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BUSINESS INDEX NORTH

INNOVATIVE BUSINESSES IN THE ARCTIC: MANY WAYS TO SUCCESS

Photo: Arctic Warriors

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...MANY WAYS TO SUCCESS

Photo: Istock

Photo: Valery Vasilevsky

INTRODUCTION

The Arctic is often described in terms of its locational properties of extreme climate, unique natural phenomena, snow, ice, permafrost, culture, distances between people, poor transportation system and constraints to on starting, operating, - and maintaining a business. These conditions foster a unique interplay between people, technology, nature, market, and ways of doing business. The most obvious business opportunity in the Arctic is normally associated with extraction industries of resources such as wood, the mining industry, the oil and gas industry, and the food industry (i.e., fishing), and also tourism. Yet this project is a first attempt to question the established connotations of business in the Arctic in Norway, Sweden, Finland, and Russia. The project team identified companies that are not only successful with regard to traditional profitability metrics but are known to the public as successful companies with a sustained competitive advantage. These companies have a unique set of resources, identity, culture, brand name, market, and clustering with other companies. We started with an inventory of a large set of companies followed by background information and subsequently visiting and conducting 63 interviews with leading companies from each country. A revised image of business in the Arctic in Norway, Sweden, Finland and Russia is starting to appear.

The most obvious picture of resource extractive industries is still valid but complemented with an entirely new set of growing companies. Our project shows that the region is attractive in many other ways. Cold climate, (silence), abundance of space in combination create a multi-billion-dollar industry in which products can be tested (e.g., car and winter testing) and storage of data in data centers. There are high-tech industrial environments and environmentally friendly manufacturing industries, as well as unique opportunities for tourism. Furthermore, our inventory shows that the Arctic brand and values added in products originate from Arctic conditions. Many of the entrepreneurs are aware of it and tend to promote Arctic values in their products and services. We report explicit examples of how Arctic values, culture, and identity are used in the food, construction, tourism industries, as well in professional services. We also noted throughout the project that many stakeholders tend to lack a comprehensive overview of the entrepreneurial activities in Arctic and ignore the fact that these companies originate from this region. This report is therefore an attempt to stimulate more research in this area and to make way for a revised image of the region.

Based on the firsthand information, at the conceptual level we define arctic business as a modern phenomenon with specific features in four perspectives: motivation, competitive advantage, branding, and clustering. Motivation is about the rationale for starting up and operating a business venture with a base in the north. In the competitive advantage perspective we look at how businesses are sustained and how their core capabilities add value. The branding perspective shows how Arctic- based businesses present themselves and communicate their values. Finally, the clustering perspective is about ways of cooperating and building collaborative business environments in the North. It turned out that, despite differences between countries and industries, the successful companies in the European Arctic have commonalities much in common with these four perspectives.

Key findings about new generation of Arctic businesses:

MOTIVATION to operate from the North is associated with strong identity with place, nature, local culture, and life style, access to unique local natural resources or settings, as well as the origins of the business owners.

COMPETITIVE ADVANTAGE is achieved through long-term relationships and competence building, organic growth, focus on quality, embeddedness in local networks, and paying attention to people.

BRANDING often builds upon the values and lifestyle of the North / Arctic in terms of words (brand names), images, and meanings. There are also big brands building upon universally accepted value concepts.

COOPERATION VIA CLUSTERS builds upon modern concepts of circular economy, technological leadership, integrated supply and value chains, commercialization of knowledge, and capitalizes on unique nature-geographic-climatic settings. The clusters are based on local communities of people and businesses closely related to each other in terms of culture, identity, and geographical proximity.

The remainder of this report is structured as follows. In the next section we present an overview and map of the business cases studied with a short description of the study method. In the four subsequent sections we present in more detail our findings about the companies' motivation, brands, competitive advantage, and cooperation through clusters. The section summary and implications concludes the report. In the report we also include a separate spread "meet the Arctic entrepreneur" providing several shining examples of successful businesses and their founders. Certainly, many more great examples could be presented. These examples should be regarded as just an illustration. More detailed information on all the business cases studied can be found in the attachment at the end of the main report.

SUCCESSFUL ARCTIC BUSINESSES: SELECTED CASE COMPANIES

Photo: SALT

The map in pages 6–7 presents only the business cases we have studied. Of course, this is only one of the first steps in this direction and more successful Arctic businesses can be identified, studied, and added to the map. A more complete map, also its online version may be produced in the future.

Our way of grouping businesses by type is fairly general and used only for purposes of visual overview.

Below in the report, more detailed attention is paid to the companies as they are grouped by the four perspectives (motivation, branding, competitive advantage, clustering). Within each perspective there are sub-themes or categories specifying the core common features of the companies.

Methods summary

63 BUSINESS CASES in the North of:
- Norway (13)
- Sweden (20)
- Finland (17)
- Russia (13)

Types of businesses studied
- High-tech, bio-medical or ICT solutions and products
- Industrial and professional services
- Culture, sport, tourist, and recreational experiences
- Manufacturing and services
- Producers of food and drinks
- Renewable energy and waste management
- Cluster organizations

Inquiry:
- Visits and face-to-face interviews
- Telephone interviews
- Photos of businesses
- Collection of visuals (e.g. photos, logotypes)

Topics:
- Motivation to operate from the North
- Ways to maintain competitive advantage
- Communicating values through branding
- Cooperation via clusters

FINDINGS

WHAT IS THE MOTIVATION TO START AND OPERATE A BUSINESS WITH A BASE IN THE NORTH?

We found that the rationale among our companies for starting up and operating business in the north falls into four major categories: Identity, Resource, Location, Origin. These categories emerge from content analyses of interviews. Below we present some illustrative quotes.[1] We also present examples of Arctic entrepreneurs throughout the section.

Many businesses IDENTIFY STRONGLY with place, natural environment, local culture and lifestyle, sense of belonging. These are embedded in the way of doing business:

The Arctic perception is in our DNA and reflects the way we communicate and build relationships (Vinter, Sweden)

We cannot operate from elsewhere, our products, the way we produce and our entire image originate from here (Jokkmokks korv, Sweden)

This is our home; we have no way out just to work hard! … unique northern nature attracts tourists, but remoteness makes services more expensive (Visit Murmansk, Russia)

We would like to create a producer center in connection with the North Character festival for attracting cinema producers, making new films in the North and presenting them to Northern audiences (Northern Character, Russia)

The North is my native land. In addition, it is an industrial region, which corresponds to our company's type of activity (Industrial Safety Systems, Russia)

We are northerners; it is because we live where we live… There was no other alternative for us (Momek Services, Norway)

To be here in Northern Norway is really important. The goal of our firm is to spread optimism about the sea, the coast and the people (SALT, Norway)

Another reason for establishing and operating businesses is access to unique local natural RESOURCES:

Our product is based on a local resource (roe of the small salmonid fish species vendace), developed into a unique brand name (Kalix löjrom), which is processed by a technique handed down from generation to generation (Bröderna Stålarm, Sweden)

We produce drinks and the natural purity and cleanliness are very important and the materials we use come from the north (Tornio Brewery, Finland)

[1] More examples can be found, all cases studied can be grouped under these four categories. Belonging to one category does not exclude the possibility of belonging to others.

Photo: OuluHealth/BusinessOulu

Why are we here in the north? Because it all started in the north. We depend on the raw materials here (Biotech North, Norway)

The role of LOCATION is very strong as many businesses operate in settings where the natural environment, climate, geography and industry are unique:

A combination of a unique infrastructure, climate, and our peripheral location offer a unique set-up for car testing (ArcticFalls, Sweden)

Oulu has been a good place to build a high-tech company. The competence of the workforce is very good and it is a good place to hire new talent and to do R&D work (Optomed, Finland)

Arctic conditions are our biggest attraction. They are related to our natural wonders such as winter, snow, icy conditions, northern lights and midnight sun (Tourism / House of Lapland, Finland)

The company is the legal successor to the Murmansk Fish Processing Plant and the Medical Cod-liver Oil Plant. Our location has historically influenced specialization of our business (Biokontur, Russia)

Our advantage is snow, red king crab, a location close to Finland, where we recruit many people. Also, many Asian tourists arrive in Scandinavia via Finland (Kirkenes Snow Hotel, Norway)

A lot of successful businesses were started in the Arctic because their owners (entrepreneurs) have originally lived and worked in the region. They have universal business concepts which in principle could work anywhere. In these cases, motivation to start and develop businesses in the North is associated with the ORIGIN of the entrepreneur and their personal decisions to live in and work from the North:

Our concept is general and we can operate from anywhere in the world but our mindset originated from this region (Leos Lekland, Sweden)

The only reason we operate from this region is the growing market and the fact that we come from this region (ElTrio, Sweden)

We find no reason to do press releases about our new products from Stockholm. We operate on a global market and London is then a better place (TreeHotel, Sweden)

Sometimes it is difficult to describe some Arctic entrepreneurs in terms of geographical or market conditions peculiar to the region. For example, during an interview with Rapunzel we observed far more general motivations. Rapunzel perceived a global need for hairpieces and hair products.

