross-sectoral cooperation and innovation. This sector is the most gender-balanced, with highly educated employees with salaries well above average. The larger share of employees in business services means better potential to develop a knowledge-based economy and overcome dependence on natural resources in the Arctic. Business services include economic activities within information and communication, real estate, professional, scientific, and technical activities, financial and insurance activities, as well as administrative and support service activities.

The share of employees in business services across the Arctic regions varied a lot and ranged across countries from Iceland with 20.2%, to Greenland with 6.4%. The share of employees in business services across the Arctic regions of Canada, the USA (Alaska), Finland, Norway, Sweden, and Russia remained lower than the respective national averages. As the graph shows, the further north you go, the lower the potential for innovation-driven economies. However, Iceland stands out, with the highest share of employment in business services (20.2%), followed by North Ostrobothnia (FI) at 17.7%, and Kainuu (FI) at 16.6%. Of note, the city of Oulu in North Ostrobothnia, Finland, represented a remarkable exception. Oulu is a high-tech Arctic city with significant business activities, especially in ICT and health technology, making it a center of R&D intensity and advanced business services. In contrast, regions like Greenland (6.4%) and Chukotka (RU) (7.7%) have the lowest share of employment in business services, highlighting a limited presence of innovation economies in these more remote areas.

Figure 3.2 Employees in business services, % of total employment (average 2017–2022)





Harpa Concert Hall in Reykjavik Iceland
Photo: Lee Holbrook / iStock

Competitive spots of the Arctic labor markets

Covid-19 brought many challenges to Arctic economies and labor markets. However, some industries and regions survived Covid better than others and even increased the number of jobs. What were competitive spots on the labor market and where were the challenges?

The table below demonstrates the competitive component in industry segments across the Arctic regions. Competitive component[7] is a part of the industrial mix analysis based on employment statistics. This measure compares the development of regional employment in a certain industry with the national trend. The competitive component is calculated based on the difference between regional and national employment change rates for a period[8]. In our case, the period is 2019–2022 — the years before and after Covid-19. The competitive component shows how many extra jobs the regional industry could either retain or create compared to the national industry trend. The competitive component for all industries together is presented in the last column of the table as % of total regional employment.

The main building in the new airport in Nuuk which is going to be the heart in international travel to and from Greenland
Photo: carstenbrandt / iStock

[7] The Competitive Component was developed by Ireland and Moomaw (1981) to test the competitive share of the shift-share model as a measure of the region's competitive advantage. It defines the Competitive Component as the difference between the regional and national growth rates for an industry.

[8] This is calculation example for competitive component: number of people employed in Producing industries in Alaska in 2019 was 33672, in 2022 — 34788. This means that between 2019 and 2022 the number of employed increased by 3.31%. Corresponding change for US Producing industries nationwide was 1.90%. Competitive component for Alaska Producing industries is calculated as follows: 33672*(3.31%-1.90%) = 477.

Table 4.1 Competitive component in region-industry employment segments, 2019–2022

Competetive component	Accommodation & food services	Business services	Construction	Education, health and adm service	Other services	Producing industries	Trade	Transportation and storage	Competitive component, % of total industries
Nunavut	33	0	-245	-406	191	1 611	391	-7	8.6%
Yukon	-28	319	385	240	179	510	-202	-219	3.4%
North Ostrobothnia	35	598	111	545	-135	634	342	257	1.5%
Sakha Yakutia	422	-17	-6 467	5 958	166	2 589	-1 436	1 826	0.6%
Iceland	183	-1 143	244	3 535	397	-294	125	-1 769	0.2%
Nenets AO	-39	188	1 080	-228	82	-1 451	334	42	0.0%
Chucotka	-55	-74	-13	-131	-44	767	-95	-274	0.0%
Arkhangelsk Oblast	621	-418	2 364	-106	417	608	-4 244	406	-0.1%
Västerbotten	138	191	47	-1 271	-528	1 410	289	-142	-0.3%
Republic of Karelia	544	362	-84	1 354	132	3 498	-902	-7 521	-0.8%
Lapland	214	-200	265	244	-170	-957	15	-123	-1.3%
Northwest Territories	-279	70	417	629	172	-183	-293	-111	-1.3%
Kainuu	-64	-197	135	-30	-145	-78	-34	-25	-1.6%
Greenland	122	-136	228	-183	-86	-445	132	-9	-1.9%
Yamalo-Nenets AO	-511	-3 164	2 497	-1 528	-937	6 223	-1 111	-11 850	-1.9%
Troms and Finnmark	-423	-576	-519	-1 111	-148	200	-403	-162	-2.7%
Norrbotten	-162	-577	130	-1 742	-46	-170	-77	-488	-2.9%
Nordland	-55	-18	-402	-2 327	116	148	-641	240	-2.9%
Alaska	-1 578	-3 421	-581	-7 965	-488	477	-3 943	-3 086	-5.8%
Murmansk Oblast	-846	-2 487	-2 831	1 637	-1 658	-1 240	-9 419	-5 774	-6.5%
Komi Republic	73	-3 851	-7 337	-1 460	-1 980	-2 809	-7 639	-8 631	-8.9%
Total	**-1 654**	**-14 552**	**-10 577**	**-4 347**	**-4 512**	**11 048**	**-28 811**	**-37 419**	**-1.2%**

Shift working settlement of a gold mine, Mayskoye, Chukotka Autonomous Region, Siberia, Far East of Russia.
Photo: Andrei Stepanov / Shutterstock

The table indicates what segments of the labor market survived Covid better (cells with green background) or worse (cells with red numbers) than the nationwide industries of the corresponding countries. For Greenland and Iceland, we used the average employment change for the Arctic countries (except Russia) as a reference to calculate the competitive component. Thus, for Greenland and Iceland, the table shows those segments of the labor market with better or worse performance than average for the corresponding industries of the eight Arctic countries.

Please note that the competitive component is not always a pure number of jobs created or lost. For example, even in cases when regional employment decreased, the competitive component may be positive if nationwide employment also decreased but at a higher rate than the regional rate. In our table, such segments of the labor market (where regional employment decreased but at a lower rate than national trends) are shown in red-bordered cells with positive values. Furthermore, the competitive component may be negative even in case of positive change in regional employment (in such cases, shown in the table as green-bordered cells with negative values, national employment increased at a higher rate than the regional rate).

The Arctic regions of eight countries differ in size, economic structure, and not least in the statistical methods applied by national agencies (e.g. for North Norway offshore oil and gas is not included in the employment statistics while for Arctic Canada, Russia, and US Alaska oil and gas is included). In this respect, the competitive component table should be used to evaluate the industrial mix for each region. Do all industries develop better than the national average or are there specific industries which are doing better or worse? As we see, the overall competitive component (all industries considered together) is positive for Nunavut, Yukon, North Ostrobothnia, Sakha Yakutia, and Iceland. The best (most balanced) industrial mix is probably in North Ostrobothnia. Here seven out of eight industry segments developed better than the national average.

Even if total competitive components in Nunavut and Yukon are higher (8.6% and 3.4%), this is due to solid development in the producing industries, while several other sectors were in declining.

Producing industries are the main driver of the competitive component in the Arctic in general (please see the bottom line of the table), while all other industries in many cases had weaker performance than their respective national averages. This indicates continued heavy reliance on natural resources. Producing industries, according to the classification used, include both mining and manufacturing, as well as fishing, agriculture, electricity, and water supply. Yet the manufacturing sector is relatively small throughout the Arctic.

Photo: Oura media kit

Oura Ring — Finland

The Finnish hi-tech industry is famous for its innovation and advanced technologies, with Oulu a central hub for this thriving sector. One notable company within the Oulu business cluster is Oura, the creator of the Oura Ring. This smart ring made from aerospace-grade titanium is known for its ability to track sleep, physical activity, and overall health metrics with high precision.

