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# Smart Specialisation in Sparsely Populated European Arctic Regions

Jukka Teräs, Viktor Salenius,
Laura Fagerlund and Lina Stanionyte

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**Contact information**
Name: Smart Specialisation Platform
Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: JRC-B3-S3P@ec.europa.eu
Tel.: +34 954488318

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# Contents

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***Authors***

Dr. Jukka Teräs, Nordregio, Sweden

Viktor Salenius, Nordregio, Sweden

Laura Fagerlund, Nordregio, Sweden

Lina Stanionyte, Joint Research Centre

## Abstract

The purpose of this report is to explore how smart specialisation (S3) has been applied in Nordic sparsely populated regions, with focus on the European Arctic. The report gives an overview of the specific context of Arctic regions and of their specialisations, and reviews how smart specialisation has supported regions in addressing Arctic challenges. It also identifies the need for joint-action efforts and outlines good-practise cases where collaborative efforts have been made to tackle common challenges or to benefit from interregional opportunities.

Smart specialisation has found very relevant applications in European Arctic regions and implementation of smart specialisation policy tools is well advanced. In some cases, the Arctic regions are pioneering advanced, collaborative approaches and developing joint investment solutions applying an S3 approach. This report emphasises that already today there are very successful cases of local, cross-regional, and cross-border collaboration that succeed in turning the Arctic context into a competitive advantage, and many new innovations and projects continue to emerge. As is demonstrated in the case-studies, smart specialisation can serve very well in mobilising regional and local actors in the European Arctic. In sparsely populated areas, interregional cooperation plays an important role for critical mass formation. The important message of the cases presented in the report is that collaboration on joint opportunities is the only way to create sustainable and long-term smart specialisation solutions in the unique European Arctic context.

# 1 Introduction

The Joint Research Centre (JRC) of the European Commission is supporting the implementation of EU Arctic Policy by participating in the working groups and task forces of the Arctic Council and by contributing with scientific activities[1] such as monitoring, analysis, modelling, and impact assessment. Supporting sustainable economic development in the Arctic is one of the main priority areas of EU Arctic policy. As stated in the Joint Communication by the European Commission and the High Representative for Foreign Affairs and Security Policy on 'An integrated European Union policy for the Arctic' (2016)[2], adaptation and implementation of regional smart specialisation strategies is a way to support sustainable growth models based on more sustainable use of resources.

The Arctic regions within the EU, as all EU regions and Member States, have applied **smart specialisation** (S3) approaches to their research and innovation policies as an ex-ante conditionality to access European Structural and Investment Funds in the 2014-2020 EU programming period. Moreover, many regions outside the EU (for example Norwegian regions) have adopted S3 approaches to focus their research and innovation investments in the fields with the highest impact and potential for competitiveness. In this report, the authors explore the applications of smart specialisation in European Arctic regions, with the ambition to discover how other sparsely populated Arctic regions could apply lessons learned in Europe in order to address challenges such as remote location, lack of critical mass, lack of connectivity between actors, and dependence on few dominant industries.

The European Arctic Region presents a **unique social, economic, and environmental setting** in Europe. With a sparse population spread across a vast land area, the natural conditions of the region become both an opportunity, in wealth in natural resources, and a distinct challenge, in long geographical distances between sparsely-populated communities. Climate change will, furthermore, have decisive and much stronger consequences on the natural conditions in polar regions than elsewhere, which presents the Arctic with an additional challenge and a need to adapt.

However, the remote location and barren natural conditions should not fuel the impression that the European Arctic is lagging behind in economic development or innovative capacity. European Regional Innovation Scoreboard data testifies that Arctic regions are developing in pace with continental averages for Europe on key indicators. In fact, some regions have taken an innovation-leader's position in several industries, including, for example, forestry and bio-economy, mining and metallurgy, and fisheries.

The report includes a description and analysis of good practice cases on smart specialisation in the European Arctic territories of **North Finland, North Sweden, and North Norway**. Formal smart specialisation strategies have been developed the furthest in the regions of Nordland (Norway) and Lapland (Finland) but other regions in the European Arctic have closely followed suit.

The potential of the European Arctic Region to benefit from its unique contextual advantages through smart specialisation and cross-region collaborative networks is illuminated in the five case-examples presented in this report. First, the **Visit Arctic Europe** project presents a remarkable example of how tourism enterprises and associations facing similar conditions across state borders and long geographical distances are collaborating to overcome mutual challenges and benefit from mutual opportunities. Second, the **REGINA project has developed a Local Smart Specialisation (LS3) concept**, a six-step smart specialisation guideline to complement regional smart specialisation concepts. The LS3 concept is purposefully planned to be accessible to the most remote localities where large-scale and cross-regional smart

[1] Willson et al., 2015
[2] European Commission, 2016

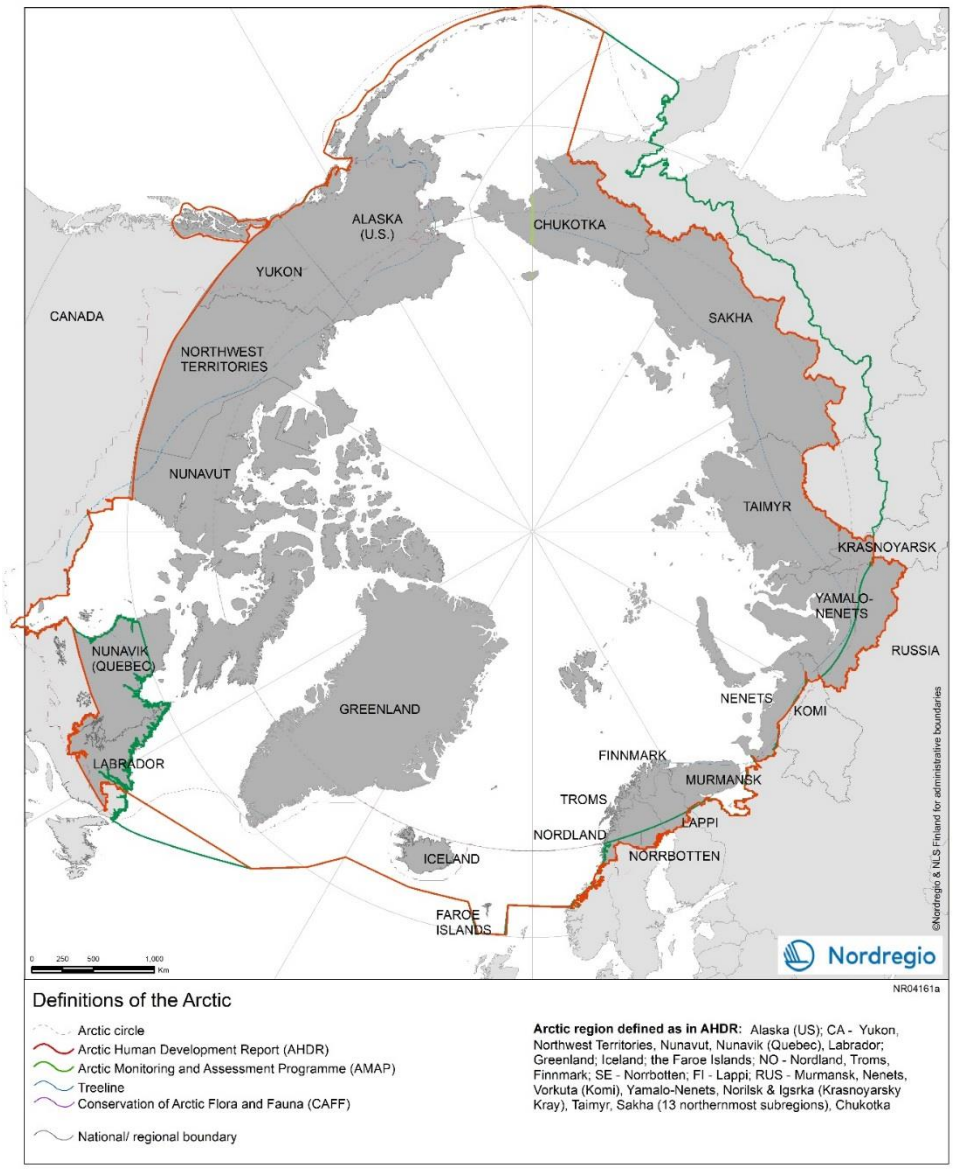
specialisation platforms may be difficult to reach. Third, **Lapland has a leading role in several interregional thematic S3 partnerships**, through which Lapland's regional authorities can engage with a wider European context, peer group and knowledge base to build on their existing smart specialisation strategy. Fourth, the East & North of Finland has proactively signed up as a test area for the **EU Pilot Action for Regions in Industrial Transition**, thereby successfully making use of available EU resources and support to safeguard the future of its population and economy by developing a proactive strategic approach to the challenges of industrial transition. Last, the initiative to establish an **Arctic Investment Platform** is well underway, and when completed it will be a key player in helping Arctic regions turn their smart specialisation strategies into actual investments and concrete progress.

The report concludes with a summary of main findings, opportunities, and recommendations on how smart specialisation and coordinated efforts can provide a response to Arctic challenges.

# 2 The Arctic context

The Arctic region consists of parts of Northern Russia, the American Arctic (Alaska and Northern Canada), and the European Arctic (Greenland, Faroe Islands, Iceland, Arctic Finland, Arctic Norway, and Arctic Sweden). However, there are several definitions of which regions are part of the Arctic (see Figure 1).

**Figure 1.** Definitions of the Arctic region




*Source*: http://www.arcticstat.org/

The Arctic area is **sparsely populated** with less than 7 people per square kilometre, which is considerably less than the EU average of 117 people per square kilometre. Population growth is weak, which puts pressure on employment growth. It is notable, too, that the neighbouring Murmansk region, one of the few Russian regions to share a border with the European Union and NATO countries, has seen a decline in the number of inhabitants during the past 20 years, from 1,2 million to less than 800,000[3].

The Arctic region is home to around 40 different **indigenous groups**, e.g. Sámi in circumpolar areas of Finland, Sweden, Norway and north-west Russia; Nenets, Khanty,

[3] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2018

Evenk and Chukchi in Russia; Aleut, Yupik and Inuit (Iñupiat) in Alaska; Inuit (Inuvialuit) in Canada; and Inuit (Kalaallit) in Greenland. The indigenous peoples face several challenges in their native environments due to, for example, climate change, globalisation, and issues related to indigenous peoples' rights to land and natural resources[4].

The Arctic region has a low density of people, a harsh climate, a fragile ecosystem, and is located far away from major global markets, all while being affected by climate change and global warming. However, it also has abundant natural resources, valuable mineral reserves, a unique environment, significant potential for renewable energy production, a multicultural population, and various universities and research centres[5].

**This report focuses on the European Arctic regions** – the northernmost counties of Norway (Nordland, Finnmark, Troms), Sweden (Norrbotten, Västerbotten) and Finland (Lapland). Table 1 summarises basic facts about the regions to be analysed in this study.

**Table 1.** Basic Facts about the European Arctic Region

| Indicator | Lapland | Norrbotten | Västerbotten | Nordland | Troms | Finnmark |
|---|---|---|---|---|---|---|
| **Total population (2017)** | 180 207 | 250 570 | 250 570 | 242 866 | 165632 | 76 149 |
| **Unemployment rate % (2015)** | 11,1 | 5,9 | 6,9 | 3,6 | 2,8 | 4,4 |

*Source*: Nordregio database, based on national statistical offices.

The European Arctic region is **significantly affected by globalisation**, with consequences for economic structure, socio-economic conditions, and social inequalities[6]. For example, an increase in global mobility creates a challenge to keep the Arctic region attractive for young people as the education sector, labour market, and culture in the region are increasingly in competition with opportunities elsewhere. **Climate change** also creates significant and deepening challenges, such as melting ice sheets, thawing permafrost, increased forest fires, and increasing variability in weather conditions. That being said, climate change also opens up new opportunities in the Arctic region, from business, tourism, and political perspectives[7].

There are some general societal trends to be recognised in the European Arctic. **Urbanisation and high mobility** has resulted in intensive in- and out-migration of human capital. This phenomenon entails a gender imbalance: since the 1990s women are more likely to become highly educated and to migrate out of their communities. In general, **the educational level is improving**, partly due to new technologies that enable distance education. Improving transportation and communication links within the Arctic region as well as between the Arctic and the rest of the world has been highlighted as an important step towards positive socio-economic development in the Arctic.