Motivation section SUMMARY

Reason for starting up and operating a business based in the north

- Strong **identity** with place, nature, local culture and lifestyle
- Access to unique local nature **resources**
- **Location** in the unique natural, climatic-geographic, or industrial setting
- **Origin** of business owners

BRANDS FROM THE ARCTIC: WHAT KIND OF VALUES ARE COMMUNICATED?

In general, we observed that innovative Arctic businesses have a strong sense of belonging to their region. It seems that such a sense of belonging, together with access to unique resources, is a source of inspiration for the companies. They are proud of being located in the North. This is also reflected in terms of communicating values through branding, as we show in this section.

We found quite many brands making a strong reference to the Arctic and North. The words "Arctic" and "North", or related terms (e.g. "Polar", "Snow", "Winter"), appear in the brand names. Often the brands include local place names or product types. The owners of all these brands attach a lot of meaning to the brand names. The meaning is associated with local values, place, identity and lifestyle. Another type of brands are those with a universal value concept. Such brands are not directly associated with the Arctic/North. They are designed for global markets or general purposes but developed by local entrepreneurs from the Northern regions. Some examples of the brands follow next.

BRANDS WITH STRONG REFERENCE TO THE "ARCTIC", "NORTH" OR LOCAL PLACES

Brand	*Core business*	*Communicated Arctic related value*	*Country*
Arctic Warriors	Natural superfoods manufacturing	Unique natural resources to add value to food products	Finland
SKIIOT	Skiing performance measurement and analysis device	Proximity to testing facilities, expert knowledge of skiing as core resource	Finland
Tornio Brewery	An artisan brewery	Pure and clean materials that originate in the North	Finland
Arctic race of Norway	Annual bicycle race held in Northern Norway	Unique geographic-climatic area to add value to a sporting activity	Norway
Arctic zymes	Recombinant enzymes from cold water marine species	Unique nature condition or resource to add value to zymes products	Norway
Kirknes Snow Hotel	Tourist experiences and recreation	Unique natural resource and setting to add value to tourism activities	Norway
Nordland Musikkfestuke	Annual music festival	Local culture, lifestyle, and nature/ geographic setting to add value to cultural activities	Norway
Biokontur fish oil	Fish oil and OMEGA 3 based dietary supplements	Unique natural resource made into dietary product	Russia
Northern Character	International Film Festival	Local culture, life style, and nature to add value to cultural activity	Russia
Sami village SAM-SYYT	Tourist experiences and recreation	Local culture, lifestyle, and nature to add value to tourist activities	Russia
Jokkmokks korv	High quality food manufacturing	Local values, culture and lifestyle to add value to food products	Sweden

BRANDS WITH STRONG REFERENCE TO THE "ARCTIC", "NORTH" OR LOCAL PLACES

Brand	*Core business*	*Communicated Arctic related value*	*Country*
Kalix löjrom Bröderna Stålarm	Fishery and caviar production	Unique natural resource and lifestyle to add value to food product	Sweden
Vinter	Integrated communications agency and consultancy	Unique values, lifestyle, cultural properties to add value to consultancy services	Sweden
Polarbröd	Bread bakery	Local values, culture and lifestyle to add value to food products	Sweden
Arctic bath	Tourist and recreational experiences	Unique natural resources and cultural-historical setting to add value to tourism activities	Sweden
Skellefteå Kraft	Electric power production	Unique natural resources and setting to add quality to energy	Sweden

BRANDS FROM THE ARCTIC WITH UNIVERSAL VALUE CONCEPT

Brand	*Core business*	*Country*
Leos Lekland	Indoor fun park	Sweden
TreeHotel	Tourist experiences and recreation	Sweden
Max Hamburger	Burger restaurant chain	Sweden
9Solutions	Health care security and communication systems	Finland
Bioactive Bone Substitutes (BBS)	Bioactive bone-graft substituteimplants	Finland
Cmicro	Measuring device for the temperature of food or drink prepared in a microwave	Finland
Kipuwex	Health and pain measurement device	Finland
Optomed	Eye disease screening device	Finland
ProWellness	IT solutions for the prevention and care of chronic diseases	Finland
Rapunzel	Hair extensions for retail customers	Sweden

Photo: Lapland Material Bank, Jaana Severidt

All in all, the brands presented contribute to the positive image of the Arctic as a region of innovative and successful businesses. Reference to local places and product types in brand names certainly adds a new dimension to the Arctic identity. Thus, the Arctic region can be perceived not only as a unique natural environment and climatic area or as area for the extraction of natural resources, but as a place full of locally developed and branded products and services.

Branding appears a strong way of communicating values and opportunities in the Arctic. Based on the reviewed examples, we can summarize that following values associated with the Arctic are communicated through branding: PURITY, QUALITY, UNIQUENESS OF THE NATURAL CONDITIONS, TECHNOLOGICAL EXCELLENCE.

Section summary - Brands from the Arctic

- **Brands with a strong reference to the Arctic** - Arctic, North or other closely related words appear in brand names; evocative meanings associated with the Arctic or local values, places and lifestyle are communicated as value added.
- **Brands with a universal value concept** - brands not directly associated with the Arctic/ North and designed for global markets or general purposes.
- **Arctic values communicated:** Purity, quality, uniqueness of the natural environment, technological excellence

MEET ARCTIC ENTREPRENEURS[2]

Oleg Terebenin is a Murmansk- based entrepreneur, founder and director of several travel companies. One of the most successful is "Visit Murmansk", which provides a wide range of services for tourists coming to Murmansk mostly from Russia and Asia. Oleg Terebenin is the first and only entrepreneur in the region to offer Igloo-houses for Northern lights viewing; he uses special software for forecasting Northern lights occurrences. He emphasizes the prominent role of origin and location saying that "The North is our home, where we have no way out just to work hard".

Kent Lindvall and **Britta Jonsson-Lindvall** developed the entire brand Treehotel by combining natural attributes with architecture and are now about to extend and launch a new concept also including culture.

Treehotel offers a unique hotel experience: rooms on the trees with contemporary design in the middle of unspoiled nature.

Kent and Britta have built a life together, a working place, an international metropolis, in the trees, in their little home village. With both feet on the ground, they have bloomed where they were planted, their high flying treetop dreams have become a reality and are continuing to expand by the day.

Kjersti Eline Tønnessen (Ph.D. in Aquaculture) and **Kriss Rokkan Iversen** (Ph.D. in marine system ecology) founded SALT - an independent consultancy and research company with expertise on and for the coast and sea. Kjersti and Kriss were students together, and agreed that they would use their educational backgrounds to contribute to coastal development – at the place where the resources and value creation actually took place. The entrepreneurs claim that to be in Northern Norway is really important, and the goal of their firm is to spread optimism for the sea, the coast and the people.

Photo: Astrid Waller

[2]This presentation material is based on interviews with the entrepreneurs or official information on their web sites.

Jonny Stålarm, who represents a small fishery summarize his entrepreneurial activity with a unique resource (fish roe) combined with a way to harvest roe and to brand the product with a specific name - Kalix löjrom or Caviar of Kalix).

The fishing starts in the second half of September and ends five weeks later. The cold brackish waters of the Bothnian Bay where the sea meets great rivers makes the water high on minerals.

Photo from www.sverigeferie.se: Stålarm brothers fishing in Bothnian bay.

Marko Höynälä is an entrepreneur who has established three firms using Internet of Things (IoT) at the core of its main products. °Cmicro is a patented IoT device that measures the temperature of food or drink prepared in a microwave and has global market appeal. SkIIoT is an IoT device worn on a skier's ankle that measures skiing performance and the surrounding conditions. The device, according to Marko was developed based on his personal interest in skiing, later working with top athletes and combining high tech innovation. A product called Kipuwex was developed to measure pain providing preventive pain alarms even when the patient is unable to express him/herself (e.g. infants, anaesthesia patients, disabled and elderly).

Photo: Juho Karjalainen, Kuume Productions

Konstantin Rubanovsky is the owner and founder of various companies in the Murmansk Region of Russia, where one of the most successful is "Kola Krai". Kola Krai is a dynamically developing company engaged in harvesting northern wild and cultivated berries with customers within and beyond the region. Konstantin claims that the berry from the Kola Peninsula is valued for its rich vitamins and minerals all over the world. This allows Kola Krai to cooperate with such world-famous companies as Valio, Bama and many other Scandinavian and European companies.

WHAT IS ARCTIC COMPETITIVE ADVANTAGE?

Photo: Treehotel

At some stage some companies grow to an extent that their likelihood of sustaining substantially change to the better – they become established companies with clear competitive advantage. What constitutes their core capabilities to add value? How do such companies in the Arctic ensure economic sustainability and stay competitive? Having analyzed our case companies, we identified several commonalities about the sources of their competitive advantage. In this section we present these main sources and support our arguments by examples - self-reported qualities of the companies.