The city of Oulu is home to numerous high-tech companies and research institutions, stimulating a collaborative environment that drives innovation. Companies in Oulu benefit from access to cutting-edge research, quality talent, and supportive infrastructure, making it a significant contributor to Finland's reputation as a leader in technology.

Sources:
https://ouraring.com
https://www.businessoulu.com/en/

Value creation

Gross Value Added, abbreviated as GVA, is a well-known and commonly used measure geared towards assessing the contribution to an economy of an individual producer, industry, sector, or region. There are two main approaches to determining regional GVA, namely the production approach and the income approach. As far as the production approach is concerned in this report, GVA is defined as turnover (or sales) less the cost of bought-in materials and services (excluding employee costs) at a company level. At an aggregate regional level, it is calculated as the difference between the total value of goods and services produced in a particular region and the cost of raw materials and other inputs used in production.

Between 2017 and 2021, the Arctic regions experienced diverse trends in Gross Value Added (GVA) across various industries.

In Canada, GVA data from 2017 to 2021 shows a positive strong economic performance in Nunavut and Yukon. Nunavut displayed strong growth, with a 5.9% total GVA increase driven by a 14.4% rise in producing Industries and a 9.3% jump in accommodation and food services. Yukon saw a moderate overall GVA increase of 3.0%, with producing Industries performing well (13.4%), while transportation and storage decreased by 7.3%. Northwest Territories demonstrated negative GVA change for the same period (-1.8% per year on average), mainly due to some decline in GVA of the producing industries.

In Alaska, overall GVA declined by 1.2%, with particularly significant drops in producing industries and other services. By contrast, some sectors like accommodation and food services and business services showed modest growth. However, the US overall experienced a moderate overall growth in Gross Value Added (GVA) at 2.3%, driven primarily by strong performance in the business services sector, which grew by 4.4%. Drop in oil price between 2018 and 2020 possibly explains weaker GVA development for Alaska in the period.

In Finland, overall GVA growth was minimal (0.8%), with sectors like business services (2.2%) and construction (0.6%) showing moderate growth, while accommodation and food services fell sharply (-6.1%). Kainuu's GVA remained stable (0.8%), buoyed up by business services (3.4%) and producing industries (2.6%). Lapland experienced a slight decline in total GVA (-1.4%), driven by significant losses in accommodation and food services (-12%) and other services (-3.7%). North Ostrobothnia, however, performed relatively well with a 1.9% GVA increase, supported by strong growth in producing industries (2.9%) and business services (3.9%).

Similarly, Greenland's economy saw modest overall growth with a GVA increase of 1.2%. This was largely driven by the education, health, and public administration sectors (3.6%) and other services (4.0%), while producing industries showed a slight decline (-0.7%).

Iceland experienced moderate growth with a 1.2% rise in GVA, driven by strong performances in producing industries (3.3%), accommodation and food services (3.0%), and education, health, and public administration (3.4%). The construction sector remained stagnant, growing just 0.1%, while transportation and storage showed a notable decline (-7.1%), which slightly tempered overall economic expansion.

Norway overall saw a 1.6% increase in GVA, with producing industries leading the way at 11.0%. However, Nordland experienced a decline in GVA of -1.8%, with significant challenges across multiple sectors. The steepest decline occurred in transportation and storage (-20.0%), followed by declines in business services (-1.9%) and construction (-2.3%). Similarly, Troms and Finmark faced a GVA contraction of -2.3%, with significant declines in accommodation and food services (-9.9%), construction (-2.8%), and business services (-3.7%). Reason for the relatively weak development of GVA in Norway in this period was high GDP inflation in 2021 after sharp increase in oil price from 2020 to 2021.

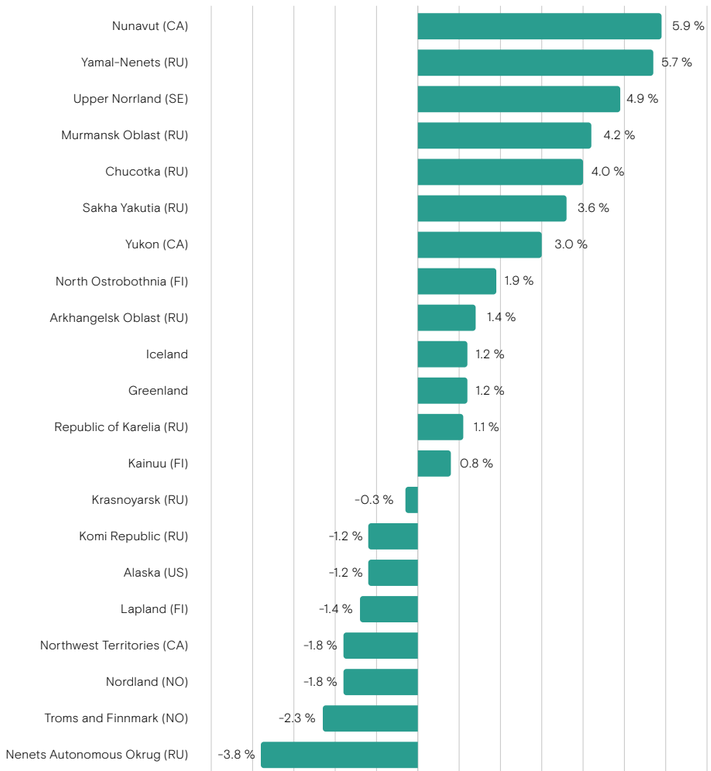
On the other hand, Sweden and regions like Upper Norrland showed a more robust performance, with a GVA increase of 4.9%, aided by strong growth in the construction (4.1%) and producing industries (13.4%).

Meanwhile, Russia's Gross Value Added (GVA) showed a modest overall growth of 2.4%, reflecting a diverse performance across various sectors and regions. The Arkhangelsk Oblast demonstrated resilience, particularly in business services, which grew by 4.8%, and producing industries, which expanded by 3.3%. Conversely, the Nenets Autonomous Okrug struggled significantly, with a decline in GVA of 3.8%, largely due to severe decline in accommodation and food services (-4.7%) and other services (-16.8%). The Sakha Yakutia region exhibited robust growth, especially in accommodation and food services, which surged by 16%. Additionally, the Yamal-Nenets Autonomous Okrug saw a substantial increase in producing industries (9.1%) but faced challenges in other areas like trade (-9.1%).

This variability across the Arctic underscores the varying impacts of economic conditions and regional policies on GVA, reflecting a complex and multifaceted economic landscape within the Arctic.

Given that data for the GVA of Norway and Greenland in 2022 are currently unavailable, we have chosen to focus our analysis on the period from 2017 to 2021 to maintain consistency. Additional data for 2022 can be assessed on Power BI.

Figure 5.1 GVA, annual average change, 2017–2021



The figure shows inflation adjusted annual average change in Gross Value Added (GVA) for 2017–2021. Due to non-availability of data for some regions, data were selected for the report go up to 2021, but if you go to our link below, you can check the updated report based upon the available data, i.e. — 2022.

Please go to MS Power BI online tool to further explore GVA and other value creation statistics.

Power BI

Photo: Johan Wildhagen / Norwegian Seafood Council

Nordland, Norway: Salmon farm cages

Northern Norway combines traditional fishing practices with modern, eco-friendly techniques. This region, known for its pristine waters and rich marine biodiversity, emphasizes sustainable harvesting methods to ensure long-term fish population health. In 2021, Norway's aquaculture sector produced approximately 1.5 million tonnes of farmed fish, primarily Atlantic salmon and rainbow trout, with a total farm gate value of around 85.7 billion NOK. North Norway regions Nordland, Troms and Finnmark are pivotal in this industry, significantly contributing to Norway's overall aquaculture output.