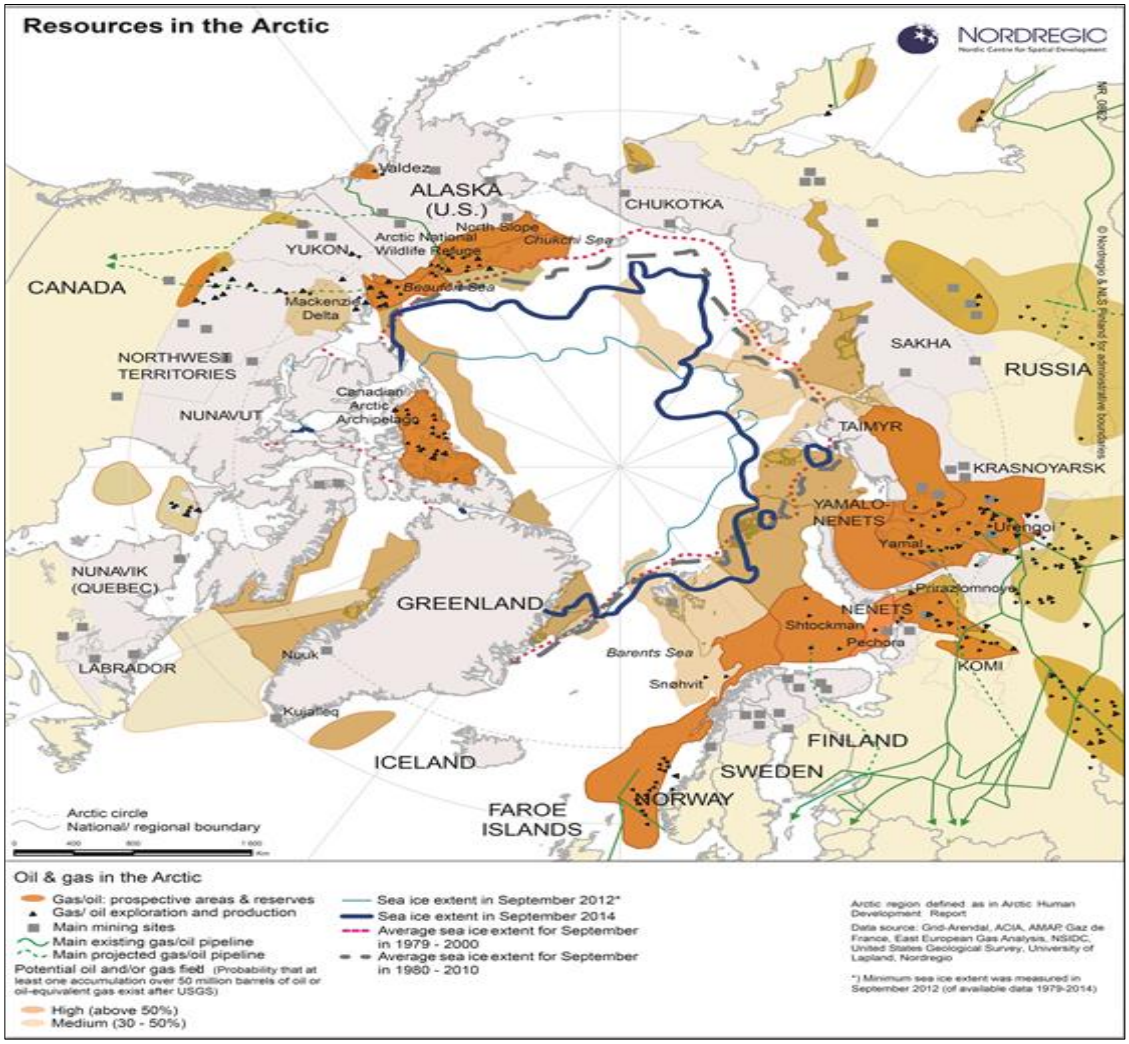
The main **sources of income in the European Arctic are large-scale resource-production industries for the international market and small-scale traditional production for local consumption. For some regions, fiscal transfers** from national government and regional development funds play an important economic role[8]. The global financial crisis affected economic activity in the European Arctic, especially within resource-based industries, which make up a dominant part of the economy throughout most of the European Arctic Region. As Arctic economies are **less diversified** compared

[4] Arctic Centre, University of Lapland, 2018
[5] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2018
[6] Glomsrød, Duhaime and Aslaksen, 2017
[7] Nymand Larsen and Fondahl, 2014
[8] Nymand Larsen and Fondahl, 2014

to many other economies, the crisis, consequently, had a particularly substantial impact in the European Arctic[9]. However, in some regions there are also some signs of increasing diversification. For example, in Finnish Lapland, the economy's traditional cornerstones are forest, metal, mining, forestry and tourism. Strong growth in other fields, like tourism and the mining industry, has affected the economy positively in the 2010s, particularly as the regional economy is thus becoming more diversified[10].

While the European Arctic regions are heavily dependent on traditional fields like fishing, hunting, forestry, and mining, the regions are also active in other economic sectors such as bio-economy, agriculture, creative industries, tourism, ICT and R&D, cold-climate technologies, maritime activities, and blue growth. The European Arctic Region has experienced impressive economic expansion and increasing future investments in and development of capacity to extract oil, gas and other natural resources. Investments in industry, oil and gas, wind power, and transport infrastructure are expected to be of great importance for future economic development of the European Arctic. Figure 2 concerns the utilisation of natural resources, which plays a significant role in the economic development of the European Arctic.

**Figure 2.** Resources in the Arctic




*Source*: http://www.nordregio.org/maps/resources-in-the-arctic/

[9] Glomsrød, Duhaime and Aslaksen, 2017
[10] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2017

**Large-scale resource-intensive industries and the bio-economy sector** are discussed in Nordregio's report on sustainable business development[11]. The most dominant large-scale industries are mineral extraction (Finland, Sweden, Norway, Greenland), extraction of oil and gas resources (Norway, the Faroe Islands), and aluminium production (Iceland, Norway). The Fennoscandian Shield, comprising Finland, Sweden and Norway, is the largest exposed area of Precambrian rocks in Europe, geologically similar to the mining regions of Canada and Australia. It has significant ore reserves and thus the potential to become a world-scale metal-producing region, and this potential is further strengthened by, for example, the increasing global interest to establish production of sustainable batteries in Northern Sweden. The European Arctic hosts riches in multiple commodities such as base metals, ferrous metals, gold, platinum metals, high-tech metals, industrial minerals, diamonds, etc. At present, almost 90% of the European production of iron ore comes from Northern Sweden, with LKAB in Kiruna and Malmberget in Gällivare as the largest producers. Northern Sweden and Finland account for a substantial share of the EU's production of gold, silver, zinc, and copper. In total, there are over 160 significant industrial mineral deposits in the European Arctic region, and at the beginning of 2015, 33 of these were open mines[12]. Norway, moreover, is the world's 15th largest oil producer and 6th largest gas producer, and the Norwegian Arctic regions host significant oil and gas reserves. All the European Arctic areas with Atlantic coastlines (Norway, Greenland, Iceland, the Faroe Islands) are conducting ongoing oil and gas exploration activities.

Because of the long coastline and access to the sea, the **marine sector** naturally plays a crucial role in the bio-economies of Iceland, Greenland, the Faroe Islands, and the Arctic regions of Norway. Currently, the marine-based bio-economy mainly involves the food industry in the coastal areas of the European Arctic. Small coastal communities in Norway and the Faroe Islands are particularly well suited for aquaculture because of their clean waters, remote location, comparatively high sea temperatures, and sheltered locations within the long and deep fjords. The potential for a **land-based bio-economy** (especially forestry) is higher in the Arctic areas of Sweden and Finland. Northern Finland and Sweden possess large forest resources. The land in the Faroe Islands, Southern Greenland and Iceland is suitable for sheep farming as an important contributor to the local economy. In Northern Norway, Sweden and Finland, reindeer husbandry is an economic activity that is strongly linked to the Sámi indigenous population. The Reindeer herding area, from the highlands of Oppland in the west to the east coast of the Kola Peninsula in the east, covers a land area of over 500,000 square kilometres[13].

Table 2 provides an estimate of planned business investments in the European Arctic in the upcoming years.

In terms of **specific priorities for Smart Specialisation in the European Arctic** these economic, demographic, and environmental realities imply that:

- S3 strategies in the European Arctic face **challenges in critical mass formation** both in industry and R&D. Lack of competent work force and the lack of sufficient education and research infrastructure reaching all parts of the regions to ensure the right skills and knowledge development. This is due to cold climate, sparse population, and long geographical distances.
- **Natural resources** constitute the base for the European Arctic economy and any development potential therein. Facing **challenges of industrial transition**, **S3 strategies will need to develop new synergies and competitive advantages based on existing natural conditions**.
- As many remote European Arctic localities are overly dependent on single industry sectors or seasonal tourism, S3 strategies will also need to secure sufficient

[11] Nordregio, 2016
[12] Nordregio, 2016
[13] Nordregio, 2016

**diversification** in order to guarantee sustainable and maintained economic conditions and demographic development.

**Table 2.** Estimate of Investments in North Finland, North Sweden, and North Norway

| **Investments 2018-2025 in MEUR (estimated)** | **Lapland** | **Oulu** | **Norrbotten** | **Västerbotten** | **North Norway** | **Total** |
|---|---|---|---|---|---|---|
| Industry | 2065 | 650 | 540 | 4006 | 380 | 7641 |
| Mining industry | 1030 | 0 | 200 | 0 | 420 | 1650 |
| Oil and gas | 0 | 0 | 0 | 0 | 10400 | 10400 |
| Hydro power | 190 | 350 | 0 | 0 | 425 | 965 |
| Wind power | 576 | 3000 | 800 | 1740 | 3950 | 10066 |
| Nuclear power | 0 | 7000 | 0 | 0 | 0 | 7000 |
| Bio power | 0 | 410 | 0 | 0 | 0 | 410 |
| Energy transfer | 600 | 150 | 270 | 100 | 2670 | 3790 |
| Trade | 100 | 655 | 220 | 0 | 630 | 1605 |
| Tourism | 2122 | 300 | 70 | 80 | 200 | 2772 |
| Transport infrastructure | 1122 | 716 | 2471 | 1840 | 4240 | 10389 |
| Public investments | 200 | 500 | 60 | 40 | 4270 | 5070 |
| Total | 8005 | 13731 | 4631 | 7806 | 27585 | 61758 |

*Source*: adopted from Lapland Chamber of Commerce, "Arctic Business Forum Yearbook 2018"

# 3 Smart specialisation in the European Arctic

## 3.1 Smart specialisation concept

Europe 2020 is the European Union's ten-year strategy for jobs and growth. It was launched in 2010 to create conditions for smart, sustainable and inclusive growth. Regional policy plays an important role in the Europe 2020 strategy. To boost innovation-led growth, nurture competitiveness, and reduce gaps between regions, the EU has called countries and regions to develop smart specialisation strategies for research and innovation to ground their research and innovation investments from European Structural and Investment Funds.

Smart specialisation (S3) is a concept premised on a **place-based approach**, as advocated in the Barca Report[14]. Smart specialisation strategies aim to prioritise public research and innovation investments through a bottom-up approach of **selecting priority domains** for the **economic transformation** of regions, building on regional **competitive advantages**. The identification of these strategic priority domains for R&I activities needs to recognise the country/region specific context, analysing of the strengths and potential of the economy. In S3, **specialisation and differentiation** are complementary, as both may reinforce positive economic developments in a region. Each region is encouraged to identify new combinations between region-specific capacities and region-specific opportunities[15]. Discovering new niches from cross-sectoral synergies regions may reinforce and **diversify** the regional economic portfolio based on identified competitive advantage. Smart specialisation policy seeks to promote regional renewal by opening new growth paths and diversifying the economy into new domains of specialisation[16].

All EU Member States and regions develop smart specialisation strategies to better target their research and innovation efforts. The Commission established the Smart Specialisation Platform (S3P) to assist EU countries and regions in developing, implementing and reviewing their smart specialisation strategies by facilitating mutual learning, data gathering, analysis, and networking opportunities. The application of the S3 concept is continuously spreading into new domains and to new regions, even outside the EU. Among a total of 219 regions and countries that are members of the S3 Platform, 22 are outside the EU[17]. Furthermore, S3 has found applications on several continents outside Europe, most prominently in Latin America and Australia. In the European Arctic, many regions (such as Lapland, Finnmark and Nordland) are members of the S3 Platform.

The **interregional and cross-border dimension of smart specialisation**, facilitating the extension of local ecosystems and the scale-up of regional and local innovation, constitutes an important pillar for future research and innovation policy. European Commission has set **Thematic S3 Platforms on industrial modernisation, energy and agro-food** to help regions work together on their common and complementary smart specialisation priorities, benefit from new cooperation opportunities with partners from other regions, and accelerate the development of joint investment projects. These platforms provide a unique opportunity for policymakers at EU, national and regional levels to pool experience, combine complementary competences, and mobilise financing for new innovation investments.

[14] Barca, 2009
[15] Foray, Morgan and Radosevic, 2018
[16] Crespo et al., 2017
[17] As of December, 2018

## 3.2 Findings from previous and related studies on S3 in the European Arctic

The OECD published in 2017 a study on **Northern Sparsely Populated Areas (NSPA)[18].** The NSPA was established as a collaborative network in 2004, to raise awareness within EU institutions about the common issues and circumstances facing these regions, to influence EU policymaking, and to provide a platform for sharing best practices. A total of 14 sub-regions in Norway, Sweden, and Finland belong to this network, and the OECD study on the NSPA presents challenges and opportunities shared by these regions as well as recommendations for the future.

The OECD report highlights that smart specialisation is the key concept for added value in the NSPA. First, it is concluded that a focus on sustainable development in the region is crucial because of the changing political and economic landscape. The conservation of the fragile natural environment is emphasised to be of great importance for the NSPA. The concept of smart specialisation is presented as a suitable policy-approach for the region in working towards these aims. The report then moves on to present policy recommendations for the NSPA-wide, national and regional levels. Recommendations for the NSPA-wide level include: increased representation of the region and its unique conditions at national and European policy fora; enhanced cooperation in strategic measures, for example by linking the support to Sámi communities with other ambitions in regional and rural development; and strengthened governance mechanisms to facilitate the collaboration between national governments and NSPA regions[19].