ENVIRONMENTAL EXPERTISE AND HIGH-QUALITY MANUFACTURING

Harsh climatic conditions as well as specific natural conditions, industry and the topography of the Arctic serve as an enabler to develop high level technical expertise and high-quality manufacturing products. While low-quality mass production can be a source of competitive advantage for other places, it is the opposite for the Arctic. What is developed and manufactured here is of high quality and can be used everywhere in the world. Below are several examples.

Industrial Safety Systems LLC is a Murmansk-based company offering professional services in the field of environmental design and oil spill warnings since 2007. The uniqueness of the company is its female personnel with high-level technical expertise. The company managed to expand its business to other regions (St. Petersburg, cooperation with the Norwegian coastal administration). Due to early market entry the company gained experience and qualified specialists who are even called on to serve as experts by Rosprirodnadzor (the Russian nature safety authority). A team composed of women is an advantage as they have such properties as competence, patience, a common language in achieving defined aims. These properties are highly appreciated by the man-dominated customer industry (oil).

Yet ideas for companies also come to fruition thanks to natural conditions. Mikael Kyrk and **Swevind** started measuring wind at the beginning of 2002. They found that cold wind is heavier (i.e., higher density), the wind is relatively stable and there are few conflict zones between different interests. These conditions allowed them to plan service provision for wind energy parks. So far they have had three projects in the largest wind energy park in Europe. Mikael Kyrk describes the process as extremely long-term oriented including numerous challenging administrative tasks . As most of the Swedish wind energy parks are expected to be land based and 90-95% are in the Arctic, Mikael sees a promising market to operate from in the Arctic.

A North Norway based company, **Nofir**, was founded in 2008 with the purpose of establishing a nationwide system for collecting discarded equipment in Norway. A total of 15 000 tons of plastic equipment from the fishing and fish farming industry is discarded each year in Norway alone. In 2012 Nofir was granted support from the European Union through the Eco Innovation scheme. Since then the company has collected material all over Europe through its branches in Norway, Lithuania, Turkey, and Poland. Director of the company, Øistein Aleksandersen, believes that their competitive advantages are strong owners (which gives secure access to capital and raw material resources) and a package of licenses and permits which are difficult to get in the waste management industry.

Stefan Johansson in **Älvsbyhus** refers to a critical era when they overcame the difficulties in the 90s'. This is also the period and the starting point to refine the product and the segments they targeted. Yet Stefan argues that their prefabricated houses are affordable to a large proportion of the market and their standards based on cold climate promise quality in other (warmer) climatic conditions. However, Stefan claims that the access to raw material and established relationships with relatively few suppliers support their business idea. Stefan Lindbäck, CEO of **Lindbäcks bygg**, represents a similar idea but targets the commercial buildings market. Their set-up for manufacturing commercial buildings allows them to cut costs and ensure that quality is met. Stefan Lindbäck also says that human capital is important to maintain quality and that is achieved in the Arctic at a lower cost.

Havator is an established Arctic company, founded in Tornio. The company supplies lifting, special transportation and heavy haulage services in over 30 locations in the Nordic countries. It offers specialized services that are essential for construction projects in the north. Investing heavily in safety, having a long tradition, Havator is expecting growth in the business due to growing metal, mining and construction industries in the north.

TECHNOLOGICAL LEADERSHIP

There are quite a lot of high technology firms originating in the Arctic addressing global challenges. The technological leadership of these companies is a result of a long-term focus on R&D and innovation.

Population ageing is at the heart of the **9Solutions** firm that provides solutions for personnel security, nurse calls, home access management and locating for both hospitals and care homes. Originally established in Oulu, 9Solutions relies on the region's long traditions in innovations and wireless communications and appreciates the availability of skilled workforce in the region.

Population aging creates a need for medical solutions in bone replacement too. Thes are offered by **Bioactive Bone Substitutes (BBS)**. BBS develops, designs, and manufactures innovative bioactive bone-graft substitute implants that required over 20 years of research and are protected by five global patent families. BBS was established in 2003 as a spinoff of a research project at the University of Oulu, Finland. In relation to Arctic resources, the implant is based on reindeer bone proteins, which contain effective bone growth factors for the bone-graft markets.

ProWellness, a provider of IT solutions for the prevention and treatment of chronic diseases (e.g. diabetes, cardiovascular diseases), cooperates closely with Oulu University Hospital (OYS) and OuluHealth (an internationally recognized health ecosystem), BusinessOulu and private actors that all work closely together in the region. Mika Sipilä, CEO of Prowellness, comments on the firm's vision of clinics for chronic conditions and entering such markets as China and the Middle East.

Seppo Kopsala is CEO of **Optomed**, a company that specializes in retinal imaging devices and with a mission is to make eye disease screenings available for everyone, wherever needed. Seppo says that product development required basic research and R&D to the tune of three million euros. He comments that Oulu is a good place to establish a high-tech company, with great expertise available it is easy to hire new talent and engineers.

Brokk Robotics in Northern Sweden is a unique and advanced technology-oriented manufacturing company that provides small robotics for the construction and manufacturing industries. Brokk is not only the global market leader in demolition robot sales, but also in R&D and innovation.

KNL Networks has developed a satellite independent method for maritime industry connectivity providing networks accessible in every corner of the world where ships are sailing - including both the Arctic and Antarctic regions. The founders complimented the innovation ecosystem in Oulu and the benefits of a supply of competent employees released from Nokia. The firm profits from being connected to the networks of other companies and subcontractors in Oulu. IoT and digitalization are the main drivers for the firm development. In the future more and more cargo will be shipped through the North-West Passage, where KNL Network technology is needed.

ARCTIC EXPERIENCE

Being located in the Arctic close to unique resources is not enough to be regarded as a source for competitive advantage. The advantage comes from what you do with the resource and what kind of experiences are associated with it. There are good examples of innovative companies and entrepreneurs which create Arctic experiences with help of modern technologies (architecture, digital technology) through reference to natural, cultural and historical context.

Unique Arctic hotels

Snowhotel Kirkenes, Norway opened for the first time in 2006 with eight rooms, and a small ice-pub and a reindeer. Since then they have grown towards the snowy clouds and are now one of the most famous igloo hotels in Norway, and in the world. The idea was to create something unique and natural. That`s why the hotel is built completely of snow and ice, and each spring melts back into the fjord. It offers unique experiences like king crab fishing, husky safaris, and viewing the Aurora Borealis.

Kent Lindvall developed the entire brand **Treehotel** by combining nature with architecture and is now about to extend and launch a new concept also to include culture.

Situated under the northern lights in winter and the midnight sun during the summer months, **Arctic Bath** is a unique hotel and spa experience that welcomes guests to immerse themselves in the elements and reminds them of logs rafting down the river as it was a hundred years ago.

Another example is the first **Igloo hotel** 50 km from the city of Murmansk in Russia, where in complete darkness visitors can experience the northern lights. Here we have observed the outcomes of how natural resources can be creatively transformed into unique experiences with the help of modern architecture and reference to the cultural and historical context.

Creative industries

OOO Rec.A is local filmmaking company whose studio for documentary films is well-known in the Murmansk Region. The company has clients in the Murmansk region and Northern Europe. The uniqueness of the company - a highly professional team, an openminded attitude to new technologies, and high product quality. Product quality is much higher than all regional competitors and competes with federal ones, which are appreciably larger and have better access to capital and human resources. Most documentary films by Rec.A are devoted to cultural and historical aspects of the Murmansk region.

Photo: Nord University

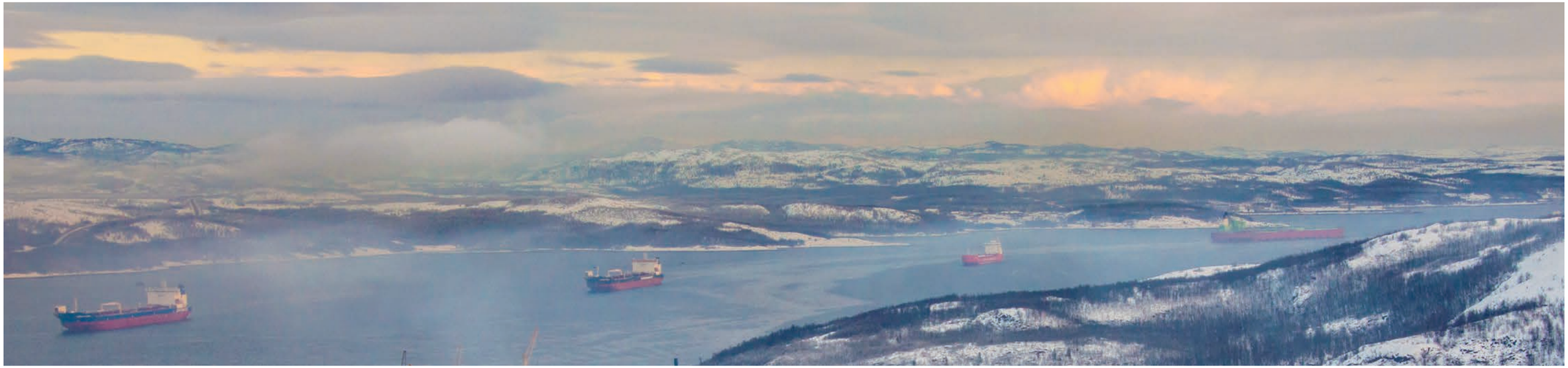

Photo: Valery Vasilevsky

THE RIGHT PLACE

Indeed, the remoteness of the Arctic territories, the difficult and limited logistics and the challenges related to infrastructure are important limitations on the development of new businesses. However, there are many examples of successful companies who manage to utilize their surroundings and turn them into remarkable business opportunities. In this respect, being "in the right place" can be a source of competitive advantage rather than a disadvantage as it gives companies a unique position in terms of resource base (including human resources, energy, favorable natural conditions), lack of other competitors, closeness to customers, advantages of cross-border cooperation. The examples below are taken from different industry segments and countries, but they are all examples of companies developing from the "right places". Such "right places" are not simply taken but often created.