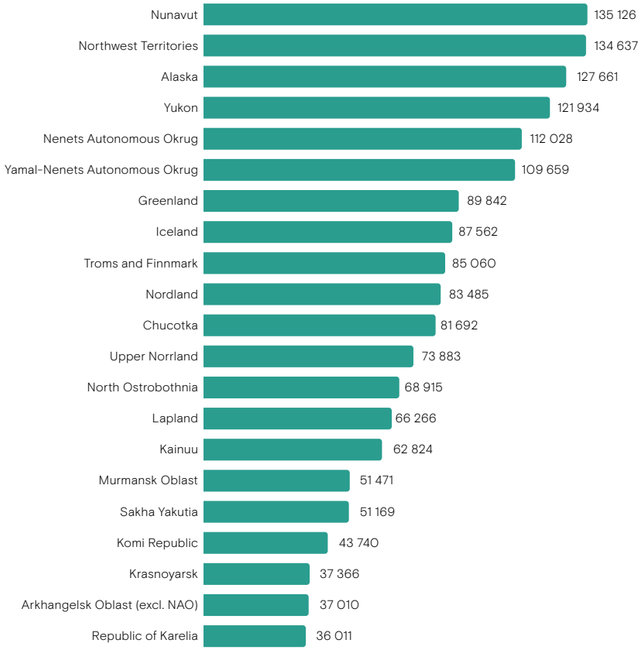
Sources:
https://www.fiskeridir.no/English/Aquaculture/Statistics
https://www.innovationnewsnetwork.com/changing-face-norwegian-aquaculture-industry/16282/

Understanding of Gross Value Added in terms of change (economy growth rates) is necessary but not sufficient. One should also pay attention to the size of the economy and to the efficiency of the economy. In this respect, let us also consider GVA per worker. This is a proportional productivity measure which can be used to compare regions of different size.

The graph primarily illustrates the Canadian economy's positive and significant economic contribution, reflected in the positions of Nunavut and Northwest Territories at the top – by prioritizing industries like education, health, and public administration, as well as business services. Joining them in the top five are Alaska, Yukon, and the Nenets Autonomous Okrug, all of which achieve GVA per worker figures exceeding $112,000 USD PPP. In addition to the Canadian territories, Alaska also demonstrates a prominent economic impact, focusing on education, health, and public administration, while the Nenets Autonomous Okrug distinguishes itself with a strong emphasis on construction. It is important to note that the top five regions are remote and highly reliant on extraction on natural resources. Meanwhile, Greenland, Iceland, Norway, Sweden, and Finland show moderate economic outcomes, often primarily driven by education, health, and public administration. Iceland's economy, on the other hand, focuses predominantly on business services. Finnish Arctic regions have the lowest GVA per worker in the North Nordic area.

Russia's Chukotka demonstrated rather high GVA per worker, which is mainly associated with the mining industry. On the other hand, regions like the Republic of Karelia and Arkhangelsk Oblast in Russia, as well as Krasnoyarsk, have considerably lower GVA per worker. For Russia, significant differences can be seen between different regions, where the Nenets Autonomous Okrug and Yamal-Nenets Autonomous Okrug are at the top. At the same time, the bottom six regions in the chart also belong to Russia, showing a vast difference and discrepancies in the development of their Arctic Region. This inequality suggests a significant variation in economic productivity and industry structure between different northern and Arctic regions.

Figure 5.2 GVA per worker, USD PPP (average 2017–2021)



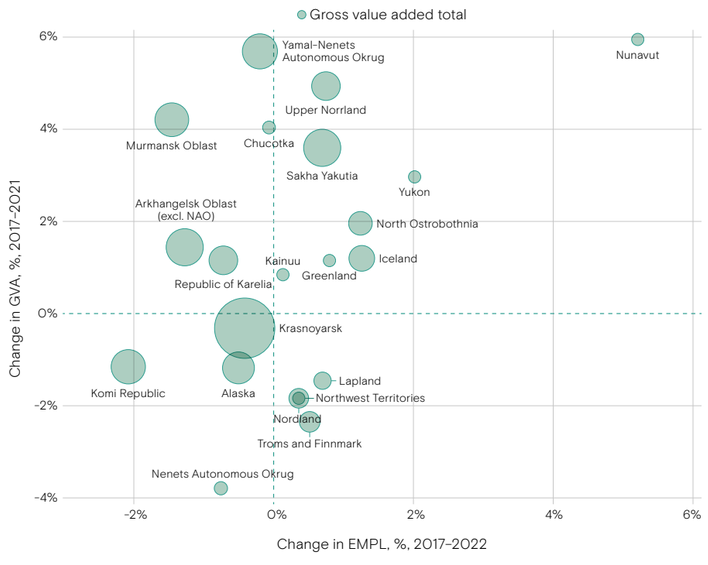
This graph shows GVA per worker (average for 2017–2021) for combination of industries: Accommodation and food services, business services, education, health and public administration, construction, each in calculation weighted by number of workers.

GVA and employment statistics for these industries are comparable for the whole Arctic. We could not compare GVA in producing industries due to different statistics standards related to oil and gas industries.

Is Arctic business socially sustainable?

The Arctic is rapidly changing and creating opportunities. These opportunities are growing in numerous ways and seeking to be the center of attraction for the future. Nowadays, the Arctic is a hotspot for geopolitics, investment opportunities in fossil fuel and mineral exploration, renewable energy, technology-based innovations, hydrogen-fueled ships, healthcare technology, and many more. Despite national and international investments and economic growth, this does not automatically result in being socially sustainable, which remains a burning question — does Arctic economic development need people? Rather, it depends on how any region is advancing itself to create socio-economic value through achieving high Gross Value Added (GVA), growth in employment, and fair distribution of welfare and income among the population. Let us start this discussion by considering GVA change and employment change on one graph. This will show us if economic development is associated with job creation. The bubbles on the graph represent the Arctic region with sizes proportional to total employment.

Figure 6.1 GVA and Employment change rate in the Arctic regions (bubble size proportional to total employment in each region)



The figure shows inflation adjusted annual average change in Gross Value Added (GVA) for 2017–2021 compared with annual average change in employment 2017–2022. The bubbles on the graph represent Arctic regions with sizes proportionate to total employment. GVA data for Norway and Greenland for 2022 were not available.

The chart shows that Nunavut emerges at the top, exhibiting significant growth in both Gross Value Added (GVA) and highest employment, suggesting robust economic and social development. Similarly, Yukon shows balanced growth on both dimensions, although at a more moderate level, indicating sustainable progress. Upper Norrland, Sakha Yakutia, and Yukon exhibit economic growth accompanied by moderate employment gains. This alignment of positive GVA and employment trends suggests a balanced and sustainable development trajectory. On a smaller scale and in a cluster, North Ostrobothnia, Greenland, and Iceland show positive changes in GVA and create job opportunities for their residents.

Yamal-Nenets Autonomous Okrug got a higher GVA percentage, whereas there was a negative employment gain. Clustered regions like Murmansk, Chukotka, the Republic of Karelia, and Arkhangelsk Oblast showed a similar trend to Yamal-Nenets. This depicts the economic growth driven by capital-intensive or highly productive sectors, such as resource extraction or energy industries. These sectors contribute significantly to GVA but do not require many workers, leading to economic gains that are not widely shared through job opportunities.

A noteworthy observation is the clustering of several regions — Komi Republic, Nenets Autonomous Okrug, and Alaska — in the lower left quadrant, indicating declines in both GVA and employment. These regions are experiencing significant socio-economic challenges, characterized by contracting economies and shrinking workforces. Such a combination could indicate long-term structural issues or external economic shocks affecting these areas.