The JRC technical report on S3 in sparsely populated areas by Teräs et al. (2015) provides an analysis on the operationalisation of S3 in the specific context of Sparsely Populated Areas (SPA) in Europe[20]. The working paper concludes that these areas are able to create innovative environments and that there is a mindset and willingness to utilise the possibilities provided by S3 processes. The S3 approach can be useful, but there are some contextual factors in SPA to keep in mind while applying it.

The report findings emphasise that SPA are not lagging behind by definition, but that the specific contextual features of the regions, such as their **narrow economic diversification and dependence on natural resources**, need to be carefully evaluated. Another specific challenge is to **keep talented people in the region**, and therefore questions of connectivity and regional attractiveness for skilled professionals are key issues for economic development. Finally, because SPA often have less financial resources and are institutionally thinner, **there is a need to align the efforts between different support programmes and strategies[21]**.

Dubois et al. (2017) contributed to the theoretical debate on the place-based nature and spatial dimension of entrepreneurial discovery in a report on territorial innovation strategies in sparsely populated areas[22]. The report is directly related to the Arctic region, especially as it covers regions with long distances to main markets and with prominence of natural resource exploitation. Three out of five case studies were regions in the High North of the Nordics: Lapland (Finland), Nordland (Norway), and Västerbotten (Sweden). The report had three main findings. First, **natural resources have an important role in contributing to regional diversification**, used by regional policy-makers as a platform for future cross-sectoral exchanges. Second, **new governance approaches** that are directly advocated in the entrepreneurial discovery process have been undertaken. **Civil society actors** are promoted to be included in the development and operationalisation process. Third, physical and digital **connectivity**, as well as the inclusion of regional knowledge actors, are important contributors to regional innovation strategies.

[18] OECD, 2017
[19] OECD, 2017
[20] Teräs, Dubois, et al., 2015
[21] Teräs, Dubois, et al., 2015
[22] Dubois, Kristensen and Teräs 2017

Ylinenpää et al. (2016) illustrate in a report on innovation networks how a specific set of interventions have stimulated regional development and innovation in two Nordic regions (Oulu in Northern Ostrobothnia, Finland, and Luleå in Norrbotten, Sweden)[23]. It is concluded that a strategy based on focus is better than a strategy based on excessive diversification, that developing core competences in a more knowledge-based economy is a gateway to success, and that regions should develop their own smart specialisation strategy. In places like Oulu and Luleå one specific branch of business/industry is normally targeted, but this results in the region being radically exposed to changes in volatile markets. Therefore, a strategy based on two or more existing or emerging sectors is to prefer, as this allows for development potential in more than one sector and in the interface between two or more sectors. This is relevant in the context of smart specialisation in the European Arctic Region, as the two examples used are regions in the High North with similar characteristics to other regions in the European Arctic.

Teräs and Mäenpää (2016) analyse two practical smart specialisation implementation processes in a study on S3 processes in the North[24]. Ostrobothnia and Lapland in Finland serve as case-examples illuminating the similarities and differences between regions within the same national context. Lapland is part of the European Arctic and is enhancing its Arctic location both in its vision and strategic measures to become an innovative region known for its Arctic expertise. Lapland's smart specialisation strategy is also directly linked to Arctic infrastructure and natural conditions. The authors conclude, firstly, that the implementation process of smart specialisation requires a considerable amount of time to be effective and inclusive. Secondly, the regions risk not fully utilising the regional capacity for entrepreneurial discovery because of limited participation of companies and entrepreneurs. Thirdly, allocation of European Structural and Investment Funds has a considerable role in mobilising regional actors. These findings clearly demonstrate that regions should dedicate enough time and resources to the implementation phase of S3 strategies.

## 3.3 European Arctic regions and innovation policy

In the European Arctic Region, the geographical distances pose a challenge for innovation; face-to-face interactions foster knowledge transfer and innovation. **Entrepreneurial discovery**, which is the fundamental process at the centre of smart specialisation, seeks to stimulate demand-driven "innovation discovery" that leads to a structural transformation of the regional economy. The S3 concept ties together knowledge dynamics with the specific socio-economic, institutional, and geographical conditions encountered in each region. It is evident that the entrepreneurial discovery process is more difficult when the geographical distances are long.

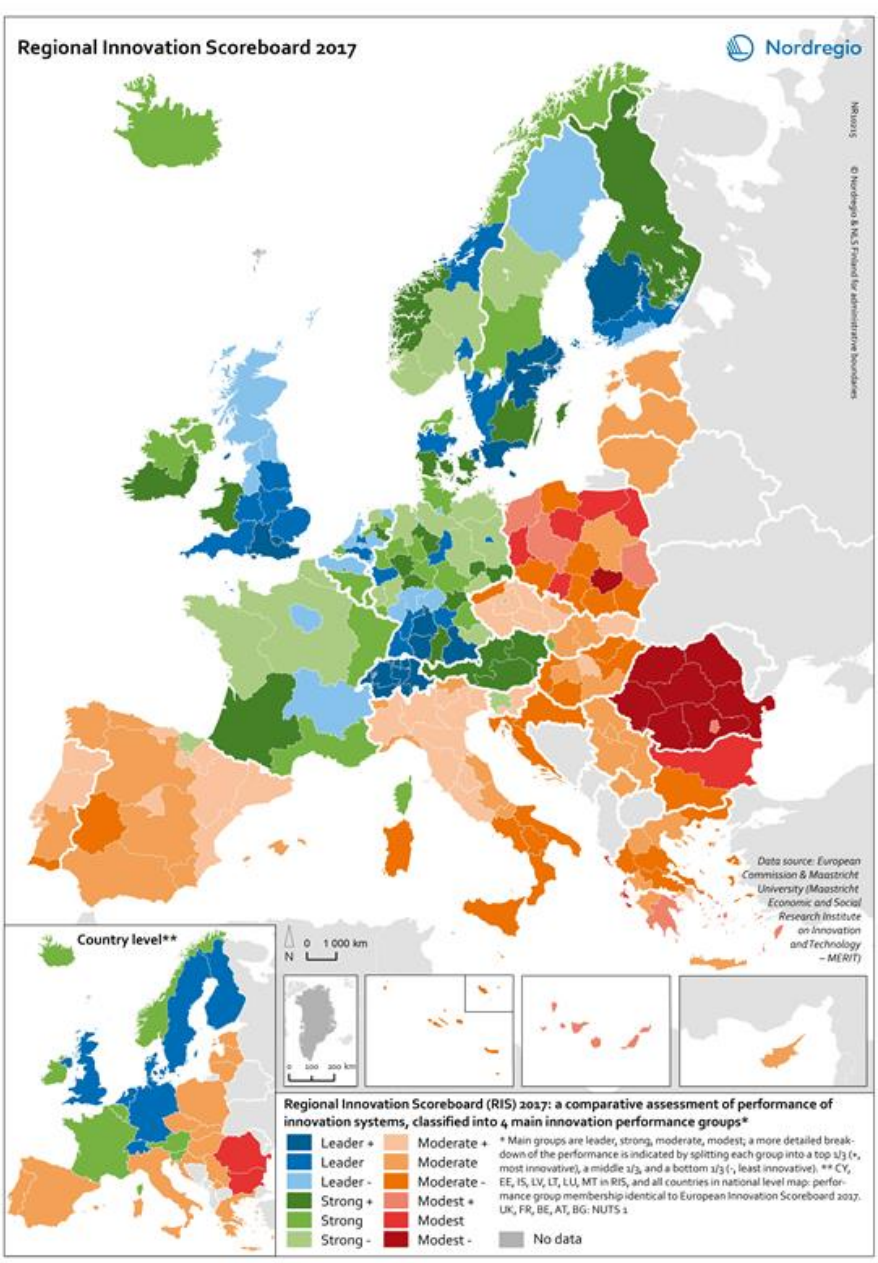
**Interregional economic collaboration** is particularly supportive of innovation when the regions are alike in either a technical or a market sense, but also as they feature mutual differences. Industries can, for example, share knowledge in similar technology but belong to different sectors. In this context, it is important to note that innovation strategies have previously relied heavily on sector-specific cluster approaches – today these concepts are more detached from one another. Innovation and smart specialisation as an interregional and cross-sector strategy fits well in the Arctic context, as long as the challenge of geographical distances is overcome[25].

Because the European Arctic is particularly vulnerable to climate change, there is **a need to promote business innovation that responds to climate change** and associated weather risks and builds resilience to them in Arctic regions. The sustainable utilisation of natural resources and the development of cleaner technologies are necessary for mitigating and adapting to climate change. Sustainable green and cold climate technologies thus constitute a particularly important investment priority. In order to increase research efforts into climate change and sustainable solutions the European

[23] Ylinenpää, Teräs and Örtqvist 2016
[24] Teräs and Mäenpää, Smart Specialisation Implementation Processes in the North, 2016
[25] Dubois, Kristensen and Teräs 2017

Arctic Region could gain from investing in infrastructure for applied research, such as testbeds and "living laboratories", some promising examples of which have already been initiated. Climate change has also resulted in opportunities for raw material extraction and processing, but more research is needed also in this regard, to find ways of taking advantage of these opportunities in a sustainable way[26].

**Figure 3.** Regional Innovation Scoreboard 2017




*Source:* Nordregio

While recognising these clear challenges to innovation and development in the Arctic Region, it is also important to emphasise that the European Arctic today **is not lagging behind the rest of Europe.** In fact, as outlined by the Regional Innovation Scoreboard (see Figure 3)[27], Norrland in Sweden ranks as an innovation leader by European comparison, with the northern regions of Finland and Norway also demonstrating strong innovative capacity: All these regions rank consistently above the European average on

[26] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2017
[27] European Commission, 2017

most key indicators included in the Scoreboard, such as R&D funding, employment and education levels among the population, and entrepreneurship statistics. In some cases, the Arctic areas even outperform other regions within their own countries (especially in the case of Norrbotten in Sweden, and East & North of Finland when it comes to the volume of R&D spending).

## 3.4 Arctic stakeholders' networks and platforms

The **Arctic Council** is an important intergovernmental stakeholder forum promoting cooperation and coordination among all Arctic States (as stated in Figure 1). The present report, however, focuses more closely on those networks and platforms that dedicate their activities to European Arctic Regions.

The Joint Communication on 'An integrated European Union policy for the Arctic' established in April 2016 **the Arctic Stakeholder Forum** (ASF) as a temporary forum to identify new investment and research priorities for the coming years and to harmonise the work of different EU funding programmes. ASF involved EU institutions, Member States, and regional and local authorities, and the work was summarised in a designated report. While the formal work of the ASF is completed, the forum will continue to meet regularly to exchange views between Arctic stakeholders and EU institutions[28].

The discussions brought up in the ASF report link directly to the question of the European Arctic's capacity for and implementation of smart specialisation. Firstly, in order to activate the regional and local potential for growth and innovation, the report identifies the region's main priorities for investment: extending and improving digital infrastructure; developing internal and external transport connections; supporting local business development, especially in fields promoting green growth and sustainable tourism; and supporting research on climate change, its effect on the Arctic Region and its development, and ways to mitigate and adapt to those effects. The Arctic Region is challenged by its natural conditions and long distances, and it is fundamental for smart specialisation and economic growth in the Arctic Region that communication and transport systems as well as economic networks overcome these challenges.

Secondly, in order to be effective, the funding and support instruments in place need to coordinate well amongst each other and be easily approachable by the local communities. On this note, the ASF report identifies ways to streamline EU funding and support programmes: improving information flow about funding opportunities and the assistance to applicants; simplifying administrative procedures and harmonising regulations across funding sources; increasing coordination between programmes and with national-level funding sources; giving more weight to multidisciplinary, cross-sectoral and international approaches; and involving local communities in the planning of support programmes[29]. Specifically in relation to these efforts the case-study on the Arctic Investment Platform initiative is described in chapter 5.

**The Northern Sparsely Populated Areas (NSPA) Network** is an informal, OECD-affiliated association linking together 14 Arctic regions in collaborative dialogue and development projects. In its Territorial Review for the NSPA, the OECD underlines that smart specialisation can be a valuable tool for reaching sustainable and innovative growth in the Arctic[30]. Motivated by this, the NSPA Network has initiated studies to map out the potential for its own role as a facilitating platform for smart specialisation activities. Several workshops on this theme have been held in 2017-2018, and preliminary plans for S3 platform activity are currently being drawn up.

Some early-stage aims have already been published on the subject. Since the NSPA Network is not a formal organisation and participation in its collaborative activities by the

[28] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2017
[29] Applica, Directorate-General for Maritime Affairs and Fisheries, European Commission, 2017
[30] OECD, 2017

constituent-regions is voluntary, there is not an ambition to develop a fully shared smart specialisation strategy. Instead the role and focus of the NSPA Network will be to enhance interregional communication and collaboration specifically in fields of common interest for those involved. This will be beneficial for knowledge-sharing activities and for maintaining a critical mass for new activities in the sparsely populated Arctic. In the same way as the Arctic Stakeholder Forum (ASF), as outlined above, has identified common investment priorities across the Arctic Region, the role of the NSPA Network as an Arctic policy collaboration platform would enhance the efficient use of funds and resources in Arctic Smart Specialisation.