Momek AS (Momek Group) is a North Norwegian industrial group of companies operating in maintenance, modification, fabrication, construction work and staffing. The company is headquartered in Mo Industrial Park, Mo i Rana. What is today the Momek Group started in 1998. As of 2014, the company has about 350 employees spread around the eight different subsidiaries. The company serves many industries: mining, process industry, oil and gas, aquaculture and renewable energy. A company representative claimed that access to customers that are close and access to employees within the cluster (industrial park) is a source of competitive advantage. Moreover, he says that the company has developed a great culture throughout the years, a flexible culture, a mix of heavy technical competence and an assertive culture - a positive culture which gives an advantage.

HermanIT is a high-availability data center offering private cloud services and software development for digital products and services. The firm utilizes space, the abundance of renewable energy and the cold climate, all of which are very favorable for data centers' operations.

OOO Murman SeaFood represents the fishing industry of the Murmansk Region. The main activity is catching and processing sea-frozen fish products, fillets and canned fish, seafood products at coastal factories, operating transport vessels. The area of activity is Murmansk Region and the northern water areas. The company exports to many countries and is known for its high-quality products. The company also has vessels equipped with facilities for fish processing. Closeness to the resource and low competition between the local companies in the segment is a precondition for the continuity of the company.

OOO "Murmanplast" is the only producer on the Kola peninsula of fish boxes made of styrofoam for chilled fish and frozen fish. The company has local origins and supplies fish boxes to all fish (breeding) farms and processing companies in the Murmansk region. It also exports its products to St. Petersburg. This is a niche company with advanced technology using Finnish raw materials. The company **Barel** was founded in Kirkenes, Norway in 1993. Today Barel develops and manufactures electronics for the global markets for the international lighting and heating industry. The company's location entails both disadvantages and advantages. As explained by the company representative, logistically it is a disadvantage to be located here (far away from the customers) as the cost of shipping is quite high. An advantage is that the location is close to the Russian border. The company has a production unit in adjacent Russia, which lowers its production costs.

GENUINE QUALITY AND TRADITIONS

For some companies, quality is not a strategic choice, but rather an authentic property based on knowledge and traditions. For such companies, resources are much more than materials. They are considered gifts from Nature which are treated with a grateful attitude, not forgetting respect for the local community who share an identity with the same resources. Below are some examples from the food companies. Many more can be found.

The agricultural production cooperative **Tundra** has long historical roots since 1930, when the collective farm was established. Today, the company produces reindeer meat, has all the required processing facilities, a workshop for sewing items made of fur and hide, and a construction team. Good quality products are in high demand among the inhabitants of the Murmansk region and beyond. The unique feature of the company is high quality natural products and community based work places for indigenous people.

Tornio Brewery, is an artisan brewery still operating in the same place where the brewery was built as far back as in 1873. Tornio Brewery re-opened the legendary brewery that was closed in 2010. At the core of the business are the purity and cleanliness of materials that originate in the north. Kaj Kostander, CEO of the brewery, who is originally from the north, likes the mentality of the people from the north and has plans for the international expansion of craft beer from Lapland.

Arctic Warriors is a superfood producing firm using unique herbs, berries, and plants from Lapland that are sourced from a network of local pickers. According to Tuija Kauppinen, sales and marketing manager, Arctic Warriors are proud to be based in Lapland and support local communities. The company's project manager Katja comes from a family where herbs have been a natural part of everyday life for centuries and the knowledge has been passed down from one generation to another.

Summary of the section

Many of our case companies clearly have access to unique natural resources or capitalize on unique natural surroundings (for example, most of the food and drink producing companies, some manufacturing companies and providers of professional services, tourism and culture companies). Others are historically embedded in the business communities and industrial infrastructure in the Arctic cities and areas (e.g. ICT and high-tech companies, several manufacturing companies). Yet there are some companies developed by entrepreneurs from the north with universal product concepts not directly related to the Arctic (e.g. Leo's Lekland, Max Hamburger, Brokk, Prowellness, Optomed). For example, Leos Lekland says that their idea is to support children's activity. This relatively unique concept is general and allowed Leos Lekland to rapidly grow in Sweden and now also in Norway, Denmark, and Finland. Joakim Gunler said his role model was Max Hamburger, also originally from this region.

Photo: OOO "Systemy promyshlennoi bezopasnosti" (Industrial Safety Systems)

Tommy Enstedt, representing Max Hamburger, describes their success by unique values and loyal staff saying that "we grow organically and ownership is important to us". Indeed, organic growth and local ownership are common features for many successful companies in the Arctic.

However, commercialization of business ideas needs a lot of systematic work and a lot of time. Despite differences between industries and countries, we identified major ways of building and sustaining competitive advantage. These ways are often associated with the northern values and lifestyle which are part of the identity of the business owners. As we have shown in the previous report, Business Index North (issued in 2018), innovative companies in the north often grow with limited access to human resources and capital. Their sense of belonging, their embeddedness in their local environments, pride in from and living in the north allows them to capitalize on nature-related resources in a creative way and develop efficient solutions based on their local networks.

Section summary - major ways to sustain competitive advantage:

- High-level expertise in environment and manufacturing
- Technological leadership
- Arctic experience
- The right place
- Genuine quality traditions

WHAT KIND OF CLUSTERS ARE DEVELOPED IN THE ARCTIC?

Cluster is used here to refer to a number of organizations sharing similar aims, characteristics, goals, and activities with a shared sense of geographical belonging. Due to this geographical sense of belonging they benefit from shared goals, strategies, and operations that are mostly stronger and more specialized than if developed independently. A cluster is typically easy to observe as activities and goals hang together. A tourism cluster often has natural boundaries determined by a natural resource such as a mountain or an island. A manufacturing cluster may on the other hand have a strong locomotive company supported by a myriad of small specialized organizations that together build one or multiple products. Some of these clusters are formed spontaneously with initiatives from individual companies while others are related to a university or other politically motivated initiative. Many cities have clusters but these are often related to technology or capital because administration can easily be coordinated and competence guaranteed to a greater extent. Clusters are thus agglomerations of organizations of some sort.

The European Arctic is home to many remarkable clusters. They are relatively small but each has a unique business idea and clear cooperation concept. Members of the clusters capitalize on access to unique local resources and locations in a unique climatic-geographic or industrial setting. Cold water, snow, biomass, fish, space, darkness and silence, access to renewable energy, as well as the highly developed technical and knowledge infrastructures available in the Arctic serve as crucial resources for commercial cooperation via clusters. Some clusters are organized in response to a large industry being established in the area (e.g. Oil and gas, pulp and paper, mining). The others are developed to attract customers to the area (e.g. car testing, tourism). The table below provides some remarkable examples.