Other regions, such as Krasnoyarsk and Arkhangelsk Oblast (excluding NAO), display a slight increase or stabilization in GVA with minor decline in employment. This could suggest a shift toward higher productivity or automation, where economic output is maintained or improved despite a reduction in the workforce. Kainuu and the Republic of Karelia also show slight economic growth with stable or declining employment, pointing to potential issues in generating inclusive economic opportunities.

Regions like the Northwest Territories, Lapland, Nordland, and Troms and Finmark indicate positive but minimal employment growth, yet a decline in GVA changes for the period 2017–2021. Whereas territories like Krasnoyarsk, Alaska, Komi Republic, and Nenets Autonomous Okrug have both negative remarks in GVA and the employment sector, raising serious concerns about maintaining the socio-economic balance and a proper standard of living. Such trends also highlight the challenges of sustaining economic growth while supporting employment in regions with limited economic diversification.

Overall, the bubble chart illustrates that in the Arctic regions, few areas demonstrate sustainable development progress, while others face significant socio-economic challenges. The contradictory paths of these regions highlight the complexity of achieving balanced growth and the need for tailored policy interventions to address the unique circumstances of each area.

Income inequality

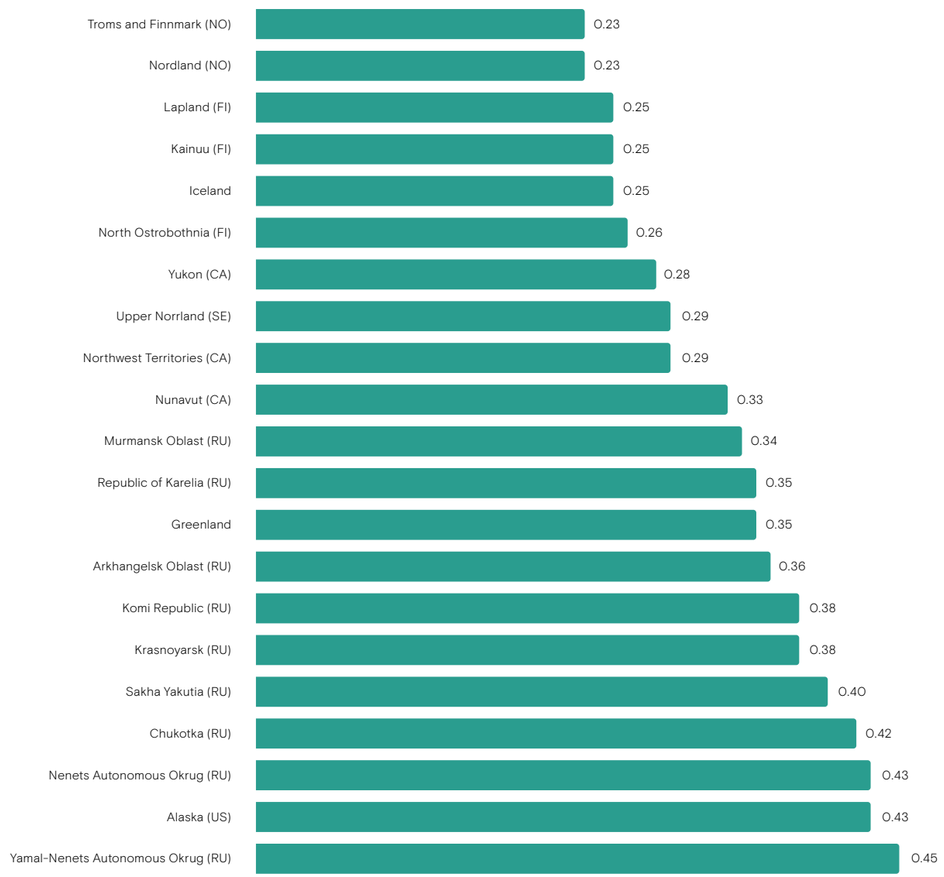
Alongside economic growth and job opportunities, one should keep an eye on the distribution of income in society. Sometimes, overall economic development goes hand in hand with growing income inequality within the population. The GINI coefficient is used to measure income inequality among individuals in the distribution of disposable income in a country or a region. The GINI coefficient is based on the comparison of the cumulative proportions of the population against the cumulative proportions of income they receive, and ranges between 0 in the case of perfect equality and 1 in the case of perfect inequality. A higher GINI coefficient indicates greater inequality, with high income individuals receiving much larger percentages of the total income of the population. Conversely, a lower GINI coefficient indicates a situation where income is more equally distributed among the population.

A proper fair and balanced distribution of income is a prerequisite for improved quality of life, social justice and — for higher income countries — innovativeness, economic development, and high labor productivity. The figure below shows GINI coefficients for the Arctic regions (average for 2021–2022).

What is a good GINI score? The top 12 countries with a clear advantage in terms of both the Human Development Index and the Global Innovation Index in 2024 demonstrate a range of GINI coefficients between 0.27 (average for the Nordic countries — Iceland, Denmark, Norway, Finland, Sweden) and over 0.4 (USA 0.41, Singapore 0.452, Hong Kong 0.539). The others lie in between (Germany 0.289, Switzerland 0.299, UK 0.351, South Korea 0.355). The average GINI for the top 12 countries is 0.336. Based on the given benchmark, we can see that the minimum and maximum GINI scores for the Arctic regions range from 0.23 to a maximum of 0.45. If we consider setting it on a scale, we can assume 0.23 to 0.29 as a low/good GINI score (yet too low GINI may indicate a lack of healthy competition), 0.3 to 0.38 as a moderate score, and 0.4 and above score as income inequality or alarming/high GINI score.

Therefore, if we reflect on the Arctic regions shown in the graph, we can see that the "Good GINI" or low-income inequality score belongs to regions such as Troms and Finmark, Nordland, Lapland, Kainuu, Iceland, North Ostrobothnia, Yukon, Upper Norrland, Northwest Territories. Regions like Nunavut, Murmansk Oblast, Republic of Karelia, Greenland, Arkhangelsk Oblast, Komi Republic, and Krasnoyarsk have "moderate GINI," which refers to indicating moderate income inequality in these regions. Furthermore, if we consider the rest of the areas, i.e., Sakha Yakutia, Chukotka, Nenets Autonomous Okrug, Alaska, and Yamal-Nenets Autonomous Okrug, these regions have High GINI scores and reflect high income inequality.

Figure 6.2 Income inequality (GINI), average 2021–22



Yamal, Russia: Yamal LNG

Yamal liquefied natural gas plant (Yamal LNG) is located in the North-Eastern part of the Yamal Peninsula in the Yamal-Nenets Autonomous District. The project is based on the South-Tambeyskoye field discovered in 1974. Yamal LNG is an integrated project encompassing natural gas production, liquefaction and shipping. Sabetta on the eastern coast of the Yamal Peninsula is the home base of the project. Development of the Yamal LNG infrastructure and shipping of LNG has become one of the key drivers for the Northern Sea Route.

A set of socio-economic indicators

To understand if the regional businesses develop in economically and socially sustainable ways, we must consider the selected indicators in combination. The table below compares Income inequality (average GINI for 2021-22), GVA development (annual change 2017-2021), GVA per worker (average for 2017-2021), and employment development (annual change 2017-2022).

Color grades are as follows — favorable state or trend, stable or moderate state or trend, unfavorable state or trend.