## 3.5 An overview of smart specialisation in European Arctic regions

### 3.5.1 Lapland (Finland)

**Description of region.** Lapland in North Finland covers an area of almost 100,000 square kilometres but only has a population of around 180,000. The three biggest urban areas are Rovaniemi, Kemi, and Tornio, which have a combined population of slightly over 120,000. Important sectors include the use of natural resources and expertise in Arctic conditions, the mining industry, tourism, process industries, and climate-change related opportunities. Lapland's competitive advantages are effective transport connections and logistics, strong traditional industry, the use of information technology, expertise in international tourism, clean nature, high quality of living, excellent range of research and development services, and the availability of extensive educational services. Challenges include long geographical distances, modest number of SMEs, low business investments in R&D, small number of foreign companies and experts, and decrease in population.

**Smart Specialisation in Lapland.** Lapland's Arctic Specialisation Programme, known as "Arctic Smartness Strategy" was devised to adhere to the instructions by the European Commission for the creation of regional and national smart specialisation strategies during the period 2014 – 2020. The main vision of the strategy is that by 2030 Lapland will enjoy a leading position in the utilisation of Arctic resources and conditions. It has three major themes: 1) the refining of Arctic natural resources, 2) the utilisation of Arctic natural conditions, and 3) cross-cutting development enabling Arctic growth. Spearhead fields are the mining and metal industry, tourism, and bio-economy, and a framework of five Smart Clusters has been drawn up in support of these focus areas. The five clusters are: **Arctic Industry, Arctic Rural Networks, Arctic Design, Arctic Security, and Arctic Development Infrastructure**. Projects initiated in the five clusters under "Arctic Smartness Portfolio" are main instruments to implement S3 in Lapland. Clusters mobilise and coordinate the broad range of actors involved to foster new partnerships and projects. The strategy also includes a framework and guidelines for monitoring and evaluation. The benefits achieved by S3 in Lapland include enabling structural changes in the regional economy with new combinations of expertise, developing more effective ecosystems, and promoting new investments with interregional cooperation. Lapland is an active member of the S3 Platform, leads and participates in a number of thematic S3 partnerships, and is also an initiating member of the Arctic Investment Platform (see chapter 5).

**Box 1. Case - Industrial circular economy in Kemi-Tornio**

Industrial symbiosis is a method of enhancing green growth, in which companies exchange resources (such as by-products from production processes) and use those as substitutes for other products or raw materials, thus maximising the efficient use of natural resources. The Kemi–Tornio region in Northern Finland is important for industrial refinement and exports. It accounts for 80% of Lapland's industrial production. The companies in the processing industry in the region make active attempts to minimise their waste and increase material efficiency by developing new products from their production by-products, residuals and waste materials. This circular economy cluster is incorporated into Lapland's smart specialisation strategy under the Arctic Smartness Cluster in Industry and Circular Economy. Small and medium sized companies in the region area actively involved in this developing of novel industrial symbiosis products and services for the processing industry. The key elements of the industrial symbiosis in the Kemi-Tornio region include forest industry, mining and steel industry companies, industrial service companies, research and educational organisations and intermediaries

Read more: Lapland's Arctic Specialisation Programme[31] ; Teräs, Mäenpää, 2016.

[31] http://www.lappi.fi/lapinliitto/lapland-s-arctic-specialisation-programme

### 3.5.2 Norrbotten (Sweden)

**Description of region.** Norrbotten region makes up almost one quarter (98,911 square kilometres) of Sweden's land mass, it has a total population of around 251,000, and its three biggest cities are Luleå, Piteå, and Boden with a combined population of slightly under 85,000. Important sectors include mining, forestry, and hydro power. In its development strategy 2030, the region lists some general trends that challenge Norrbotten: demographic changes and urbanisation, globalisation and increasing mobility, the rise of individualism, digitalisation, and climate-change related challenges. Norrbotten also faces other challenges, such heavy out-migration of young people and women, and housing shortages reported in the urban centres of 10 out of 14 municipalities.

**Smart Specialisation in Norrbotten.** Norrbotten's vision is that the region will be the most welcoming and re-thinking region in Sweden by 2030. It will be a multicultural and creative meeting place for new ideas, innovation and creativity. In the Arctic environmental context, Norrbotten will be particularly important as small satellites monitoring climate conditions and changes are being launched from the region.

Norrbotten's vision is presented in its regional development strategy for 2030, which is divided into three parts: 1) attractive living environment, 2) competence provision and increased labour supply, and 3) innovation and entrepreneurship. The latter could well be implemented through S3 type measures. According to the regional development strategy 2030, Norrbotten has a traditional strong base in the sustainable utilisation of its natural resources, especially mining industry, forests, and hydropower. S3 brings in additional focus on related variety and increased attention to **space technology, digitalisation, energy technology, advanced environmental technology, tourism and experience industry, cultural & creative industries and to innovation environments and testbeds of know-how and technology** in Arctic conditions[32].

Norrbotten's Regional Development Strategy will be complemented by a Regional Innovation Strategy for 2030, which will be published in early 2019. The Regional Innovation Strategy will be strongly anchored to the smart specialisation concept, as well as to the Regional Development Strategy.

As Norrbotten is dependent on a few key sectors it is vulnerable to market changes. In the Regional Development Strategy, smart specialisation is highlighted as a solution to decrease this vulnerability not only by focusing on regional strengths and conditions but also by enhancing smart diversification of the regional economy.

Internationalisation, focus on export activities, transnational collaboration in R&D and business development are high on the agenda of S3 in the Regional Development Strategy 2030 in Norrbotten.

**Box 2. Case - Facebook establishment in Luleå**

Facebook decided to locate its first European establishment, a big data server facility, in Luleå in 2011. Luleå has traditionally focused on steel works and paper and pulp industries, but the region's capability to deliver reliable and renewable energy (mainly hydro power) to Facebook's establishment was an important advantage that affected Facebook's decision. Luleå's cold climate, which provides natural cooling of the data servers, and the strength of the local university in providing skilled labour, are additional competitive advantages for Luleå as the host city of Facebook's establishments. Consequently, in the Norrbotten 2030 strategy the successful negotiations with Facebook are brought up as an excellent example of how S3 thinking benefits the region in practice. The server halls are currently being expanded, and a Facebook "Technology Deployment Centre" is being established in Luleå Science Park. Almost 1000 persons will be employed by the establishment, and today the Luleå region has developed into a European leading cluster, with 18 different data centres.

Read more: Regional utvecklingsstrategi för Norrbotten 2030[33]; Innovationsstrategi för Norrbottens län 2013 – 2020[34]; Ylinenpää et al., 2016

[32] Regional utvecklingsstrategi för Norrbotten 2030

[33] https://www.norrbotten.se/publika/lg/regio/2018/RUS/Remiss/Remiss_Regional%20utvecklingsstrategi%20f%C3%B6r%20Norrbotten.pdf

### 3.5.3 Västerbotten (Sweden)

**Description of region.** Västerbotten region spans 55,432 square kilometres, making it the second biggest region in Sweden after Norrbotten. The largest cities are Umeå (about 85,000 inhabitants and about 126,000 in the whole municipality) and Skellefteå (about 36,000 inhabitants and about 73,000 in the municipality). The region's sparse population presents a challenge. It is difficult to engage local actors in innovative environments and networks, there is considerable intraregional variation in the volume and quality of key network infrastructure, and changing demographics are putting pressure on the functioning of the welfare state especially in sparsely populated inland areas. That being said, urban centres along the coastline already have good logistical services by roads, railway, ports and airports. Key industry sectors in Västerbotten include high-tech processing industries, forestry, energy and cleantech, life science, ICT, and service industries.

**Smart Specialisation in Västerbotten**. Västerbotten's Regional Development Strategy highlights the following focus areas for smart specialisation: **sustainable energy and environmental technology; digital service sectors for smart regions, such as e-health and telemedicine solutions; life science; innovations in healthcare; experience-based and creative industries; testing activities; and technology and service development for industry.** Alongside these, the process IT sector has been emphasised in recent reports as a promising regional specialisation (for both Västerbotten and Norrbotten). Prioritised actions for innovation include the development of a collaborative regional innovation support system and meeting places for innovation, increased cooperation between business and academia, and adequate access to risk capital. The strategy also focuses on reaching out to women in particular, as region's innovative activities are male-dominated. Resolving this gender imbalance is fundamental for long-term sustainable growth. The process of compiling Västerbotten's regional S3 strategy has started in 2018.

Västerbotten aims to be a region with room for rethinking, home to entrepreneurial and globally-connected inhabitants who develop new and pioneering ideas. The Regional Innovation Strategy 2014 – 2020 is based on the Regional Development Strategy and focus on horizontal criteria that enable innovative thinking, such as equality, integration, diversity, environment, and interfaces between different industries. The Innovation Strategy elaborates on the focus areas presented in the Regional Development Strategy, and the ambition is to increase efficiency by linking the prioritised areas to closely related missions and strategies at the local, regional, national, and international levels. Västerbotten is a member of the JRC S3 Platform and its knowledge-intensive environment has already given rise to several extensive initiatives of interregional and transnational collaboration. Västerbotten is also involved, for example, in developing an Arctic Investment Platform (chapter 5) and engages actively in initiating a Baltic Sea Region S3 ecosystem based on interregional cooperation.

**Box 3. Case – Northvolt establishment in Skellefteå**

Northvolt was founded with the mission to build the world's most sustainable batteries, with a minimal carbon footprint and the highest ambitions for recycling, thus promoting Europe's transition to renewable energy. Ground preparations for a production facility in Skellefteå began in June 2018, and the factory is expected to be finished in 2023. Although the project is not explicitly described through smart specialisation, all the central elements of the concept are present, thus presenting a case of bottom-up de facto smart specialisation. Building the factory in Sweden enables access to fossil-free and inexpensive energy sources. Skellefteå is part of a raw material and mining cluster and has a long history of process manufacturing and recycling, and because the factory will be powered by 100 percent renewable hydro power, the manufacturing process will produce close to zero carbon dioxide emissions.

Read more: Regional utvecklingsstrategi för Norrbotten 2030[35]; Innovationsstrategi för Norrbottens län 2013 – 2020[36]

[34] https://www.norrbottenskommuner.se/media/1453/innovationsstrategi-foer-norrbottens-laen-2013-2020.pdf
[35] http://regionvasterbotten.se/wp-content/uploads/2012/08/V%C3%A4sterbottens-l%C3%A4ns-RUS-2014-2020.pdf
[36] http://regionvasterbotten.se/wp-content/uploads/2012/08/V%C3%A4sterbottens-l%C3%A4ns-RUS-2014-2020.pdf

### 3.5.4 Nordland (Norway)

**Description of region.** The Nordland region borders Troms to the North and Trøndelag to the South. Nordland has around 243,000 inhabitants and spans an area of 38,456 square kilometres, which is equal to 12% of Norway's land mass. The administrative centre is Bodø Municipality, with an urban population of 40,200. Nordland is rich in natural resources used for energy and raw materials and has an internationally competitive processing and marine industry. The economy is strongly globalised, and companies in Nordland deliver goods and services within, for example, metal, mineral and chemicals, seafood, and tourism sectors. New companies have developed in particular in the petro-maritime field as well as in various business services. Challenges include modest employment creation and lack of innovative capacity in companies compared to elsewhere in Norway. It is challenging for local businesses and industry to compete on the same level as larger hubs and research institutes in Trondheim, Oslo, Bergen and Stavanger. R&D and skill-formation statistics for Nordland present some of the weakest results in Norway.

**Smart Specialisation in Nordland.** Nordland has worked with smart specialisation since 2012 through its regional R&D and innovation programme. Now smart specialisation is part of Nordland's Innovation Strategy for 2014 – 2020, with the aim of enhancing innovation across the private sector. The proportion of SME's in Nordland is larger than in the rest of Norway and these companies are an important target group in the strategy. In the specialisation-part of the strategy, three sectors are prioritised in particular: **seafood, processing industry, and experience-based tourism.** These are also interconnected with the **mechanical and maritime industries**. There is a common challenge for the three sectors: the market-dominating companies in Nordland have their head offices outside the region and several are part of large multinational corporations. This needs to be factored in when outlining future development. Moreover, the field of commercial services needs to be strengthened, as Norway has a strong knowledge-based economy and much of current and future employment growth occurs in this field. The tourism sector is also facing specific challenges in Nordland, as it is dependent on public-sector support but is not recognised as a sector that needs national-level funding. Nordland is taking part in the EU's work on smart specialisation as innovation, knowledge/market development, and research funding to a growing extent takes place internationally.

The Nordland County Council is eager to further develop smart specialisation in the region, but a lack of resources makes it challenging. Education and infrastructure are prioritised in public funding, and subsequently there is not enough funding to also place strong focus on business development and smart specialisation. Smart specialisation is regarded as a useful tool both for identifying phenomena that already take place in Nordland's economy and for devising new development paths. Innovation Norway is working closely with the Nordland County Council on S3 topics. Nordland has even launched an "S3 school", an initiative to educate the public sector about smart specialisation.

**Box 4. Case- Whalesafari Andenes**

Whalesafari Andenes started in 1989 as the first provider of whale watching in Norway. Andenes is the centrum of the southernmost municipality in Nordland: Andøy. It is a hub port for whale-watching as no other place along the Norwegian coast is equally close to the edge of the continental shelf. Great sperm whales live closely to the northwest, and Andenes is the only place in Northern Europe with a 95 – 99% possibility to see whales on a relatively short trip. Educational and research activities are also a strong part of whale-watching tourism. Maximising the benefit of its surrounding conditions, Whalesafari Andenes demonstrates a clear case of de facto smart specialisation that has emerged within Nordland's regional S3 priority-area of experience-based tourism (see above) but that operates independently of collaborative and strategic S3 efforts.