CLUSTERS IN THE NORTHERN NORDICS AND MURMANSK REGION OF RUSSIA

Name	*Business idea*	*Cooperation concept*	*Origin*
Bioeconomy	Local raw materials from the North are processed for commercial purposes	Circular economy	Lapland Finland
Biotech North	Local bio-marine resources are processed for commercial purposes	R&D	Tromsø Norway
Circular Economy	Industrial waste is processed for commercial purposes	Circular economy	Lapland Finland
Mo Industripark	Big industrial environment placed in favorable geographic-climatic-infrastructural setting	Circular economy and shared infrastructure	Mo i Rana Norway
Murman Tourism	Whole region is made available and positioned for tourists	Total supplier / integration Murmansk Region	Russia
Oil and gas cluster Helgeland	Meeting procurement demands of the oil industry in the North	Total supplier / integration Helgeland District	Norway
Smart Construction Cluster	Building advantage through digitalization of the construction industry	Technology development	Alta Norway
Space	Unique technical and knowledge infrastructure in the North serves as a base for space applications	Technology development	Helsinki (HQ) Finland

CLUSTERS IN THE NORTHERN NORDICS AND MURMANSK REGION OF RUSSIA

Name	*Business idea*	*Cooperation concept*	*Origin*
Swedish proving grounds	Unique climatic-geographic setting serves as a base for car testing	Total supplier / integration	Älvsbyn Sweden
Swedish Wind Energy	Unique climatic-geographic setting and infrastructure enables wind power production	Total supplier / integration	Piteå Sweden
Tourism / House of Lapland	Whole region is made available and positioned for tourists	Total supplier / integration	Lapland Finland
Winter testing	Unique climatic-geographic serves as a base for car testing	Total supplier / integration	Lapland Finland
NCE Aquaculture	Commercial production of farmed fish and seafood for the global market	Total supplier / integration	Nordland county Norway
Server technology cluster	Unique geographic-climatic setting serves as a base for server plants	Shared infrastructure and technology development	Luleå Sweden

A specific feature of these clusters is compact communities of people and companies with geographic proximity and shared culture, history and identities. For example, as reported by our case company:

"Closer relationships, shorter distances in between advisory engineers, entrepreneurs, suppliers, and university… Operating from Finnmark gives an opportunity to quickly implement our ideas and concepts…The relative advantage is up, is that you are a kind of "Petri dish" (Smart Construction cluster, Norway)

The Arctic clusters presented above are strongly positioned both for delivering products to markets far outside their region and for providing services attracting customers from other parts of the world.

Section summary - Arctic clusters

- Clusters are rather small but many
- Cooperation concepts: circular economy, commercialization of knowledge, technological leadership, integration of supply/value chains.
- Empowered by close-knit local communities

CLUSTERS IN THE NORTHERN NORDICS AND MURMANSK REGION OF RUSSIA

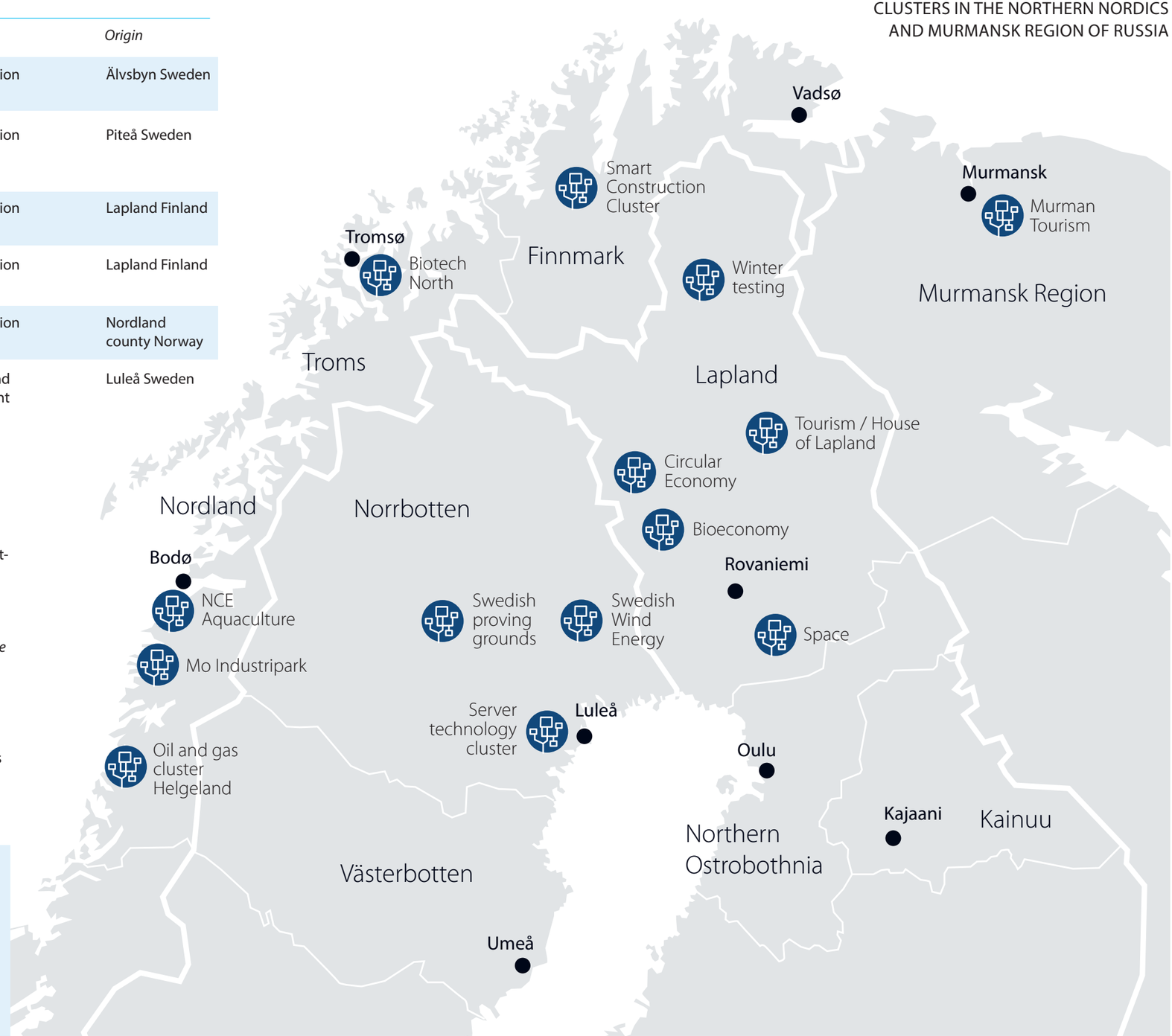

Photo: Kirkenes Snow Hotel

SUMMARY AND IMPLICATIONS

We found a new generation of innovative companies in the Arctic part of Norway, Sweden, Finland and North-West Russia. They have developed high quality niche products and services. These products and services reach domestic and international markets outside the Arctic, or they attract customers to the region. The findings of this report are briefly summarized in the table below.

TABLE: COMMON SUCCESS FACTORS AMONG ARCTIC COMPANIES

Motivations to operate from the North:

- Identity with place, nature, and local culture
- Unique natural resources
- Location in unique natural, climatic, -geographical or industrial settings
- Origins of business owners

Participation in clusters:

- Clusters are rather small but many
- Cooperation concepts: circular economy, commercialization of knowledge, technological leadership, integration of supply/value chains.
- Empowered by close-knit local communities

Brands communicate Arctic values:

- Purity
- Quality
- Uniqueness of the natural environment
- Technological excellence
- Universal value concepts

Main sources of competitive advantage:

- Environmental expertise and high-quality manufacturing
- Technological leadership
- Arctic experience
- The right place
- Genuine quality and traditions

We interviewed the companies and made an analysis in order to share knowledge about business in the Arctic. These companies are examples of remarkable businesses developed in the High North that people can be proud of. In our view the Arctic is a land of opportunities with successful innovative businesses and entrepreneurial activity: it is more than a resource province and periphery. It is possible to build on the North – as seen in the examples of Optomed (successful globally) and BBS (underwent IPO). Leo Lekland and Max Hamburger are also good examples of fast international expansion and gaining recognition. Many local producers say that being located in the North is a privilege and opportunity rather than a disadvantage. Companies creatively use natural resources and put them into products and services with high value added. We have successful global companies from the north and shining examples of rapid international expansion and recognition. With this report we aim to overcome the main challenge - lack of knowledge about successful business in the Arctic. Future research may include data collection on different sectors and industries and a study of Arctic business models. Business Index North continues to be a reliable provider of a detailed overview of business development in the High North.

Implications of this report:

- Being located in the North is perceived by many as a privilege and opportunity rather than a disadvantage
- Residents of the European High North have reason to be proud of remarkable businesses developed here
- Readers are encouraged to use the examples shown in this report to spread the optimism for doing business in the Arctic

The main idea of this report was to encourage the development of a strong and healthy identity of the Arctic regions associated with successful and innovative businesses. We concede that we did not explicitly present any challenges while aiming at drawing a clearly positive image. Certainly, the challenges persist and they are quite well known – limited access to human and economic capital. These challenges are perhaps serious barriers to extensive development of business in the Arctic. Yet Arctic business is not for amateurs, but when things are made in the Arctic, by the Arctic and for the Arctic they are valued in most places in the world.