Table 6.1 Assessment of Arctic Value creation with a set of Socio-Economic indicators

Region	Income inequality	GVA development	GVA per worker	Employment development
Troms and Finnmark (NO), Nordland (NO), Lapland (FI)	Low	Negative	Moderate	Stable
Northwest Territories (CA)	Low	Negative	High	Stable
Kainuu (FI)	Low	Stable	Moderate	Stable
Iceland, North Ostrobothnia (FI)	Low	Stable	Moderate	Positive
Yukon (CA)	Low	Positive	High	Positive
Upper Norrland (SE)	Low	Positive	Moderate	Positive
Nunavut (CA)	Moderate	Positive	High	Positive
Murmansk Oblast (RU)	Moderate	Positive	Low	Negative
Republic of Karelia (RU), Arkhangelsk Oblast (RU)	Moderate	Stable	Low	Negative
Greenland	Moderate	Stable	Moderate	Stable
Komi Republic (RU), Krasnoyarsk (RU)	Moderate	Negative	Low	Negative
Sakha Yakutia (RU)	High	Positive	Low	Stable
Chukotka (RU)	High	Positive	Moderate	Negative
Nenets (RU), Alaska (US)	High	Negative	High	Negative
Yamal-Nenets (RU)	High	Positive	High	Negative

Norway's arctic regions of Troms and Finmark, and Nordland had slightly declining GVA in 2017-2021, but a moderate productivity rate and equal wealth distribution make them socially sustainable. However, it is noteworthy that Norway does not add the income generated from the Oil and Gas sector to their regional account. In 2017-2021, Norway nationwide had moderate GVA based growth (1.6% on average per year), which was the reason for poorer GVA development at the regional level, as shown in the statistics. At the same time, Lapland in Finland showed characteristics like those of Norwegian Arctic territories. Observations of the selected indicators for longer time series are necessary to assess if the region is on a sustainable development path with balanced development of economy and labor market.

The Northwest Territories of Canada had a socio-economic, sustainable profile. The other Nordic Arctic regions also showed signs of social sustainability. For example, Finland's Arctic regions had low inequality of income and stable employment development, and, apart from Lapland, the GVA development was also stable, with moderate productivity and, overall, a good economic infrastructure, which is an example of moderate sustainability. For Sweden, Upper Norrland stands out in creating job opportunities, a positive GVA, and in keeping income inequality at a low level. Their productivity was also at a moderate level, indicating overall economic stability and sustainability. On the other hand, Kainu, another Finnish region, had low-income inequality, yet was moderate on other economic indices, where they can have a look at how to improve their economic restructuring, bringing investments in sustainable business.

For Iceland, income inequality is low, and job creation is positive; however, the GVA is not as high as others and the productivity is moderate, so the sustainability can be considered moderate, as in North Ostrobothnia in Finland. For Greenland, all the indicators are at a stable/moderate level, showing stability overall. The trend for Canada varies, with differing characteristics in different regions. For example, the Northwest Territories had low-income inequality and employment creation, with socio-economic sustainability. These areas should focus on achieving diversity in terms of their economic activities, bringing more investments, and might also try to focus on the resource constraints. Other Canadian regions such as Nunavut and Yukon demonstrated positive GVA development, high employment and productivity, with low/moderate income inequality, which is in general good for the economy and can be considered socially sustainable.

For Russia's Arctic regions, we see a varied socio-economic situation. The Russian Arctic economy show the dominance of oil and gas, and other natural resource extraction, which is low labor intensive, creating fewer employment opportunities, and income inequality is high. At the same time, due to the influx of "petro-currency" or income from extracting natural resources, the GVA development of regions like Yamal-Nenets, Murmansk Oblast, Chukotka, Sakha Yakutia remained positive. This indicates Russia's heavy dependency on the producing industries (specially mining and oil and gas) and likewise demonstrates the urgency of creating diversity to be more sustainable in socio-economic factors. However, it may be somewhat difficult to change the nature of their investments and outcome at once, but through continuous research and development, and consistent policies it may be possible. Also, as resource extraction is not considered conducive to environmental sustainability, the diversity will be helpful for regions like Komi Republic, Krasnoyarsk, and Nenets Autonomous Region, where the GVA development was still negative.

Alaska in USA, where industry and welfare in many ways depend on oil extraction has a similar profile to that of Nenets Autonomous Region in the Russian Arctic. Like the Russian resource-producing regions (Yamal-Nenets, Nenets), in Alaska we can see a combination of high economic value creation combined with high inequality in income distribution. To some extent, income inequality in Alaska is reduced with Permanent Fund distributions, which is an important instrument reducing poverty.

Photo: Growcer media kit

Canada: Growcer vertical farming

Growcer, founded by Corey Ellis and Alida Burke in 2015, aims to make fresh, local produce accessible year-round to Northern Canadian communities despite challenging climates. Using advanced hydroponic vertical farming techniques, including their Osiris initiative, Growcer's systems are designed to withstand extreme temperatures and promote robust crop growth.

Since a successful pitch on Dragon's Den, Growcer has expanded significantly, partnering with over 70 growers and employing 30 staff members. Their work includes collaborations with Indigenous communities and educational institutions to promote food sovereignty and educational opportunities, making substantial societal impacts through sustainable agriculture solutions.

Sources:
https://www.thegrowcer.ca/growing-systems
https://www.cbc.ca/dragonsden/pitches/the-growcer

Think-box: AI effect on Arctic value creation and employment?

According to the Norwegian Perspective on the Arctic Future, AI can be capable of doing greater things, such as scientific data analysis, efficient reporting, expediting ways to solve Arctic challenges, promoting sustainable developments, high-end automation, improving remote areas, and enhancing the chance of battling the climate changes in a better way. However, there are risks, too. High automation, elaborative data analysis, and machine learning can reduce the number of job opportunities in the Arctic region, which will impact both intellectual and labour-based jobs, which can be alarming. For example, lots of initiatives for driverless buses are ongoing, of course, with the help of AI, and if they succeed in the near future, we may not have any jobs for drivers at all. Not only in labour-intensive jobs, many operational-level and mid-level management employees may also lose their jobs. In a recent study on Job Security in the Artificial Intelligence era, researchers have argued that if automation continues through the help of AI, the percentage of job losses can be between a minimum of 9% and a maximum of 47% by the year 2030. However, AI is creating jobs, too, and new opportunities are coming to the skilled youth that were not there before.

While the Arctic economy is largely dependent on fuel and mineral extraction, AI can vastly expedite research on renewable energies, decarbonization of extractive industries and can help to cut down both emissions and costs. Also, through the AI-based analysis for the oil and gas sector and mineral extractions, finding its whereabouts, the extraction percentage, or the economic viability can be quicker and more efficient. It will help to cut down the costs where every penny counts. There can be fruitful progress in other sectors like fishing and aquaculture, reindeer herding, sustainable tourism, mineral extractions, etc, which can eliminate the GVA value creation gap, and employment opportunities. For example, a North-Norwegian Start-up called Eagle AI is working on locating the fish using satellites, which will ease the effort, cut the costs of fuels, and reduce the contamination of the sea. For the indigenous peoples, climate change has disrupted their reindeer herding, but GPS technology and advanced weather forecasting have already helped address issues like inconsistent snow cover, altered migration patterns, and increased predation risks. With AI, these solutions could become more accessible and affordable, enhancing economic and environmental sustainability. Food security is another big challenge here, but through AI and advanced R&D, can increase productivity.

Even though AI can help us push the Arctic economy and productivity forward, it may compromise future employability. This brings the urgency to reform education to equip youth with the right skills for the future. As for policies, they should be designed to secure equal access to knowledge and technology in the population. Availability and quality of education are important prerequisites.