Read more: "Innovative Nordland" Innovation Strategy for Nordland 2014 – 2020[37]; FoU-strategi for Nordland 2013 – 2025[38]

[37] https://www.nfk.no/tjenester/naring/innovasjon/innovative-nordland-innovation-strategy-for-nordland-2014-2020.807690.aspx

[38] https://www.nfk.no/_f/p34/i1f10176f-1a0f-467f-97b1-6f45a8fd09c2/fou-strategi-for-nordland-2013-2025.pdf

### 3.5.5 Troms (Norway)

**Description of region.** Troms is the second northernmost region in Norway and the only Norwegian county bordering both Sweden and Finland. It has more than 166,700 inhabitants and spans 25,870 square kilometres. Troms has 24 municipalities, and the administrative capital is Tromsø, which has almost 75,500 inhabitants and hosts the headquarters of the Arctic Council. According to a February 2018 decision by Norwegian Parliament, Troms and Finnmark (Norway's northernmost region) will be merged together by 2020. The Arctic University of Norway (UiT) based in Troms has 16,000 students across Northern Norway.

Troms's strength is its natural resources. The coastal waters feature sustainable fish stocks and well-developed seafood production. Moreover, the region has minerals, forests and renewable energy, and a strong tourism sector. Troms hosts extensive Arctic knowledge in scientific communities with expertise in climate issues and sustainable use of resources. As in all sparsely populated regions, Troms' challenges include a shortage in infrastructure, market prospects, and risk capital, as well as environmental challenges and cold climate conditions. Moreover, relations between industry and research are weak - industry actors in Troms have not fully seized the regional R&D potential.

**Smart Specialisation in Troms.** Troms has a County Plan for 2014 – 2025, with the aim of creating a common base for strategic development in the region. Even though smart specialisation is not explicitly addressed in the plan, the essence of smart specialisation thinking is present, bringing in an industrial specialisation approach to achieve critical mass and associated cluster effects. As part of the on-going processes of this development, Troms County facilitates and finances the regional innovation eco-system, which includes business and science parks, incubators, regional and national instrumental agencies as well as study centres, business networks and clusters.

The 'Arctic Innovation' R&D Strategy for Troms describes how the region's natural resources and Arctic location are specified as clear opportunities for research-based knowledge and skills-formation. Here, too, the smart specialisation approach is recognisable, and the strategy describes the entrepreneurial discovery process as a key contributor to regional development. Four priority areas presented in the strategy: **tourism, supplier industry, remote sensing and earth observation, and maritime resources.** These areas, where the region's natural resources are combined with the advantages gained from geographical location and research-based knowledge, are considered to have potential for value creation. Moreover, in May 2018, Troms entered into an S3-based cooperation agreement with Lapland, aiming to facilitate interregional collaboration on regional development, transport and communication, education, R&D efforts, and cultural heritage.

**Box 5. Case – Arctic 365 tourism cluster**

The purpose of the Arctic 365 tourism cluster is to solve challenges related to season-dependent economic activities in Northern Norway through cooperation across industries. The cluster focuses on identifying new target groups for increasing year-round tourism, linked closely to Innovation Norway's ambition to promote nationwide development in the tourism sector. A particular aim of the cluster's activities is to link the tourism sector to regional R&D efforts in order to benefit from the best ideas and technologies in developing tourism. During the six years of its operation, the cluster has given rise to increased interconnectedness and trust among cluster members, regional authorities, and R&D stakeholders. The cluster has created pilot packages for international markets, developed new tourism products and services, coordinated educational programmes, and participated in several R&D projects. The ambition of the initiative is to strengthen the tourism industry to span activities during all seasons, and this aim is furthered through the four priority areas of the cluster: Innovation, Internationalisation, Competence, and Collaboration.

Read more: "Troms County Plan 2014 – 2025"[39], "Arktisk Innovasjon, FoU-strategi for Troms"[40], ''Strategi for næringsutvikling i Troms 2018–2025"[41].

[39] http://www.tromsfylke.no/Tromsfylke/media/1962/fylkesplan-2014-25_nettversjon-1.pdf
[40] https://www.tromsfylke.no/Tromsfylke/media/3291/fou-strategi.pdf
[41] https://snu-troms.no/

### 3.5.6 Finnmark (Norway)

**Description of region.** Finnmark is Norway's northernmost region and simultaneously the northernmost region of the European mainland. With around 76,000 inhabitants and an area of 48,617 square kilometres, it is both Norway's largest and least populated region. The administrative capital is Vadsø. Despite being remotely located, most localities in Finnmark are relatively well connected with each other and with other regions thanks to a high standard in road and marine infrastructure.
Finnmark, like many other Arctic regions, relies predominantly on natural resources for its economy. Especially since the beginning of the 2000s, numerous new oil and gas drilling facilities have been built on the continental shelf off the Finnmark coast. Fisheries and fish refineries are a traditional but continuously important sector. Mining also remains important. Nordkapp (the North Cape, the northernmost point of continental Europe) is a main tourist destination. Developments in skills formation and R&D spending, however, are the most modest in the entire country.

**Smart Specialisation in Finnmark.** Finnmark's Regional Development Plan for 2014-2023 was adopted in 2015. The strategy outlines a range of future scenarios that have been drawn up for the region and elaborates on development priorities. The four primary focus areas are international cooperation, innovation and competence, industry and business development, and capacity for new initiatives in municipalities. The County Council grants funding to development projects that align with the priorities outlined in the Regional Development Plan.

In late 2016 the County Council decided, based among other factors on the successful adoption of S3 in neighbouring Lapland, to start drawing up a smart specialisation strategy of its own. This process is still underway but there have been decisive steps toward linking Finnmark's future steps with smart specialisation strategies. Finnmark has become part of the EU S3 Platform, wherein it has specified four sectors as its smart specialisation priorities: **minerals, experience economy, food industry, and energy.**

**Box 6. Case – Recruitment fund for fisheries**

Recruitment fund for fisheries: The coastal waters of Finnmark, bordering the North Atlantic and the end stretch of the Gulf stream, are particularly suitable for fishing and the fisheries industry has a long-established tradition in the region. The County Council in Finnmark has established a recruitment fund for fisheries to lower the threshold of establishment for aspiring fisheries entrepreneurs who are investing in the first vessel of their own, or for established fishermen to renew or upgrade their vessels. Loans are granted with affordable terms and on 20% of the total amount of the investment, up to a maximum of NOK 1 million. The recruitment fund is an example of enabling instruments that contribute to smart specialisation implementation.

Read more: Smart Specialisation in Finnmark[42] , Finnmark regional development plan and other regional strategies[43].

[42] https://www.ffk.no/internasjonalt/smart-2-3/
[43] https://www.ffk.no/naring/planer-og-strategier/

The following table gives a summary and an overview of smart specialisation strategies, related programmes and priorities in the European Arctic region.

**Table 3.** Smart specialisation related programmes and priorities

| Region/ Country | Current smart specialisation strategies or/and other relevant programmes embracing S3 approach | Priorities indicated in smart specialisation strategies and other related documents | Current developments and plans for renewal |
|---|---|---|---|
| Lapland, Finland | Lapland's Arctic Specialisation Programme (2013) | • Arctic Industry<br>• Arctic Rural Networks<br>• Arctic Design<br>• Arctic Security<br>• Arctic Development Infrastructure | In 2018 Lapland's S3 strategy was merged with the region's new internationalisation strategy. |
| Norrbotten, Sweden | Innovation Strategy for Norrbotten 2013 - 2020 (2013) | • Digitalisation<br>• Space technology<br>• Energy technology<br>• Advanced environmental technology<br>• Tourism and experience industry<br>• Cultural and creative industries<br>• Arctic innovation environments and testbeds | New regional innovation strategy with smart specialisation will be released in 2019 |
| Västerbotten, Sweden | Innovation Strategy for Västerbotten 2014 - 2020 (2014) | • Sustainable energy and environmental technology<br>• Digital service sectors for smart regions (e-health, telemedicine)<br>• Life science<br>• Innovations in healthcare<br>• Experience-based and creative industries<br>• Testing activities<br>• Technology and service development for industry | New smart specialisation strategy development process started in 2018 |
| Nordland, Norway | Innovation Strategy for Nordland 2014 - 2020, (2014)<br>R&D Strategy for Nordland 2013 – 2025, (2013) | • Seafood<br>• Processing industry<br>• Experience-based tourism<br>• Horizontally: mechanical and maritime industries | Strategy renewal subject to monitoring and evaluation results |
| Troms, Norway | Troms Master County Plan 2014 - 2025 (2014)<br>Arctic Innovation, R&D strategy for Troms, (2018) | • Tourism<br>• Supplier industry<br>• Remote sensing and earth observation<br>• Maritime resources | Updating Arctic Innovation, R&D strategy for Troms with more explicit links to S3 is under consideration |
| Finnmark, Norway | Future Finnmark 2014 - 2023, (2015) | • Minerals<br>• Experience economy<br>• Food industry<br>• Energy | New smart specialisation strategy development process started in 2018 |

# 4 Findings of Arctic S3 Meeting in Rovaniemi, Finland in April 2018

As outlined above, several recent reports are promoting smart specialisation as a workable concept for promoting competitive advantages and launching joint partnerships to address common challenges in European Arctic regions. The JRC technical report on Implementing Smart Specialisation in Sparsely Populated Areas[44] has already examined the implications of developing smart specialisation in the context of sparsely populated areas, suggesting a tailor-made approach due to the challenges of critical mass and absorptive capacity. From an Arctic perspective in particular, these questions were examined in the Arctic Cooperation meeting in Rovaniemi on 13 April 2018. The meeting served as a kick-off session ahead of starting the work for building the knowledge on how smart specialisation concept can be exploited in the Arctic context. The event was organised in cooperation with the Regional Council of Lapland and was co-hosted by the non-profit organisation ProAgria, which is a member of the Arctic Smart Rural Communities Cluster in Lapland, Finland. The meeting gathered over 20 participants from North and East Finland, North Sweden, and North Norway. Participants discussed the key questions below on Figure 4 and based on that elaborated some recommendations, solutions to Arctic challenges and good practise cases.

**Figure 4.** Arctic S3 meeting in Rovaniemi, April, 2018

Source: Nordregio

Smart specialisation developments in Lapland (Finland), North East Finland, Northern Sweden, Nordland (Norway) were presented more in detail. In **Northern Norway** smart specialisation is a means for going beyond and **extending the current competitive strengths** in fisheries, aquaculture, and tourism. As emphasised at the meeting regarding **Northern Sweden**, regional research and innovation have been developed based on the smart specialisation principles, although the smart specialisation priorities have not been fully exploited; **horizontal priorities** have been preferred instead, in order to avoid domination by a few prioritised industries. In **East & North Finland**, in turn, it was pointed out that **ESIF funding activities** have been based on smart specialisation. Cross-border collaboration in joint opportunities could clearly reinforce these regions, however, connectivity challenges and low critical mass in skills complicate these efforts. Thus, especially Northern Swedish regions have recently considered

[44] Teräs et al. 2015

relaunching discussions on smart specialisation priorities to renew and strengthen innovative capacity.

Discussions in smaller groups outlined the major challenges and put forward some proposals based on the key questions of the meeting. The first of the three discussion groups focused on challenges relating to **industrial transition and low cross-sectoral mobility** among key industries in the Arctic regions. In their policy recommendations, the group members proposed searching for solutions via an open interregional innovation platform for the Arctic, granting specific attention to the support needs of SMEs, as well as making more use of digital solutions in measures to support industrial transition. The second group discussed challenges with **adjusting national and EU level policy strategies to the specific Arctic context** and environment. The group proposed working towards a stronger and more unified representation of the Arctic regions in international and European bodies, adapting policy instruments together across regional and national borders, as well as working on closer strategic partnerships with peers and regional authorities in other parts of Europe. The third and final group discussed problems of **lacking critical mass and interregional communication and mobility in the European Arctic.** Their recommendations underlined the importance of bringing Arctic regions closer to each other through harmonising educational schemes and work qualifications, improving communications and transport infrastructure, and reinforce the interregional dialogue in for a like the NSPA Network.

**Key lessons from the Rovaniemi S3 meeting in April, 2018:**

- It is challenging to keep all relevant actors involved in working together with adapting smart specialisation strategies to Arctic conditions.
- While they face similar challenges, the European Arctic regions are not well informed about each other's developments. Long distances and lacking communication are inhibiting cooperation.
- Many cooperation networks already exist in the European arctic, which cover different issues and challenges. But these networks are quite fragmented, and it is difficult to speak in a unified voice representing all the Arctic regions.
- Different regions in the European Arctic have followed different approaches to smart specialisation. For example, while Lapland is marketing Arctic Smartness Initiative based on 5 Arctic Smartness clusters, in Northern Swedish regions smart specialisation is largely seen as already embedded in research and innovation strategies, and these regions thus have not outlined specific smart specialisation priorities.
- Arctic regions can be characterised as largely dependent on a few resource-intensive industries, therefore smart diversification and cross-sectoral approaches are more preferred than pure specialisation.
- There is also a gender dimension. Many Arctic regions face the specific challenge of providing jobs for women, especially in traditional industries exploiting natural resources as these fields are male-dominated.
- There is a need for better coordination between smart specialisation strategies, national programmes, initiatives and European structural funds investments.
- Investments are an essential part of Arctic S3 approaches, staying at the strategy/planning level only is not enough. To reinforce implementation of strategies the political ownership at regional level needs to be in place.