SUCCESSFUL ARCTIC BUSINESSES: ADDITIONAL INFORMATION

PROVIDERS OF CULTURE, SPORT, TOURIST AND RECREATION EXPERIENCES

Name	*Core business*	*Origin*	*Website*	*Country*
Arctic race of Norway	Annual bicycle race held in Northern Norway	North Norway	https://www.arctic-race-of-norway.com	Norway
Arctic bath	Tourist and recreation experiences	Boden	https://arcticbath.se/	Sweden
Kirkenes Snow Hotel	Tourist experiences and recreation	Bjørnevatn	https://www.snowhotelkirkenes.com/	Norway
Leos Lekland	Indoor fun park	Luleå	https://www.leoslekland.se/	Sweden
Nordland Musikkfestuke	Annual music festival	Bodø	http://musikkfestuka.no	Norway
Northern Character	International Film Festival	Murmansk	http://northchar.ru/eng/	Russia
Rec.A	Filmmaking	Murmansk	http://www.rec-a.ru/	Russia
Salma tour	Tourist experiences and recreation	Polyanye Zori, Murmansk Region	http://salma-tour.narod.ru/	Russia
Sami village SAM-SYYT	Tourist experiences and recreation	Lovozero	http://lovozero51.ru/	Russia
TreeHotel	Tourist experiences and recreation	Boden	https://treehotel.se/en/	Sweden
Visit Murmansk	Tourist experiences and recreation	Murmansk	https://visitmurmansk.info/ru/	Russia

HIGH-TECH, BIO-MEDICAL OR ICT SOLUTIONS AND PRODUCTS

Name	*Core business*	*Origin*	*Website*	*Country*
9Solutions	Health care security and communication systems	Oulu	https://9solutions.com/en/	Finland
Arctic zymes	Recombinant enzymes from cold water marine species	Tromsø	https://arcticzymes.com/	Norway
Bioactive Bone Substitutes (BBS)	Bioactive bone-graft substitute implants	Oulu and Reisjärvi	http://www.bbs-artebone.fi	Finland
Biokontur	Fish oil and OMEGA 3 based dietary supplements	Murmansk	http://www.biokontur.ru/	Russia
Brokk	Robotics manufacturing	Skellefteå	https://www.brokk.com/	Sweden

HIGH-TECH, BIO-MEDICAL OR ICT SOLUTIONS AND PRODUCTS (continues)

Name	*Core business*	*Origin*	*Website*	*Country*
Cmicro	Measuring device for measuring the temperature of food or drink prepared in a microwave	Oulu	http://www.cmicro.io/	Finland
HermanIT	High availability data center and software development	Oulu and Kajaani	https://www.hermanit.fi/en	Finland
IT Pole	Implementation and integration of business-oriented software	Murmansk	http://jokkmokkskorv.se/	Russia
Kipuwex	Health and pain measurement device	Oulu	http://www.kipuwex.com	Finland
KNL Networks	Communication services for the maritime industry	Oulu	https://knlnetworks.com/	Finland
Optomed	Eye disease screening device	Oulu	https://www.optomed.com/	Finland
ProWellness	IT solutions for the prevention and care of chronic diseases	Oulu	http://www.prowellness.com/	Finland
SKIIOT	Skiing performance measurement and analysis device	Oulu	http://www.skiiot.com/	Finland

MANUFACTURING AND SERVICES

Name	*Core business*	*Origin*	*Website*	*Country*
Barel	Electronics for lighting and heating industry	Kirkenes	www.barel.no	Norway
Elektriska trion	Electric services supplier	Luleå	http://www.el-trion.se/	Sweden
Havator	Lifting, special transport and heavy haulage services	Keminmaa	https://havator.com/	Finland
Hybricon	Electric bus manufacturing	Umeå	https://www.hybricon.se/en	Sweden
Lindbäcks bygg	Production of multi-dwelling houses	Piteå	http://lindbacks.se/	Sweden
Momek Services	Industrial manufacturing and services	Mo i Rana	https://services.momek.no/	Norway
Murmanplast	Production of styrofoam fish boxes	Murmansk	N/A	Russia
Rapunzel	Hair extensions for retail customers	Umeå	https://www.rapunzelofsweden.com	Sweden
Älvsbyhus	Construction of houses	Älvsbyn	https://www.alvsbyhus.se	Sweden

PRODUCERS OF FOOD AND DRINKS

Name	*Core business*	*Origin*	*Website*	*Country*
Arctic Warriors	Natural superfoods manufacturing	Narkaus	https://www.arcticwarriors.fi/en/	Finland
Jokkmokks korv	High quality food manufacturing	Jokkmokk	https://www.arcticwarriors.fi/en/	Sweden
Kola Krai	Harvesting northern wild and cultivated berries	Murmansk Region	https://www.thekolaland.com/ru	Russia
Max hamburger	Burger restaurant chain	Luleå	http://www.mip.no	Norway
Murman SeaFood	Fishing and manufacturing of seafood products	Murmansk	http://www.msf.mels.ru/	Russia
Polarbröd	Bread bakery	Älvsbyn	https://www.polarbrod.se/	Sweden
Bröderna Stålarm	Fishery and caviar production	Luleå	http://www.caviarofkalix.com/	Sweden
Tornio Brewery	An artisan brewery	Tornio	http://www.tornionpanimo.fi/	Finland
Tundra	Agricultural food production cooperative	Lovozero	N/A	Russia

INDUSTRIAL AND PROFESSIONAL SERVICE PROVIDERS

Name	*Core business*	*Origin*	*Website*	*Country*
Arctic Falls	Car testing services	Älvsbyn	http://www.arcticfalls.se/	Sweden
Industrial Safety Systems	Professional services in the field of environmental design and oil spill preparedness	Murmansk	https://www.vipsyst.com/	Russia
SALT	Research and consultancy services related to the coast and the sea	Svolvær	https://salt.nu	Norway
Vinter	Integrated communications agency and consultancy	Luleå	https://vinter.se/	Sweden

RENEWABLE ENERGY AND WASTE MANAGEMENT COMPANIES

Name	*Core business*	*Origin*	*Website*	*Country*
Nofir	Waste management - discarded equipment from fisheries	Bodø	https://nofir.no/	Norway
Skellefteå Kraft	Electric power production	Skellefteå	https://www.skekraft.se/	Sweden
Swevind	ITechnical consultants related to wind power	Umeå	https://svevind.se/	Sweden

CLUSTERS

Name	*Core business*	*Origin*	*Website*	*Country*
Bioeconomy	Bioeconomy solutions for paper and cardboard producers	Lapland	https://www.lapland.fi/business/	Finland
Biotech North	Marine bioprospecting and marine rest raw materials	Tromsø	https://www.biotechnorth.no	Norway
Circular Economy	Circular economy solutions for industry and community	Lapland	https://www.lapland.fi/business/	Finland
Mo Industripark	Green industrial park and development zone	Skellefteå	https://www.brokk.com/	Sweden
Murman Tourism	Tourist experiences and recreation	Murmansk Region	http://murmantourism.ru/	Russia
NCE Aquaculture	Farmed fish and seafood	Nordland county	http://nceaquaculture.com	Norway
Oil and gas cluster Helgeland	Manufacturing and services related to the oil and gas industry	Helgeland district	http://www.oljegassklyngehelgeland.no	Norway
Smart Construction Cluster	Implementation of «Digital Roadmap" for the construction industry	Alta	http://www.smartconstruction.no	Norway
Server technology cluster	Farm of server plants related to Facebook servers	Luleå	N/A	Sweden
Space	Development of international space related business	Helsinki (HQ), all over Finland	http://spacefinland.fi/	Finland
Swedish proving grounds	Automotive winter testing	Älvsbyn	https://spga.eu/	Sweden
Swedish Wind Energy	Wind power and renewable energy	Piteå	https://swedishwindenergy.com/	Sweden
Tourism / House of Lapland	Tourist experiences and recreation	Lapland	https://www.lapland.fi/business/	Finland
Winter testing	Winter testing in the transportation and logistics sector	Lapland	https://www.lapland.fi/business/	Finland

Photo: Shutterstock

BUSINESS INDEX NORTH

Business Index North (BIN) is a project that contributes to sustainable development and value creation in the Arctic. The overall goal is to set up a recurring, knowledge-based, systematic information tool for stakeholders. This is the special issue of the "Business Index North" analytical report that focuses on innovative companies from the BIN area – northern regions of Norway, Sweden, Finland and Murmansk Region of the North-West Russia. For the future issues of the report we would like to include more territories of the Russian High North, as well as Greenland, Iceland, Alaska and the Northern territories of Canada. BIN project is implemented through an international network of universities, research organizations, as well as representatives of business and public sector institutions. The main implementing partner is the High North Center for Business and Governance at Nord University Business School. Nordland County Council and The Norwegian Ministry of Foreign Affairs provide basic funding for the BIN project.

www.businessindexnorth.com

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RSHU

R&D in the business sector

R&D activity is one of the major drivers of economic growth in a knowledge-based economy. In a knowledge-based economy, growth is sustained through technological advantage, access to information and know-how; to a lesser extent it depends on natural resources and means of production. In particular, R&D activity in the business sector is about the formal creation of new knowledge and important conditions for building competitive advantage. Knowledge-based businesses are able to operate on markets far beyond their regions of origin. Conversely, a low level of R&D activity causes businesses to be dependent on natural resources and means of production physically located in the regions.