AI generated picture (Co-Pilot).
Request: renewable energy and mining for critical minerals in the Arctic where AI and robots/machines are extensively used, and ***the role of people is minimal***

AI generated picture (Dall-E 3).
Request: renewable energy-based workplace in the Arctic where AI and robots/machines are used, but ***people are in the central role*** *and their presence is essential/maximum*

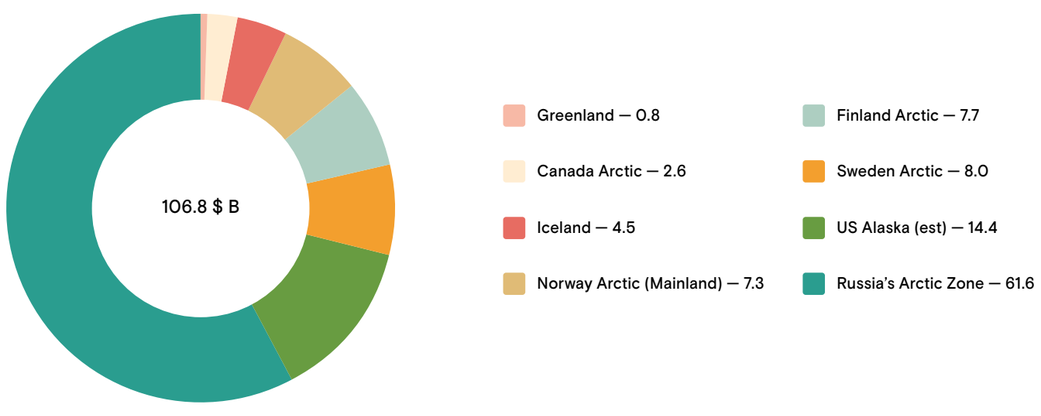
Investments

Arctic investments among the Arctic nations are driven by national priorities that reflect each country's strategic, economic, environmental, and defence interests in the region. The Arctic is increasingly seen as a zone of critical importance due to its natural resources, geostrategic position, and environmental significance.

A heavy reliance on natural resources such as oil and gas, minerals, seafood, and fisheries is common for Arctic economies from an international perspective. Total annual Arctic investments (including both governmental and private, own and attracted investments) are estimated at 106.8 Bill USD in Purchasing Power Parities (PPP) (average 2017–2021).

Russia accounts for 50–60% of all Arctic investments. The rest 40–50% is distributed among the seven other Arctic nations. The graph below compares total investments (measured as Gross Fixed Capital Formation GFCF[9]) across Arctic areas of the eight Arctic countries.

Figure 7.1 Arctic investments, Bill USD per year (average 2017–2021, USD PPP)



The figure shows average GFCF (investments) for 2017–2021 in Bill USD PPP (Current prices). The value for Arctic Norway (regions of Nordland, Troms and Finnmark) does not include investments in offshore oil and gas as they are registered in national accounts, not regional accounts. If considered, offshore oil and gas investments related to the Norwegian Arctic would add about 1.5 BIll USD PPP.

The value for the United States (Alaska) is estimated based on strong correlations between the regional Gross Value Added (GVA) and the GFCF across Arctic regions and countries. State level data on GFCF in the United States are not available.

The figure shows total investment for the Russian Arctic Zone according to its official definition. Total investments for the Russian Arctic regions considered in this report amount 83.8 Bill USD PPP.

Power BI

Please go to MS Power BI online tool to further explore investments statistics.

[9] According to the Organisation for Economic Co-operation and Development (OECD), GFCF is defined as the acquisition of produced assets (including purchases of second-hand assets), including the production of such assets by producers for their own use, minus disposals.

Russia

The most investment-intensive segments of the Russian Arctic are resource extraction and transportation industries in Yamal-Nenets, Sakha Yakutia, Krasnoyarsk North, Komi, Nenets, and Murmansk. In addition, essential investments are made in the manufacturing sector in Murmansk, Krasnoyarsk North, and Yamal-Nenets. Yamal-Nenets also receives substantial investments in the sector of professional, scientific, and technical activities. In total, 80% of all Russian Arctic investments were concentrated in these regions and industries in 2017–2022. Please refer to a special BIN report focusing on Russian Arctic investments.

While the relatively small economies of Chukotka and the Republic of Karelia have seen growth in investments, larger regions like Arkhangelsk Oblast, Yamal-Nenets Autonomous Okrug, and Skaha Yakutia have experienced more subdued progress or even decline. Petroleum based regions of Nenets and Komi have experienced the most significant decline in investments in the Russian Arctic. The less oil-dependent regions of Murmansk, Krasnoyarsk-North maintained stable investment levels during the period 2017–2022 — apparently due to the solid industrial sector, and the development of transportation infrastructure. All in all, the total volume of Russian Arctic investments grew only by 0.9% on average per year in 2017–2021 (if adjusted for inflation, the Russian Arctic investments declined by 3.3% in average per year). Possible explanations for this are the diminishing of foreign investments (due to sanctions) and the nationwide decline in investments in the extraction industries during the period.

Norway, Sweden, Finland

The average annual growth of investments in the North Calotte (comprising the northern regions of Norway, Sweden, and Finland) was 6.7%, per year in 2017–2021, which is higher than for Norway, Sweden, and Finland as a whole. While all three countries prioritized investments in the public sector and electricity, Norway's key investment sectors focused on the production of goods and services, as well as oil and gas extraction, including related services. In contrast, Sweden placed greater emphasis on investments in service production. However, each Arctic region within these countries has its own specific investment priorities.

In Nordland, approximately 5.98% of investments target education, with 5.17% directed to manufacturing, 5.12% to real estate, and 5.11% to fishing and aquaculture, making these industries pivotal for the local economy. In Troms and Finmark, aside from public sector and electricity investments, key sectors include education — 8.67%, health and social services — 5.39%, real estate — 4.94%, and fishing and aquaculture — 4.67%.

In Sweden's Upper Norrland, the production of goods, particularly mining and manufacturing (including batteries) were the main areas of investments. Upper Norrland demonstrated remarkable investment growth with an investment index (10.4%) much higher than that for Sweden as a whole (5.3%). Meanwhile, Finland's northern regions have their own investment priorities. In North Ostrobothnia, manufacturing of electrical and electronic products leads with 21.7% of investments. In Lapland, mining and basic metal manufacturing (15.1%) and transportation and storage (4.8%) are the top sectors. Kainuu places particular emphasis on mining and basic metals manufacturing (22.2%) and human health and social work activities (7.94%).

Canada

The share of Arctic Canadian investments, as well as the average growth in investment levels, were small during the 2017–2021 period. The public sector, specifically general government gross fixed capital formation, accounted for approximately 25% of total investments across Canada's Arctic regions, highlighting a significant role of government spending in these areas relative to the national total. However, this level of investment has not sufficed to drive substantial growth in the Arctic compared to other regions of the country. Canada's Arctic investments constitute only 0.6% of the country's total investment.

Greenland

Despite experiencing the highest average annual growth in investments (14.7%) among Arctic nations, Greenland's overall investment levels remain the lowest, accounting for only 0.7% of total Arctic investments between 2017 and 2022. The primary sector attracting investments in Greenland is fisheries, which forms the backbone of the local economy alongside subsidies from Denmark.

However, Greenland's mining sector is a potential area for future development. Industry participants report that local populations, which rely primarily on fishing, are generally open to the idea of mining. There is growing interest in exploration, especially for minerals critical to the green transition. Rare earth elements such as neodymium, dysprosium, and terbium, essential to produce the permanent magnets used in wind turbines and electric vehicle motors, are seen as promising targets for future investment in Greenland.