# 5 Good practice cases in the European Arctic

This chapter illustrates good practice cases on Arctic smart specialisation. The cases have been selected in order to present a rich variety of cases in Northern Finland, Northern Sweden, and Northern Norway, with a main focus on interregional and transnational cooperation efforts and their relevance to S3. In addition, transferability of the used practices and their relevance to other Artic regions in addressing similar challenges was considered. The selection of cases has been conducted in collaboration with the relevant regional authorities overseeing smart specialisation development in each respective region. The rationale for case-selection is that the cases are either explicitly linked to official S3 strategies of their region, or that they are otherwise closely connected to the network-level S3 aims and measures in their region.

## 5.1 Visit Arctic Europe

**Project in brief:** Visit Arctic Europe exemplifies how tourism enterprises and associations facing similar conditions across state borders and long geographical distances are collaborating to overcome mutual challenges and benefit from mutual opportunities.

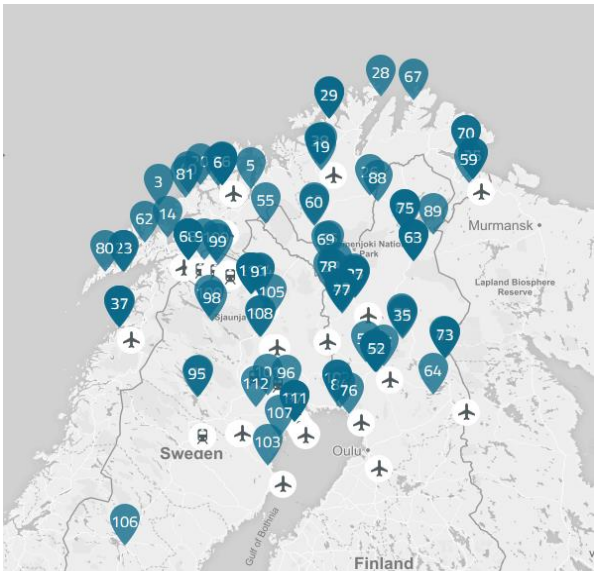
**S3 Relevance:** Sustainable and innovative use of the Arctic natural conditions for tourism and recreation constitutes one of the core focus-areas of smart specialisation in European Arctic regions. Visit Arctic Europe has, for example, been an involved stakeholder in the (Europe-wide) interregional thematic S3 partnership on Digitalisation and Safety in Tourism, within which Lapland's regional authorities hold a leading role. Lapland's 2018 international strategy[45] explicitly emphasises tourism as a key priority for regional S3 efforts.

**Challenges addressed**: Long geographical distances, lack of critical mass for attractiveness, fragmented market.

The Visit Arctic Europe project presents a remarkable example of how tourism enterprises and associations facing similar conditions across state borders and long geographical distances are collaborating to overcome mutual challenges and benefit from mutual opportunities. What is more, these companies have traditionally regarded each other as competitors and thus this collaborative initiative demonstrates a recent increase in mutual trust. The project is significant both in its size and impact and it is funded by Interreg Nord.

Visit Arctic Europe was started as collaboration between the Finnish Lapland Tourist Board (lead partner), the Northern Norway Tourist Board, and the Swedish Lapland Visitors Board. The first project period lasted from August 2015 to March

**Figure 5**. Visit Arctic Europe participating actors




*Source:* http://visitarcticeurope.com/

[45] Regional Council of Lapland

2018, had over 130 participating enterprises, and a budget of EUR 6.4 million. The project area spans Northern Norway, Northern Finland, Northern Sweden, and Sápmi (which spreads over all three countries).

The project was designed to establish cooperation between SMEs in the included areas. Participating enterprises vary in size, from small family-owned businesses to big hotel chains, and various parts of the tourism industry are represented. The main aim of the first project period was to increase business collaboration across borders and improve joint competitiveness in a global market. The project was based on common strengths and values of the Arctic Region as a travel destination, with the vision of developing new and innovative cross-border tourism concepts. More than 700 participants took part in cross-border networking events, workshops, seminars, and cluster meetings arranged as part of the project. Furthermore, transport connections are vital for growth, and thus the project worked on improving accessibility to the region and between different parts of the European Arctic. A further focus-area was international marketing, with tourists from the UK, Benelux and German-speaking Europe chosen as primary target markets, and the US and China as secondary target markets.

The widespread efforts of the project are estimated to have resulted in 33,000 new holidays sold already in the period between November 2016 and September 2017. This equates to more than 255,000 new overnight stays, and 78 new cross-border travel packages where tourists visit several destinations in the European Arctic during the same trip. To ensure that the project actions were justified and effective, stakeholders received analysed and updated information on the performance of the new R & D activities. This included creating tools for measuring the success of the project, analyse future travel trends studies, analyse studies on digital trends in tourism and customer behaviour, and report on obstacles in cross-border cooperation. The project gathered information about instant fixes, development needs and new approaches and concept suitable for the area to develop internal accessibility.

Visit Arctic Europe has begun its second phase in April 2018 and will continue until March 2021, with a budget of EUR 5.3 million. The aim of the second phase is to strengthen cross border networking and commercial cooperation in order to further develop the Visit Arctic Europe area as a year-round, sustainable and high-quality travel destination.

**Read more:** http://visitarcticeurope.com/about-visit-arctic-europe/

## 5.2 REGINA LS3

**Project in brief:** The REGINA project has developed a Local Smart Specialisation (LS3) concept, a six-step smart specialisation guideline to complement regional smart specialisation concepts.

**S3 Relevance:** The LS3 concept is purposefully planned to make smart specialisation an accessible a useful tool for remote localities, for which large-scale and cross-regional smart specialisation platforms may be difficult to engage with.

**Challenges addressed:** Dependence on natural resources and the importance of retaining economic benefits for local development, keeping talent in remote localities.

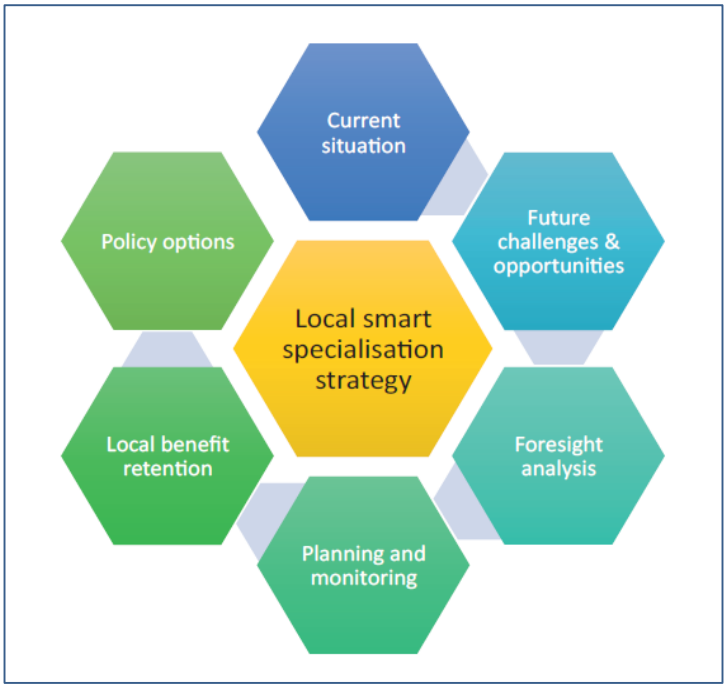
The REGINA project, established as part of the Northern Periphery and Arctic Programme 2014-2020 and finalised in September 2018, has developed a series of tools and support structures tailored for remote communities in the European Arctic and Scotland which face large-scale resource-based industrial development in their local economies. A key outcome of the project was the development of the Local Smart Specialisation (LS3)

concept, which is a local-level, six-step smart specialisation guideline purposefully planned to be accessible to the most remote localities and actors for which other smart specialisation platforms may be out of reach. LS3 has been piloted in localities across the European Arctic, with promising results and positive feedback.

The main mission for the LS3 concept is to support the aspirations and competences of the local community and its institutions. It is inspired by the S3 concept but focuses specifically on the local level (municipal level) in identifying and developing assets and capabilities on the ground. LS3 is particularly relevant for European Arctic communities where industry and economic development is heavily anchored in natural resources. The risks facing these local economies are similar across the Arctic Region: negative demographic structures and trajectories; risk of conflicts and disputes related to natural resources; and the importance of retaining economic benefits for local development.

The reason that local-level efforts are crucial is twofold. First, in many cases in the European Arctic, a very remote location and sparse conditions may make local economies isolated from national and regional policy-efforts and their impact. Second, present and future changes and transitions in the most important industry-sectors for the European Arctic will have consequences (either positive or negative) that are much more significant at the local level than for a region as a whole, for example when production from local industrial facilities is concentrated to one regional location. By emphasising these local dimensions the LS3 concept offers a strategic planning and policy response that improves the preparedness and reduces vulnerabilities of communities in remote and sparsely populated areas. It is based on making use of existing territorial assets to secure economically beneficial, socially inclusive, and environmentally responsible future development. This includes adapting both to the expansion and to the decline or closing-down of local industrial activity.

**Figure 6.** Six steps of the LS3 concept




*Source:* http://www.reginaproject.eu/

The LS3 concept consists of six components with a specific running-order:

1) the current situation is analysed first; 2) followed by the identification of challenges & opportunities; 3) foresight analysis; 4) planning and monitoring; 5) local benefit retention can be implemented in parallel; 6) identifying policy options is the final step.

The overall aim is that this six-step framework is a flexible base on which to design a designated community strategy that incorporates the specific contextual factors of the local area in question.

Read more: http://www.reginaproject.eu/

## 5.3 Lapland as an Arctic leader in S3 thematic platforms

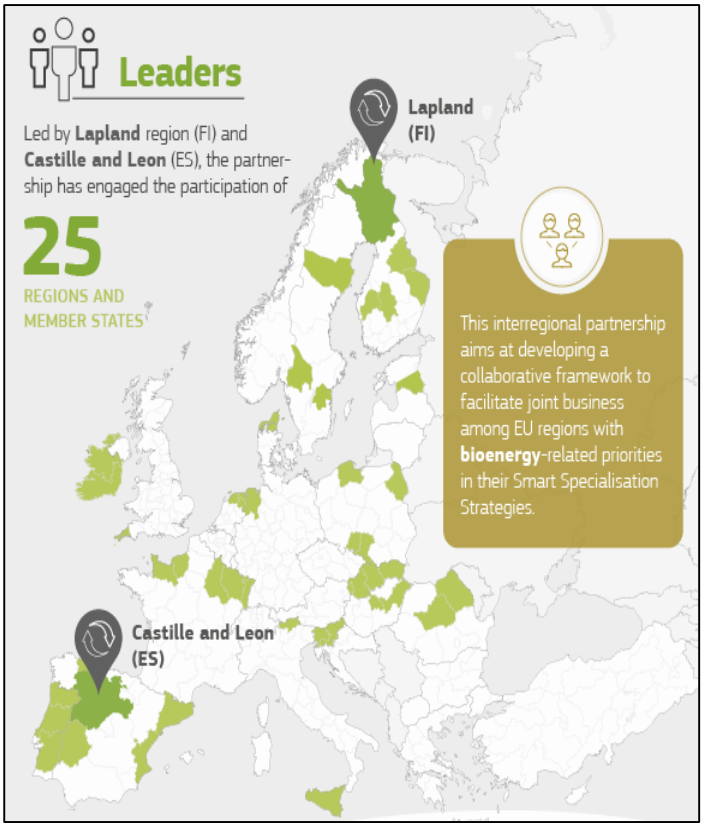
**Initiative in brief:** Lapland's regional authorities have distinguished themselves in leading, coordinating and active partnership roles in several thematic S3 partnerships.

**S3 Relevance:** Participation and collaboration in thematic S3 partnerships is based on regional or national smart specialisation strategies and linked to the priorities (indicated in the strategies) that correspond to the main theme of the Thematic Platforms and their partnerships.

**Challenge addressed**: Lack of critical mass development, dependence on a few dominant industries, limited capacity to finance interregional projects, limited number of potential partners and knowledge sharing to promote new domains.

The Lapland region in Northern Finland provides a very good case-example of how a Europe-wide smart specialisation collaboration can be actively coordinated by and grant benefits for a remote and sparsely populated region. Lapland's S3 strategy has been materialised through the delineation and development of five thematic clusters, each supporting and strengthening a regional, collaborative ecosystem in its respective focus-area. These efforts are strongly linked to Lapland's leading role in several thematic smart specialisation partnerships connecting regions from different parts of Europe. Lapland is primarily involved in collaboration on energy and industrial modernisation related topics. As of December 2018 Lapland has been officially participating in 5 thematic S3 partnerships and taking a leading role in 3 of them[46].