Riina Kangas (Graphic designer) and Seppo Kopsala (CEO), Optomed
Photo: Alexandra Middleton

According to the UNESCO Institute for Statistics[1], R&D spending by the business sector is an underlying factor for country-level success. In case of lower level of R&D activity in the private business sector, even if it is compensated with heavy public R&D spending, an advanced innovation system can hardly be created. This is because innovation systems rely on collaboration between public and private entities in a systematic way. The university sector appears to be an important contributor to this process.

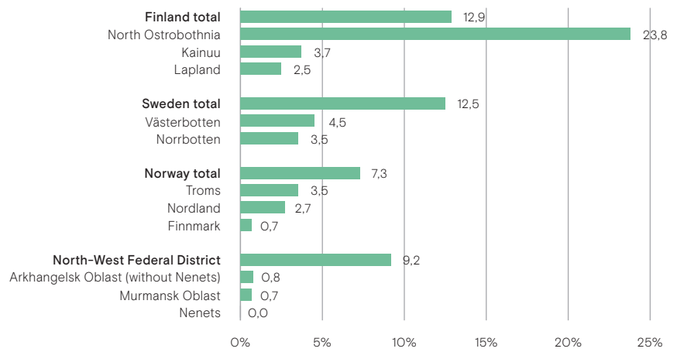
In this chapter we investigate R&D activity in the business sector of the BIN area by focusing on numbers of R&D staff and patenting. Numbers of R&D staff serve to indicate the resources (investments) inputted into innovative activity. Patenting is an output characteristic associated with the capacity of firms to develop new products and take steps towards the commercialization of new knowledge. Considered in combination, both indicators are markers of competitiveness of an industry, its capacity to develop and commercialize new knowledge, as well as the attractiveness of regions to highly-skilled people.

Main findings

- All BIN regions except North Ostrobothnia have a much lower level of R&D activity in the business sector than their countries on average
- R&D on such a low level inevitably has a negative impact on value creation
- If no action is taken, development of the BIN area would continue to depend on natural resources, use of own territories, local manufacturing; opportunities for technological leadership would remain very limited

[1] http://uis.unesco.org/apps/visualisations/research-and-development-spending/

Figure 4.1 — Number of R&D staff in business sector per 1000 people employed (annual average for 2013–2017)



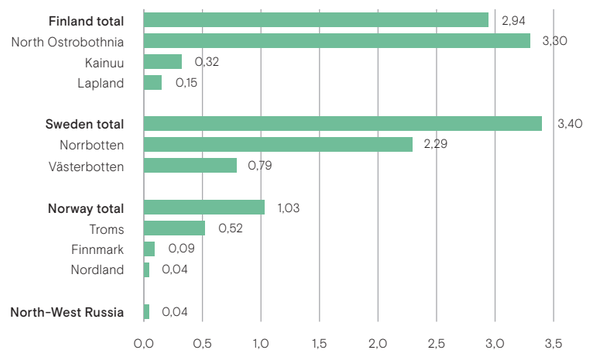
The figure shows the number of man-year R&D staff (annual average for 2013–2017) in the business sector per 1000 people employed for all sectors. R&D staff encompasses all personnel directly involved in research and development, including administrative personnel, persons in supporting functions, both inside and outside the R&D department.

All BIN regions except North Ostrobothnia have far fewer R&D staff in the business sector than their countries on average. The example of North Ostrobothnia is remarkable as it has nearly a twice higher level of R&D human resources than Finland on average. The success of North Ostrobothnia is associated with the combined effect of Nokia's strategic involvement in this region since the early 1990's followed by the development of a cluster of ICT companies and with the University of Oulu having a pronounced technological profile. North Ostrobothnia is competitive on the global scale as it has a concentration of business R&D personnel comparable to that in the metropolitan areas of Stockholm, Helsinki-Uusimaa and even the capital region of South Korea (the world's highest R&D spender in terms of % of GDP and involvement of business).

The regions of Västerbotten, Norrbotten, Troms, Lapland and Kainuu and also Nordland have some, but a relatively low volume of business R&D staff in total employment.

The regions of Finnmark, Murmansk, Arkhangelsk and Nenets are practically devoid of R&D human resources in the entrepreneurial business sector.

Figure 4.2 – Number of patent applications to EPO per 10000 capita (annual average 2016–2018), by address of inventor

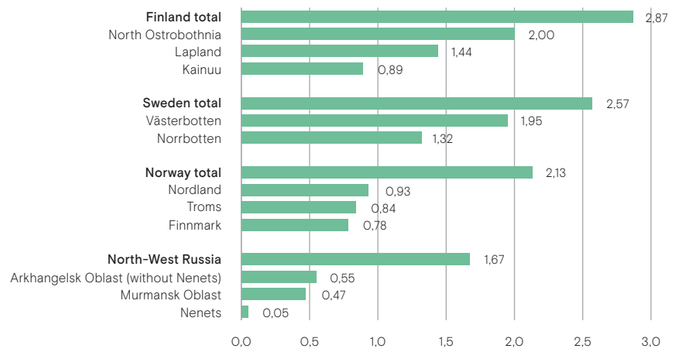


The figure shows intensity of patenting activity through the European Patent Organization (EPO). This is an indicator of knowledge aimed to be commercialized outside its country of origin. BIN region residents participated in this activity as inventors. Some of the inventions included in these counts for BIN regions are owned by companies from the outside. For example, Nokia and Ericsson, headquartered in capital areas, own a major number of patented inventions made in North Ostrobothnia and Norrbotten respectively.

In most BIN regions, intensity of the patenting activity through EPO is lower than the corresponding country average, except North Ostrobothnia. Norrbotten performs relatively well due to the involvement of Ericsson in the region. There are some regional firms with numerous international patents competing on the global market, such as Optomed (North Ostrobothnia), Liko Research and Development AB (Norrbotten), Sweetree Technologies AB (Västerbotten), Lytix Biopharma AS (Troms).

There is a very low level of patenting activity through EPO in North-West Russia (it may be that inventors in Saint Petersburg, which has a fairly high concentration of R&D, use different routes than EPO for patenting their inventions).

Figure 4.3 – Number of patent applications to national offices per 10000 capita (annual average 2016–2018), by address of owner



The figure shows intensity of patenting activity through national patent offices. This is an indicator of knowledge commercialized domestically (although national offices are also used as first entry to international patenting, this figure shows only the number of domestic applications). The figure shows inventions both made and owned by regional residents (thus the counts for Nokia and Ericsson are included in the country statistics for Finland and Sweden).

All BIN regions perform worse than their countries on average, yet there is a fairly high level of patenting activity in North Ostrobothnia and Västerbotten, followed by Lapland and Norrbotten, then by Kainuu, Nordland, Troms and Finnmark.

Regions of Arkhangelsk and Murmansk performed much worse than North-West Russia in average (there city of Saint Petersburg has relatively high level of patenting activity).

Implications

Finland, Sweden and Norway are among the top five countries in the world in terms of knowledge economy performance according to the recent World Bank's Knowledge Economy Index[2] report. Russia was placed 54 among 144 countries assessed by the WB, but inside Russia the North-West Region adjacent to Northern Europe has significant potential for R&D accumulated in the city of Saint Petersburg. The results reported here illustrate that national knowledge economy performance does not necessarily translate to the regional level.

With a low level of R&D in business activity, today the BIN regions are hardly participating in their countries' leadership in knowledge economy performance (with the notable exception of North Ostrobothnia). If no actions are taken, the economy of the BIN area will have to continue relying on natural resources, use of own territories and means of production based in the regions. As such, the BIN regions would make a very limited contribution to the technological leadership and development of knowledge economy in the BIN countries and internationally. The creation of highly-skilled professional jobs in the region, such as in the R&D sector, would also enhance the attractiveness of living in the area for highly educated professionals.

Taking the next leap in development from natural resource dependency toward a knowledge economy requires progressive measures to attract people and investments in research and development in the business sector. There are five general suggestions on how to improve the current situation.

- Facilitate state and private investments in development of existing regional R&D clusters. There are concentrations of business R&D activities in the regions of North Ostrobothnia, Norrbotten, Troms and Västerbotten. The areas with the highest R&D concentration activity are electronic communications (North Ostrobothnia, Norrbotten), radio communications, computing and calculating (North Ostrobothnia), biotechnology and medical or veterinary sciences, food and foodstuffs (Troms), chemistry (Västerbotten and Troms), manufacturing companies within the automotive and patient care industries (Norrbotten). The rest of the BIN area has rather sparse business R&D activity
- Design policy measures to attract big companies to place their R&D activities in the BIN area. There is a remarkable example of North Ostrobothnia with Nokia, an advanced IT cluster and a technologically profiled university. What if new large companies operating in the area are encouraged to contribute to the local community by investing in own R&D?
- Facilitate and support R&D activities in the existing industrial environments. For example, policy measures can be designed to attract R&D companies to industrial parks (e.g. Mo Industrial park in Norway is a concentration of companies with shared infrastructure and interconnected technologies
- Stimulate cooperation between innovation hubs (clusters, technological and industrial environments) already established in the BIN area
- Establish shared R&D infrastructures[3] for actors in the BIN area

The five proposed directions are of a general character. There is a need for further studies to assess their feasibility. The BIN project is a natural and competent partner for such subsequent feasibility studies.