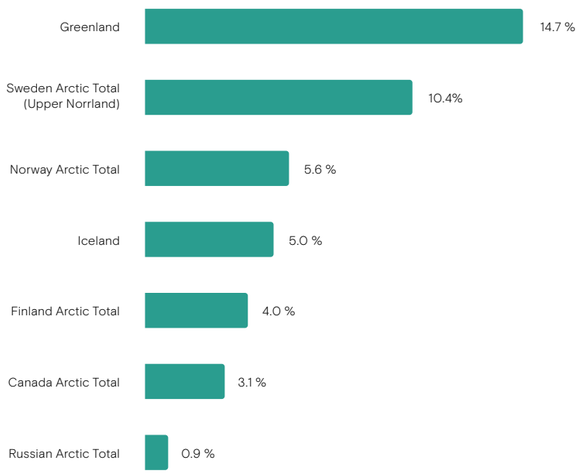
Iceland

The annual average change in investments in Iceland stands at 5%, which is higher than in the Finnish Arctic but lower than in the Norwegian Arctic regions. Key sectors driving these investments in Iceland include government services, which account for 17.18% of total investments. Other significant sectors include electricity, gas, steam, and air conditioning supply, as well as water collection (7.73%), real estate activities (6.30%), construction (4.94%), and computer programming, consultancy, and information service activities (4.09%). These sectors form the backbone of Iceland's investment landscape, contributing to its steady growth.

US Alaska

Alaska ranks as the second-largest Arctic region in terms of investment volume, holding a 13.5% (our estimate) share of total Arctic investments, second only to Yamal-Nenets (37.7%) in Russia. The oil and gas industry dominates Alaska's economy, contributing nearly 85% of the state's budget through oil revenues. However, due to the absence of detailed US investment statistics, it is challenging to provide precise data on the sectoral distribution of investments in Alaska or the exact growth rate of investments between 2017 and 2022. This lack of detailed information limits our ability to assess the full scope of investment trends in the region during this period.

Figure 7.2 Annual average change in investments, 2017–2021



This figure shows annual average change in investments for 2017–2021, measured as Gross Fixed Capital Formation. Calculation was based on current prices in local currencies converted to USD in Purchasing Power Parities (PPP).

For Russia Arctic all regions considered in this report are included, but only Krasnoyarsk-North is counted as a part of Krasnoyarsk.

No US/Alaska GFCF data available.

Photo: iStock, mtcurado

Reykjanes, Iceland: Reykjanes power station — Geothermal power plant ('Reykjanesvirkjun')

The Reykjanes Power Station is a geothermal power plant that generates 100MWe from two 50MWe dual-flow turbines with sea-cooled condensers. It utilizes steam and brine from a reservoir with temperatures between 290°C to 320°C, extracted from 12 wells that are 2700 meters deep.

Geothermal energy is one of the cleanest and most sustainable forms of energy production. It represents approximately 0.3% of the world's total electricity generation. Iceland is a global leader in geothermal energy, with nearly 30% of its electricity produced from geothermal sources.

Sources:
International Renewable Energy Agency: https://irena.org
Atlantic Council: https://www.atlanticcouncil.org

Summing up:

Regional economic profiles

Despite the common Arctic context, there are significant differences among the 22 Arctic areas analyzed in this report. Size of the population, structure of the economy and labor market, territory area, connectivity with infrastructure, political and administrative jurisdiction are among the most significant variable factors. Therefore, any attempt to draw a common bottom line for comparing these areas would potentially omit a lot of important specificities. Keeping this limitation in mind, to recap the report, in this section we present regional economic profiles described by the indicators explored in this report. The following indicators are included:

- Employment growth rate, 2017–2022
- GVA growth rate, 2017–2021
- Share of employees in business services, 2017–22
- GVA per worker (selected industries), 2017–21
- Income inequality (GINI), 2022
- Investments growth rate, 2017–2021

The table below presents the values of these indicators for each region studied. The values are visualized with colored data-bars and each indicator is compared to the "Arctic average" for reference purposes. Red data-bars are associated with negative values.

We do not recommend using this table as an overall ranking of the Arctic Regions (as the set of indicators is limited and there is no uniformity regarding the weights of the indicators). Rather, we suggest looking at groups of comparable regions (e.g. within the same country or same macro-region, or similar size of population) and comparing them by specific indicator. Furthermore, certain indicators can be compared with the average for the Arctic (Arctic average) for reference purposes. Also, for a particular region, values for all indicators in combination can be considered to assess coherence within the regions' economic profile (e.g. is economic growth associated with growth in employment and reduced inequality of income distribution?).

Table 8.1 Economic profiles of the Arctic region compared to the "Arctic average"

Region	GVA per worker, 2017–21, average, USD PPP	GINI 2022	Employment change, 2017–22, annual average, %	GVA change, 2017–21. annual average. %	Investment change, 2017–22, annual average, %, based on USD PPP	Employment in business services, share of total, 2017–22, average, %
Nunavut (CA)	135 126	0.331	5.2 %	5.9 %	4.3%	10.8 %
Iceland	87 562	0.242	1.3 %	1.2 %	5.0%	20.2 %
Yukon (CA)	121 934	0.275	2.0 %	3.0 %	6.7%	9.3 %
North Ostrobothnia (FI)	68 915	0.260	1.2 %	1.9 %	3.2%	17.7 %
Upper Norrland (SE)	73 883	0.295	0.75 %	4.9 %	5.3%	14.7 %
Troms and Finnmark (NO)	85 060	0.226	0.5 %	-2.3 %	5.6%	10.5 %
Nordland (NO)	83 485	0.220	0.4 %	-1.8 %	5.6%	9.4 %
Kainuu (FI)	62 824	0.247	0.1 %	0.8 %	13.4%	16.6 %
Lapland (FI)	66 266	0.245	0.7 %	-1.4 %	3.2%	14.8 %
Yamal-Nenets (RU)	132 004	0.452	-0.2 %	5.7 %	-0.6%	11.6 %
Northwest Territories (CA)	134 637	0.287	0.4 %	-1.8 %	-6.4%	8.2 %
Alaska (US)	127 661	0.428	-0.5 %	-1.2 %		14.1 %
Greenland	89 842	0.345	0.8 %	1.2 %	14.7%	6.4 %
Murmansk Oblast (RU)	49 778	0.346	-1.5 %	4.2 %	20.7%	11.8 %
Sakha Yakutia (RU)	50 911	0.406	0.7 %	3.6 %	3.2%	10.0 %
Chucotka (RU)	81 804	0.438	-0.1 %	4.0 %	39.45 %	7.7 %
Republic of Karelia (RU)	35 730	0.350	-0.7 %	1.1 %	18.1%	10.8 %
Krasnoyarsk (RU)	36 906	0.383	-0.4 %	-0.3 %	6.4%	12.0 %
Arkhangelsk Oblast (RU)	37 522	0.366	-1.3 %	1.4 %	-4.2%	9.6 %
Nenets (RU)	108 771	0.441	-0.8 %	-3.8 %	-10.6%	9.3 %
Komi Republic (RU)	44 973	0.382	-2.1 %	-1.2 %	-5.2%	11.1 %
Arctic average	**81 695**	**0.33**	**0.3 %**	**1.2 %**	**6.4 %**	**11.8 %**

Implications for Arctic stakeholders

Overall, value creation in the Arctic remains closely tied to growing needs for natural resources, environmental issues, and geopolitical concerns. Demographic shortages, harsh climatic conditions and geographic remoteness continue to pose challenges in workforce sustainability, especially in remote communities. Sustainable development of the Arctic would require the following priorities from policymakers, investors, international, national and regional authorities. None of the stakeholders have enough power and resources alone to change the situation. Sustainable development of the Arctic must be a joint project requiring a coordinated effort. Indigenous and local knowledge systems must be integrated in this development. We also encourage academics, educators, and journalists to further engage in reaching out to and informing the public, and especially young people, about the challenges and opportunities for sustainable development in the Arctic.

Secure social sustainability of business

Economic value creation in the Arctic needs to be more sustained with new job opportunities and fair distribution of generated profits and incomes. Reinvestments in infrastructure are important. None of the 22 Arctic regions analyzed possesses a high socio-economic sustainability where economic and societal developments are mutually supportive. For some regions this is moderate, for others, it is rather low.