**Figure 7.** Lapland leading bioenergy partnership




*Source:* http://s3platform.jrc.ec.europa.eu/s3-thematic-platforms

In S3 Thematic **Energy Platform** Lapland is leading the partnership on **Bioenergy**, which engages 20 other regions collaborating in the development of renewable energy from forest-based and non-food based agriculture. Lapland coordinates the thematic partnership together with the Castilla y Leon region in Spain. The parnership is currently working in four priority areas: biofuels, biomass, biogas and knowledge transfer.

In S3 Thematic Platform on **Industrial Modernisation** Lapland is leading the partnership on **Digitalisation and Safety for Tourism** together with Andalusia in Spain and Slovenia. The partnership has five other official partners and seeks to maintain and support Europe's position as the world-leading continent in tourism visits, through finding new digital and collaborative solutions for improving the resilience, growth, and safety of the European tourism industry.

[46] JRC, S3 Platform

**Sport** partnership under industrial modernisation is another theme where Lapland was the initiative-taker in forming the partnership and continues to have a leading role together with South Netherland. The partnership facilitates joint research, investment and innovation in the sport industry across Europe. It involves eight other regions working on the agreed areas of focus: smart sport wearables, smart sport environment, healthy active lifestyle.

Lapland is also an official partner in other thematic partnership such as **Social Economy** in industrial modernisation. The partnership aims to empower the formation of social economy clusters and networks within and between regions, for example by way of improving funding opportunities and mapping of social economy value chains. In thematic partnership on **Sustainable buildings** under S3P Energy Lapland together with other 43 partners works to enhance energy-efficiency, insulation, renewable energy integration, and other sustainable production factors in the construction sector.

In addition, Lapland has interest and follows thematic partnerships developing Smart Sensors for Agro-food, High-tech Farming solutions, and improved SME Integration into Industry 4.0 strategies. Lapland has also recently applied to be part of the partnership on Mining Industry and Global Value Chains.

Read more: http://s3platform.jrc.ec.europa.eu/s3-thematic-platforms

## 5.4 ELMO East & North Finland as part of EU regions in transition

**Project in brief:** East & North Finland has proactively signed up as a test area for the EU Pilot Action for Regions in Industrial Transition.

**S3 Relevance:** By participating in the Pilot Action, the regions make use of available EU resources and support to safeguard the future of its population and economy by developing their regional strengths. Industrial transition has recently been emphasised by leading experts as one of the main challenges that European regions aim to overcome through smart specialisation[47].

**Challenge addressed:** Accelerating industrial transition for more resilient economy, streamlining EU financial investments.

The Eastern and Northern regions of Finland constitute one of twelve test areas for the European Commission's Pilot Action for Regions in Industrial Transition. This demonstrates a case of an Arctic region that has successfully mobilised to make use of available EU resources and support to safeguard the future of its population and economy.

In July 2017, the EU Commission announced two Pilot Actions: industrial transition and interregional cooperation[48]. These actions help regions invest in their competitive assets, address challenges of industrial transition, create value, access new markets, and join forces with other regions. Transformations such as economic globalisation, decarbonisation, and emerging and digital technologies are putting a pressure on Europe to become more competitive and resilient. Amidst these developments, regions experiencing significant industrial transition are facing specific, aggravated challenges, such as the lack of appropriate skills for embracing new technologies and sectors, high labour costs, and deindustrialisation. Moreover, these regions may not currently attract sufficient investment or manage to fully utilise opportunities offered by EU funds to

[47] Berkowitz, 2018
[48] European Commission, 2017

further develop their regional strengths. In other words, smart specialisation and economic diversification is at the centre of what the Pilot Action for regions in industrial transition aims to achieve.

The Pilot Action provides its participant-regions with support from Commission experts as well as technical assistance by the European Regional Development Fund. Each partnership receives hands-on support from the Commission and advisory services up to a value of EUR 200,000, including peer learning and foresight activities organised in partnership with the OECD. An additional grant of up to EUR 300,000 for the purpose of implementing the new regional strategies will be made available to regions demonstrating sufficient progress.

**Figure 8.** East & North Finland as industrial transition region


*Source:* https://ec.europa.eu/regional_policy/en/information/publications/

After an application process among 12 test regions selected - the East & North of Finland is one from the European Arctic. The region will develop or redesign a strategy for regional economic transformation based on its smart specialisation priorities, e.g. forest bioeconomy, blue bioeconomy, health and well-being, tourism, energy, circular economy, and traditional industries (metal, wood, food processing). After developing its strategy, East & North Finland may receive additional grant to implement the strategy during 2019-2020. The European Observatory for Clusters and Industrial Change (EOCIC) will analyse the region's cluster activity and innovation policies, and the expert group Idea Consult will support the region's strategy process and development. The region will focus on tighter collaboration with other Finnish regions, while at the same time developing East & North Finland internally and forwarding the region's specific development opportunities. In collaboration with OECD workshops, East & North Finland will develop concrete support actions on themes such as future-oriented entrepreneurship, preparedness for future jobs, expanding innovation actions, and moving towards a low-carbon economy. Through involvement in the Pilot Action, East & North Finland gains great benefit for the region's own development, and in addition, local actors have the potential to influence the development agenda of the EU financial framework post-2020.

Read more:
http://ec.europa.eu/regional_policy/en/information/publications/factsheets/2018/pilot-action-regions-in-industrial-transition

## 5.5 Arctic Investment Platform

**Initiative in brief:** Stakeholders in a number of regions have recently joined forces to establish an Arctic Investment Platform for supporting development and innovation in the European Arctic.

**S3 Relevance:** The Arctic Investment Platform will be a key financial stakeholder helping Arctic regions implement their smart specialisation strategies and reaching concrete progress.

**Challenge:** Fragmented projects and investments, lack of early-stage private investment capital and capacity for scaling up.

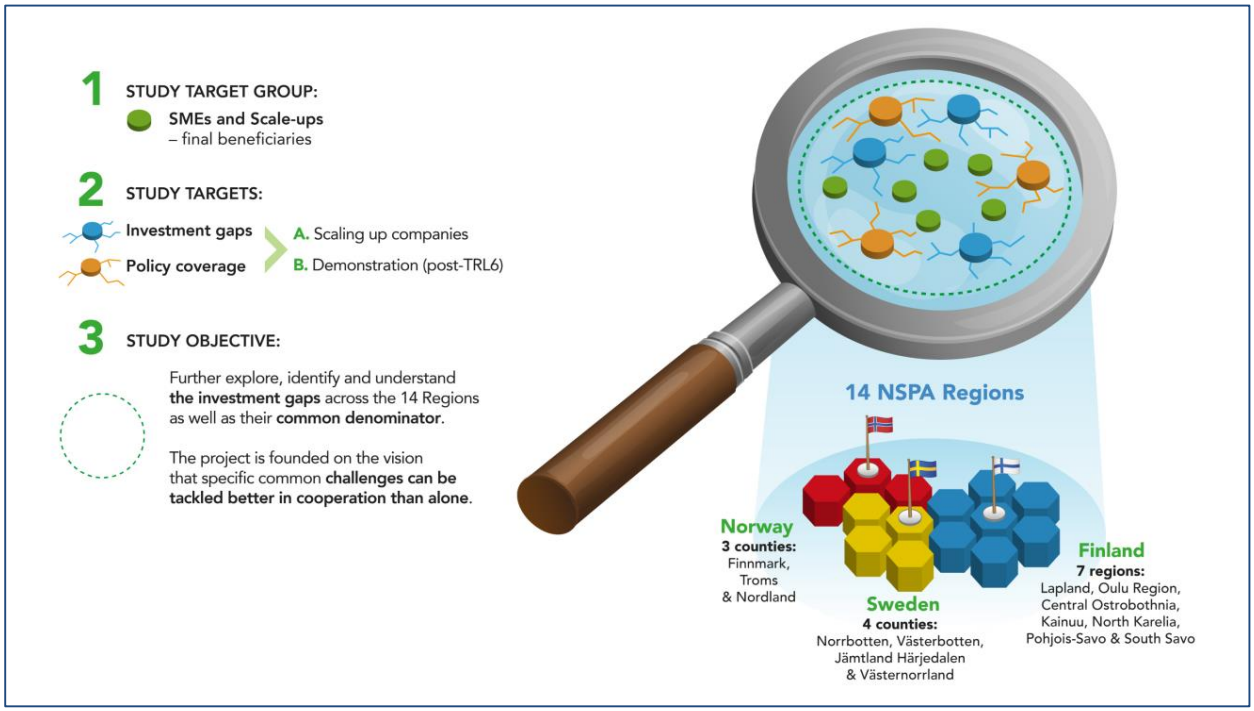
The initiative for an Arctic Investment Platform (AIP) has taken decisive steps forward in the year 2018, and a feasibility study with on-site interviews and analyses is currently under way. The report will be finalised by the end of 2018, giving **an updated overview of the investment needs across the European Arctic** and of the way the AIP could be structured in order to be as effective and supportive as possible. When initiated, the AIP will serve the very important purpose of helping the Arctic Region **turn their smart specialisation strategies into actual investments and implemented development steps**. Moreover, the initiative also aims to streamline existing financing instruments and answer the lack of expertise in financing growth-stage enterprises.

The Regional Council of Lapland started up the preliminary survey for the potential to establish a cross-regional body of specialised financial cooperation in the European Arctic based on the Investment Platform model outlined by the expert task-force of the project. Target partners are national and international level financing and policy-institutions (EC, EIB, the Nordic Council of Ministers, the Arctic Council, World Economic Forum etc).

The smart specialisation strategies of the different Arctic regions are being used as the main guideline for determining key investment priorities on which the AIP, once established, should focus. In this way the developers of the Platform hope to reach targets that conventional investment funds have not identified. The themes that the AIP preparation phase has covered include, among others, circular economy, travel and tourism, and sustainable energy solutions. A main priority identified in the preliminary analyses has been to support industrial scale-ups, in addition to **supporting start-ups and SMEs with a clear internationalisation strategy**, while keeping in mind the regional specificities, for example the high share of micro-companies and underrepresentation of medium-sized companies.

The survey process, including a preliminary workshop held in Umeå, Sweden in August 2018 as well as a preliminary gap analysis, has so far aimed at identifying the main investment gaps shared by European Arctic regions so that the AIP can be structured to answer to these challenges as efficiently as possible. **Lack of early-stage private investment capital** is a substantial hurdle to future economic and technological development. The present focus has now turned towards supporting small-scale piloting projects, and subsequently also to the next step of funding large-scale demonstrations. Attracting more private capital requires investors to trust in the prospects of and expected returns from Arctic investments, and this trust, in turn, would be easier to establish if local industries would be further along in their development. Strategically intervening in this negative circle is thus identified as a key investment priority. Other priorities in the Arctic context include **alleviating information asymmetries** through the AIP so that industries and investors are better informed of each other, as well as supporting the maintaining and attracting of human capital and expertise in the area.

**Figure 9.** Key points of the AIP feasibility study




*Source*: AIP preparatory material, 2018

# 6 Encouraging collaboration on joint opportunities in smart specialisation in the European Arctic

The European Arctic context presents several geographic, demographic, and economic characteristics which render innovation and growth particularly difficult to achieve. Common features among most areas in these regions include long distances, sparse populations, and industrial agglomerations dependent on single industry-sectors in need of upgrading and transition. In these conditions, achieving critical mass, stable and diverse economic output, and new clusters and innovations presents a substantial challenge. That being said, these distinct challenges can be countered with distinct solutions. Many features of the unique European Arctic context are shared across several regions and communities that between them have generations of experience but very few natural opportunities to share this knowledge with each other. This opens up clear **potential for Smart Specialisation efforts to mobilise joint interregional initiatives and partnerships as a means to build the future.**

The case research presented in the previous chapters has brought forth a number of examples of how European Arctic regions are engaging with each other and with external partners on smart specialisation, both in strategy and in implementation. Some of these are direct initiatives by S3-coordinating regional authorities wishing to strengthen their capacity and find innovative solutions by working together with others. Other initiatives to collaborate on mutual regional strengths have been taken independently, by stakeholders or regions with a less formalised S3 framework, as a means to strengthen regional growth and combat mutual challenges. These cases of de facto smart specialisation are, moreover, often linked ex-post to formal S3 frameworks in one or several different regions, as those regions expand and develop their own smart specialisation strategies.

The cases of joint-initiative smart specialisation brought up in this document include:

- **Visit Arctic Europe**, as an independent collaboration between tourism authorities in European Arctic regions;
- **Lapland's leading role in thematic S3 partnerships** which brings together regional authorities from all over Europe;
- **The Arctic Investment Platform** initiative as a future joint funding structure across European Arctic regions facing similar strengths and weaknesses;
- **Regina LS3** as a smart specialisation tool for remote and sparsely populated localities in different regions, as these localities often have more in common with each other than with their respective regions' cities and core areas;
- **East & North Finland** as part of the Pilot Action on Regional Transition, exemplifying how regions with a distinct regional transition challenge draw on interregional and transnational support structures to secure their future.

These examples testify of the significant added value that collaboration across sectors, regions, and institutions can bring to the adoption and implementation of smart specialisation in the European Arctic. Simply emulating and transferring smart specialisation strategies or activities from elsewhere, for example in densely populated areas where interregional collaboration is not equally crucial for critical mass formation, risks wasting some of the potential benefits and future impacts that smart specialisation entails. The importance of collaboration on joint strengths and opportunities has been highlighted as a key feature of contemporary developments of the smart specialisation concept.