Avoiding green colonialism

Given the heavy dependency on natural resources and the relatively low level of R&D and advanced technological companies in the Arctic, there is a risk of slipping into (the path of) "green colonialism" since decarbonization solutions also require natural resources (e.g. critical minerals). "Green colonialism" is the external imposition of environmental policies, usually by foreign powers, without regard for the rights, needs, or cultural practices of indigenous and local communities. "Green colonialism" may be associated with economic benefits but poses challenges for local communities and ecosystems.

Accelerate transformation to knowledge-based economy

The emerging technologies in different sectors have accelerated Industrial Revolution 4.0, where IoT-based technologies are becoming vital due to the rise of AI. Therefore, our future steps require us to be more accountable and cooperative. In response to the changes, investments, and policies need to be strengthened, where the reform of the current economy to a knowledge-based economy should be prioritized and expedited. The Arctic regions would benefit if more Arctic-specific R&D activities directed to circular economy solutions, robotics, biotechnology, space, and IT are implemented in the region.

Reforming education

To expedite the knowledge-based economy, reforming traditional education will be indispensable. With the current education system, there are gaps between knowledge, skills, and real-life challenges. Quality education is still not readily available in the remote areas. By exploiting the benefits of technology and better connectivity, such gaps can be diminished. Furthermore, the education offered needs to be transformed in ways that are culturally appropriate to the Arctic regions. There are huge issues with attracting and retaining educators in schools who primarily come from other regions. Reforming education requires cooperation, collaboration, and coordination. If not taken seriously, these issues will result in growing inequality of income, and, more importantly, in inequality of access to knowledge and technology.

Need for up-to-date open Arctic data

To develop information-based services, and make AI more efficient for analysis, high-end automation, and promoting sustainable developments, we need to establish the Open Arctic Database without any restrictions or borders. Currently, there are no such collaborations, and there is a lack of interdependence and trust, which should be removed. The present situation with availability and access to relevant Arctic data is simply not adequate. The data-analytical tools used in this report would be much more efficient if we could have access to more detailed, up-to-date, and comparable Arctic data.

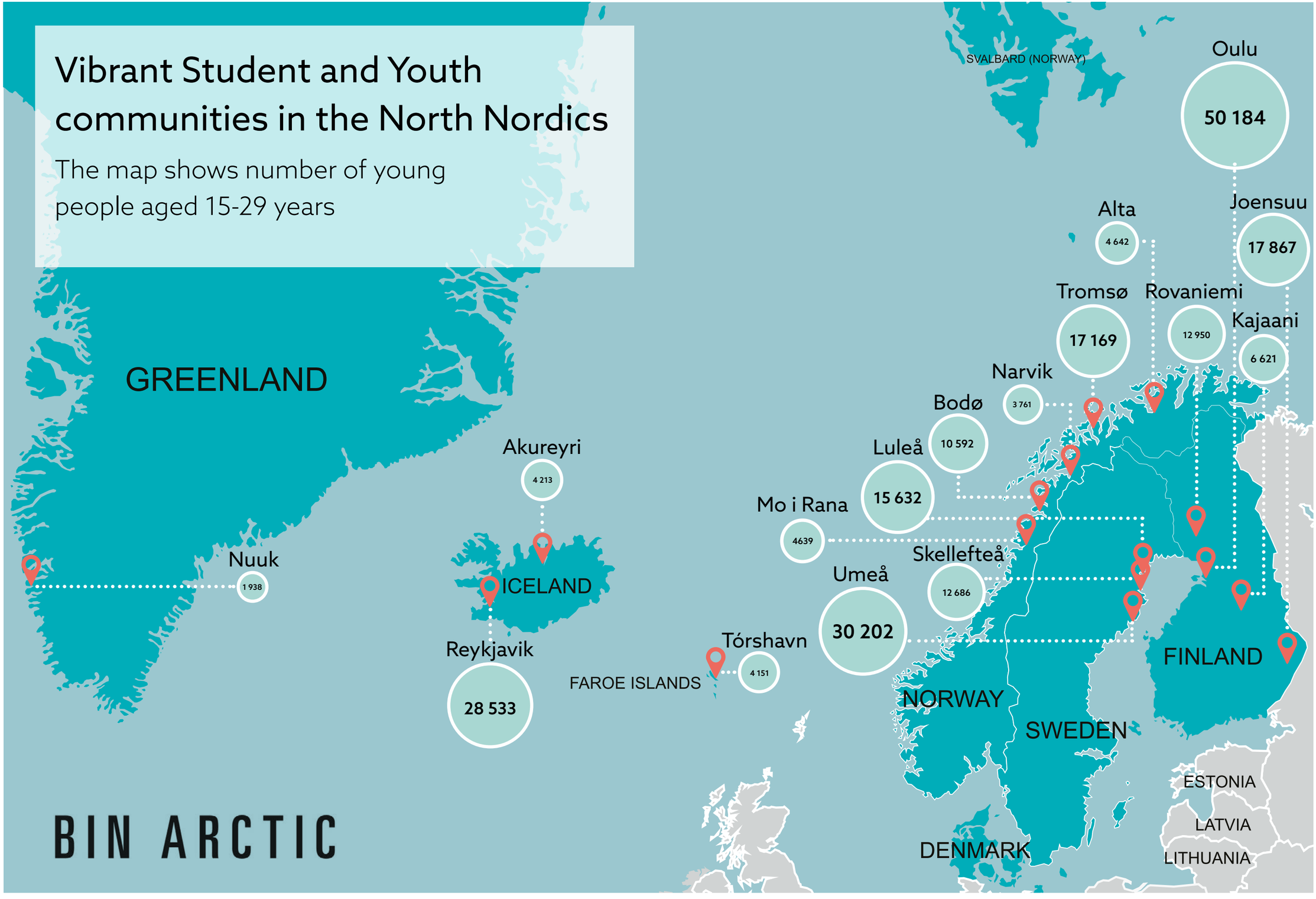
International cooperation must transcend political boundaries and differences in governance frameworks

To tackle modern challenges, such as environmental and climate change, growing geopolitical tensions, and reducing the socio-economic gaps requires an open-ended and unconditional humanitarian collaboration approach not constrained by bottlenecks or political boundaries. The Arctic macro-region, with its history of open dialogue, low tension, international cooperation, and, importantly, a wealth of indigenous knowledge and traditions, can serve as a pioneer and example to the entire world in how to address significant challenges.

Further steps in the Business Index North project, in addition to annual overview reports, include the development of a series of shorter insight reports (several per year) focusing on specific issues related to sustainable business development in the Arctic. The topics of these insight reports are decided in cooperation with our institutional partners and other Arctic stakeholders, and according to the current information and knowledge demands in society. Topics of the two upcoming insight reports are "Green investment opportunities in the Nordic Arctic", and "Young Entrepreneurship in the Arctic". Also, we intend to update our Arctic Resilience Monitor. If you would like to share and discuss ideas for new topics of higher relevance for sustainable development in the Arctic, please feel free to contact the authors of this report. Business Index North is open to cooperation for a better Arctic. Please contact us if you would like to discuss opportunities for cooperation.

Vibrant Student and Youth communities in the North Nordics

The map shows number of young people aged 15-29 years



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BUSINESS INDEX NORTH

BIN Arctic

The project aims to increase awareness of opportunities for and challenges to sustainable development in the Arctic. We produce reports, develop analytical tools, and facilitate dialogue among Arctic stakeholders, including international bodies, governments, investors, entrepreneurs, academia, media, and students. From 2017 to 2022, BIN reports focused on the European Arctic, particularly the North Nordic and Barents Euro-Arctic regions. Since 2023, we have expanded to cover the entire Arctic, addressing topics such as sustainable development, socio-economic resilience, innovation, transportation, telecommunications, energy, and value creation.

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Implementing partners

Strategic partners

Basic funding partner

Norwegian Ministry of Foreign Affairs