# 7 Key findings and recommendations

## 7.1 Smart specialisation in European Arctic

Based on the observations of existing regional strategies, previous research, as well as the case-examples described above, it stands clear that the European Arctic region is already today weathering the challenges posed by its **unique natural conditions** increasingly well. As a textbook example of what the smart specialisation concept is designed to achieve, the **Arctic natural environment is turned into an opportunity** in the form of natural-resource utilisation, from which new and innovative business areas and networks are emerging alongside and within the traditional industries. Long geographical distances continue to pose a challenge for business activity and for increased networking and collaboration among local actors. That being said, the smaller size of the communities and the cultural proximity across state borders also present a unique opportunity in terms of networking – as long as information asymmetries are overcome, there is considerable potential for Arctic actors to face mutual challenges together. As seen in the case-examples, **collaborative, interregional networks** for implementing Arctic smart specialisation is already proving a success, and many promising initiatives are currently in their development stages.

**Lapland** in Finland and **Nordland** in Norway are the regions where formal smart specialisation strategies have been developed the furthest. What is striking about the Lapland case in particular is how well local actors and resources have been mobilised in practice in the implementation stage of the strategy, namely, via a cluster-based approach highlighting the core development areas and bringing together regional actors to engage with those areas in regional ecosystems. Smart specialisation strategies in other regions are also being prepared and finalised. These will act as useful platforms for funding and expertise to be channelled to where they are needed. Overall, it can be observed that it is **in the practical, 'Doing-Using-Interacting' mode of innovation** where the European Arctic is particularly strong[49]. The specific context of the European Arctic as a remote and sparsely populated yet resource-rich region means that regional success will hinge to a large extent on how well remote communities and industries and are reached and empowered in practice by the measures of the regional strategies. That being said, there is of course also increasing capacity for Science, Technology and Innovation -based progress, with many strategic R&D and academic partner institutions within and beyond the European Arctic.

To sum up, the key emphasis and takeaway of this interim report is that innovation and sustainable growth in the **European Arctic is not lagging behind by default**. In fact, considering its specific, contextual situation, the region is developing remarkably well by European comparison. **Designated smart specialisation strategies have been or are being presented in all regions of the European Arctic, and even outside of these efforts, the principles of smart specialisation are already being used de facto in practice by local initiative-takers and clusters, as presented in our case-studies.** In these de facto cases, either 1) a formal smart specialisation strategy is not yet present, but a current R&I strategy is clearly based on prioritisations and a bottom-up entrepreneurial discovery process, or 2) a formal smart specialisation strategy exists in the region but the S3 elements in the identified case-study have not been supported in practice by this framework. The ultimate aim of all the efforts described in this study is to support and strengthen emerging and already established initiatives towards a sustainable, innovative, and vibrant European Arctic Region. The smart specialisation concept can be developed even further in providing a roadmap to get there.

[49] Asheim and Coenen, 2005

## 7.2 Revision of research questions

This section provides an overview of findings and conclusions responding to the key questions outlined at the S3 Arctic meeting in Rovaniemi in April 2018 (see chapter 4).

### Is smart specialisation a response to Arctic challenges?

- Smart specialisation can be very useful, as long as the theory and methods are adjusted to the Arctic context (for example, smart diversification would be suitable in regions currently too dependent on single industry-sectors).
- Rather than a universal response, the role of smart specialisation in the European Arctic could be better described as a complementary policy tool to tackle advanced regional policy challenges.
- Above all, smart specialisation can serve very well as a trigger to mobilise regional and local actors in the Arctic, as exemplified in the case-studies.

### How has it worked in the Northern regions?

- There has been great variety across regions, but in general terms the S3 applications undertaken so far seem to have worked very well. However, it is mostly too early to make categorical judgements about specific impacts.
- Some great S3 success stories have been uncovered in the case-studies, for example the Arctic Circular Economy initiative in Kemi-Tornio, Finland, among others.
- The fact that regions in Northern Norway have been so active in adopting smart specialisation despite being outside of the EU should be emphasised as a positive sign.

### What are good examples of implementing S3 in the Arctic?

- A particularly impressive finding is the already extensive use of S3 in the Arctic as a tool to facilitate industrial transition – one of the most strongly emphasised contemporary and future applications of S3.
- There are already many signs of interregional thinking and cooperation on joint opportunities and mutual strengths. This collaborative dimension of S3 has great potential in the European Arctic.
- There are several initiatives and applications in Arctic regions that are currently not linked to formal S3 strategies but that clearly exhibit de facto adaptions of smart specialisation thinking. These applications, many of which still remain uncovered, often involve traditional Arctic specialisations and thus go beyond the industries most commonly associated with European innovation policy (high-tech industries; nano- and bio-technologies; ICT).

### How to encourage and facilitate Nordic collaboration on joint opportunities in smart specialisation?

- Mobilising regional and local actors is the main tool; The S3 concept can definitely be used for this as long as it is adapted to the European Arctic context. The importance of committed local individuals/facilitators driving these initiatives should not be underestimated.
- Regions and localities across the Arctic have more in common in some fields than in others – it is important to identify specifically these domains as they are the most suitable objects of joint projects and platforms (see for example existing transnational collaboration on Arctic tourism)
- It is important to highlight that there remain significant information asymmetries and communication challenges among the European Arctic regions and communities. Addressing this is crucial for mobilising joint efforts.

### What instruments have been operational?

- Singular S3 projects and tools have been adopted. Most of these seem to fit into the local conditions in an excellent way, while a few of them seem to have been initiated primarily for the reason of fulfilling ex-ante criteria for structural funding.
- There have been many successful adoptions of implementation-phase S3 measures. Recent initiatives include the ambition to form new instruments for investments and funding.
- Particularly inspiring case-examples include well-working synergies between smart specialisation and cluster policies, most notably in the case of the of the Arctic Smart Clusters in Lapland.
- Monitoring and future evaluation of the Arctic S3 initiatives undertaken so far constitute important further steps to be developed by relevant stakeholders as more data on the performance of these initiatives gradually becomes available.

## 7.3 Findings and recommendations

Based on the analysis of the adoption of smart specialisation in European Arctic regions, the authors of the present study came up with the following recommendations for future development of smart specialisation approaches in the European Arctic regions.

First, the unique location, nature, and characteristics of the Arctic region, with all its opportunities and challenges, should be kept as the starting-point from which to develop even smarter, more sustainable, and more inclusive Arctic regions and communities. The smart specialisation concept provides the European Arctic regions with a powerful regional development instrument, the wide-ranged tools and methods of which serve as a valuable complement to current regional development strategies and processes. Several European Arctic regions – both in EU Member States and in non-member countries – have already been able to create and develop value-added activities through smart specialisation applications. The authors encourage the European Arctic regions to make full use of the 'toolbox' of policy-methods provided by the smart specialisation concept, including the guidance and support services offered by the JRC S3 Platform.

Second, the importance of increased external and transregional networking – as a means to combat isolation and ensure critical mass – should be emphasised even more in European Arctic applications of smart specialisation. Ranging from interregional S3 Peer Review events to Thematic S3 Platforms and Innovation Camp type networking-tools, smart specialisation opens up new possibilities for transregional and international networking. As stated by Kevin Morgan at the Smarter Conference 2018[50]: "*The real problem is not being small. The real problem is being lonely*." Because of the geography, location, and long distances characterising the European Arctic, avoiding isolation requires specific attention in the European Arctic compared to many other regions. Moreover, avoiding isolation is also an important strategy for avoiding organisational lock-in patterns by introducing new concepts and ways of thinking to European Arctic professional communities.

Third, many of the European Arctic regions have relatively well-developed innovation systems with innovative companies and intermediaries as well as high-quality knowledge providers (universities, research institutes, vocational facilities, etc.). This generally positive evaluation may, however, hide the internal divergences present within the regions: There may be sufficient volume and ingredients of regional capital to achieve critical mass and profit from adopting smart specialisation, but the more remote localities inside the region may in the worst case become increasingly peripheral as a result of these developments and lose their potential to develop and innovate. European Arctic

[50] https://www.regionalstudies.org/events/2018-smarter-conference/

regions are therefore recommended to pay particular attention to inclusive smart specialisation approaches and applications, for example by learning from the experience of local smart specialisation initiatives of the REGINA NPA project described earlier in this report. At the same time, it is also important not to get locked into a narrow focus on local needs and capacities but to try to connect missing competences from outside the regions and explore opportunities provided by transnational networks.

Fourth, long-term sustainable development in the European Arctic is an issue that gains increasing focus: To combine the protection of vulnerable Arctic nature with the increasing interest for vast natural resources remains a sensitive balancing-act for policy-makers and other stakeholders. The European Arctic regions are encouraged to pay even more attention to sustainability in their smart specialisation activities, while maintaining balanced and open dialogue between economic, social, and environmental dimensions of regional sustainability and prosperity. As it is also advised in Joint Communication (2016) smart specialisation strategies can help to develop local models of sustainable growth and job creation in the European Arctic. Smart specialisation tools provide the regions with a useful platform and opportunity to work constructively and substantively on sustainability.

Fifth, it is of crucial importance that the European Arctic regions do not view smart specialisation as only a strategy process. Efficient and well-working implementation of smart specialisation strategies and processes is a fundamental step for smart specialisation to be valuable and successful in delivering new products, services, jobs, and wellbeing to the region. Strengthened coordination between regional smart specialisation strategies, national programmes and initiatives, and European structural funds investments can empower the implementation of tailor-made smart specialisation systems supporting new growth avenues for the regions.

Last, the importance of communication as an integral part of smart specialisation remains undervalued. The European Arctic regions are strongly recommended to invest significantly in systematic, engaging, and high-quality communication in order to ensure that their smart specialisation efforts have a wide reach and impact.

# 8 Conclusions

The implementation and application of smart specialisation strategies varies between the European Arctic Regions under review in this study. Some Nordic European regions initially had a cautious approach towards smart specialisation, as some of them did not have obligation to develop regional smart specialisation strategies as a formal requirement (for example Swedish[51] and Norwegian regions), and as dependence on a few dominant industries made the case for choosing more horizontal approach. That being said, smart specialisation elements have been present in the past, such as inclusive and interactive bottom-up discussion with stakeholders from different environments of regional eco-systems, resembling the entrepreneurial discovery process central to smart specialisation. Some regions (for example Lapland and Nordland) conceived smart specialisation as useful in finding new ways to promote regional growth and, with a cross-cutting strategic approach, in discovering new paths and new niches of development to reduce the dependence from a few large firms. Based on experiences from the first few years of implementing smart specialisation strategies, European Arctic regions are increasingly convinced that smart specialisation is a suitable policy approach for low-density Arctic economies and can reinforce their innovative capacity.

Smart specialisation can be a building block for collaborative initiatives and help regions join transnational networks of knowledge and transnational value chains[52]. Therefore, the Arctic regions should be **encouraged to formalise their smart specialisation strategies**, which will grant them better access to the knowledge networks and partnerships under the Thematic S3 Platforms.

Although the European Arctic regions share many of the same challenges, low connectivity and information asymmetries mean that Arctic regions are not well aware of each other's developments. **Joining forces in common platforms and networks can reinforce the European Arctic** through a more strategic and coordinated response to Arctic challenges, mobilising collective efforts with joint capacities and investments. As demonstrated by the case-study in this report on developing an Arctic Investment Platform, many such efforts are already under way.

Having learned how European Arctic regions benefit from smart specialisation approaches, and in particular from streamlining efforts that connect and mobilise existing capabilities, assets, and financial resources, it is clear that **smart specialisation has potential** to bring broad social and economic benefits and also **to fit into the context of other Arctic regions beyond the EU**.

To conclude, **the adoption of advanced S3 policy tools are already well underway and been developed impressively far in many regions in the European Arctic**. Particularly inspiring is the overall finding that there are several signs of key developments that are creating the foundations for efficient and extensive smart specialisation applications in the future. Most notably, these developments include a move towards developing **investment solutions** via the S3 framework, as practical implementation of new industry-specialisations and strategies will be highly dependent on raising more capital in relatively remote regions in northern Europe. Furthermore, amidst the sparse and remote conditions it is significant that many current S3 initiatives are focused on **mobilising local actors and capacities** and facilitate their **interregional communication and networking**. The importance of the collaborative dimension has been highlighted as a central feature of future developments of smart specialisation as a concept and policy tool in all of Europe. In this way, the European Arctic can be seen to stand centre stage in contemporary S3 discourse. Just as European Arctic regions can continue to learn from the examples of S3 policies by their peers across Europe, there are also several valuable lessons that the rest of Europe and other

[51] Hallonsten and Slavcheva, 2017
[52] Hegyi and Rakhmatullin, 2017

Arctic regions can learn by observing and engaging with the emerging applications of S3 in the European Arctic context. The key collective message of these lessons, as identified in the present study, is that **collaboration on joint opportunities** is the only way to create truly sustainable and long-term smart specialisation solutions in the unique European Arctic context.

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## List of abbreviations

| | |
|---|---|
| AIP | Arctic Investment Platform. |
| ASF | Arctic Stakeholder Forum |
| EDP | Entrepreneurial Discovery Process |
| ESIF | European Structural Investment Funds |
| LS3 | Local smart specialisation – tool developed by the REGINA project |
| NSPA | Northern Sparsely Populated Areas |
| OECD | Organisation for Economic Co-operation and Development |
| S3 | Smart specialisation |

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