[2] The Knowledge Index is an economic indicator prepared by the World Bank Institute to measure a country's ability to generate, adopt and diffuse knowledge. According to this methodology, knowledge economy consists of education and human resources, the innovation system and information and communication technology.

[3] Definition of research infrastructure: https://www.scienceeurope.org/policy/policy-areas/research-infrastructures/

Section (05)

Innovations from the North

Core-and-periphery is a recurrent and ongoing debate in regional science. Much of the literature on business start-ups tends to focus on models in core areas. An assumption in this literature is that business activity at large can be explained by access to financial and human capital, and that peripheral growth is a consequence of growth in the core areas.

This report has taken a first step to explain how companies with limited access to the aforementioned dimensions grow strongly domestically and globally. In so doing this chapter presents an overview of key clusters, brand names and companies in the BIN area. The underlying aim of this overview is to offer updated images of growing organizations beyond extraction industries and highlight known companies' less known origin. Furthermore, the chapter reports on key performance indicators (KPI) for the entire BIN area and its Norwegian, Swedish, Finnish and Russian parts respectively. The latter is based on survey results.

Findings:

- BIN area business has already developed a significant innovation potential – an issue often overlooked when the region is viewed on the basis of natural resources
- Many innovative businesses and brands build upon identity with Northern life style and values
- New emerging industry sectors, such as tourism, have served to develop related industries such as promoting food branding and symbolic values of the BIN area
- The most successful companies in the BIN area are those with higher growth opportunities, sound value performance, yet a less aggressive approach to innovative competitiveness
- Selected companies in the BIN area report strong organizational and value performance while exports and uniqueness KPI scores remain low.

Overview of key clusters, brand names and companies

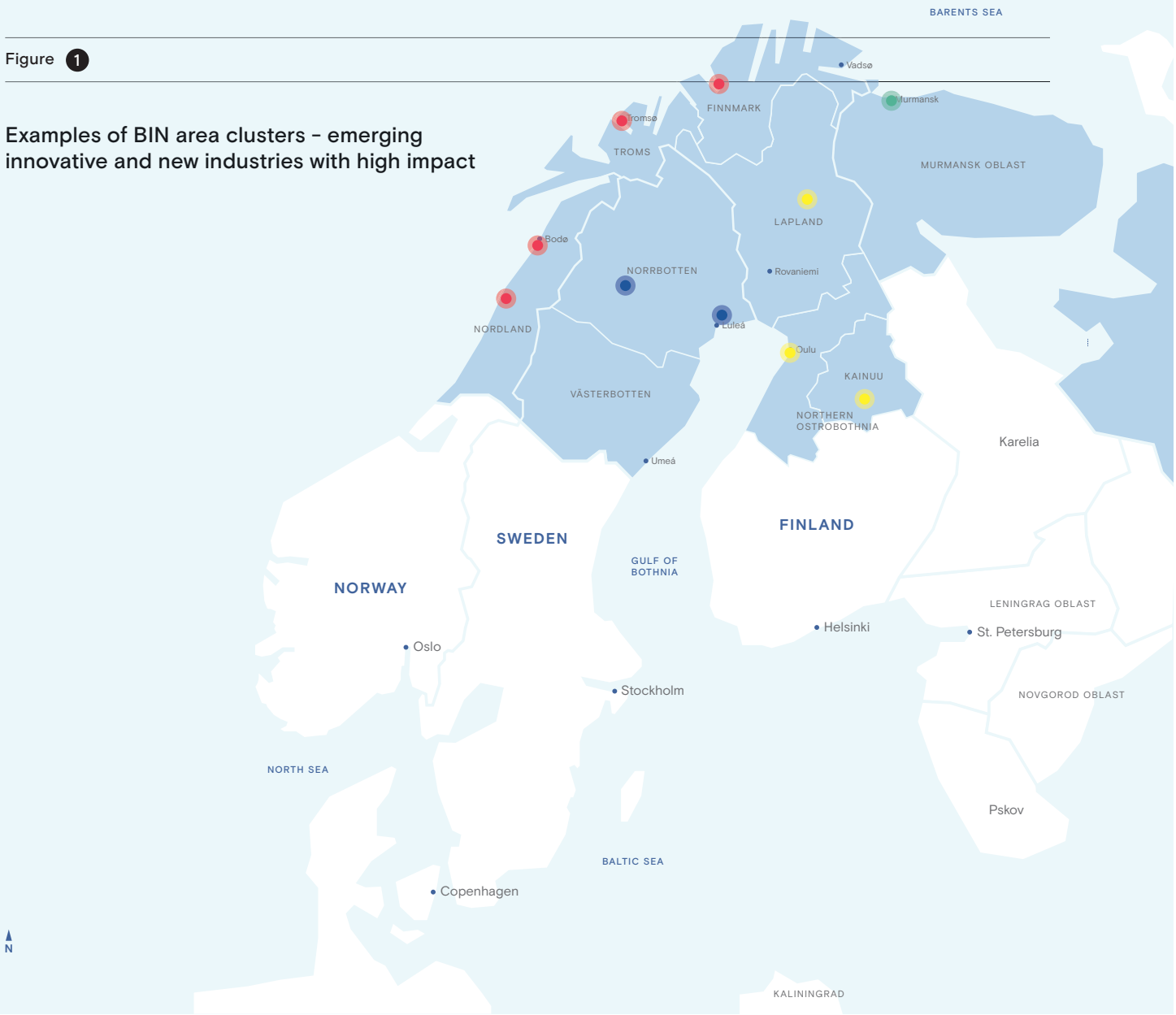
A cluster here refers to a number of organizations sharing similar aims, characteristics, goals and activities with a shared geographical belongingness. Due to this geographical sense of belonging they benefit from shared goals, strategies and operations that are mostly stronger and more specialized than if developed independently. A cluster is typically easy to observe as activities and goals are related. A tourism cluster often has natural boundaries determined by a natural resource such as a mountain or an island. A manufacturing cluster may on the other hand have a strong locomotive company supported by a myriad of small specialized organizations that together build one or multiple products.

Clusters can likewise be identified due to cultural characteristics with experience or knowhow for building boats, manufacturing or making movies. In addition, we have small manufacturing clusters formed due to an entrepreneurial spirit, capital or some other property characteristic that stimulates business creation. Some of these clusters are formed spontaneously with initiatives from individual companies while others are related to a university or other politically motivated initiative. Many cities have clusters but these are often related to technology or capital because administration can easily be coordinated and competence guaranteed to a greater extent. Clusters are thus agglomerations of organizations of some sort. These clusters may be formed strategically or grow through attractiveness related to any of the characteristics mentioned above.

The BIN area is unique in many ways. It has a unique base of natural resources, culture and entrepreneurial spirit. In recent years a number of activities have been launched to an international audience when car testing companies came up to the Artic region to test cars. This activity attracted a significant amount of foreign direct investment (FDI) to a sparsely populated part of the BIN area. This and other clusters in the BIN area are presented on Map 1 below. We selected these clusters to illustrate emerging innovative and new industries with high impact.

Figure 1

Examples of BIN area clusters – emerging innovative and new industries with high impact



Sweden

Blue dots represent an *inland cluster of car testing activity* and a *coastal industry with server technology*.

Norway

Red dots represent *NCE Aquaculture* cluster with commercial production of farmed fish for the global market; *Biotech North* – a blue biotech industry cluster; Emerging *Smart Construction Cluster* and *Mo Industrial Park*.

Finland

Yellow dots represent *Kajaani cluster of data centres* providing "green" power; *tourism industry* cluster and *Oulu health technology cluster*.

Russia

Green dots represent an emerging *Tourism and recreation cluster of the Murmansk region*.

On the map we also emphasized information technology server-farms around Luleå in Sweden as the location of Facebook servers in Luleå became known to an international audience. The rationale of cold weather for cooling servers, an ample supply of cooling water and a location close to a technical university became a winning concept. This concept attracted multiple similar organizations now forming a farm of server plants. The most famous foreign direct investment (FDI) is likely the establishment of Facebook servers in Luleå.

Finland was likewise successful in launching and developing around Santa Claus in Rovaniemi. Northern Finland also strategically developed a triangle of tourism around Rovaniemi, Levi and Ylläs. The design of hotels and services such as those of Holiday Club were also benchmarked and reproduced to other tourism clusters. The tourism industry operating in the area from Rovaniemi to Sääriselkä has seen a rapid growth. According to the Finnish public service broadcasting company YLE, there were about 2.6 million overnight stays by non-residents in Finnish Lapland in 2016. The greatest boost to tourism in the area stems from growth in the number of tourists from Asian countries: overnight stays by Asian tourists rose by close to 50 per cent and stays by tourists from China doubled in comparison to 2015.

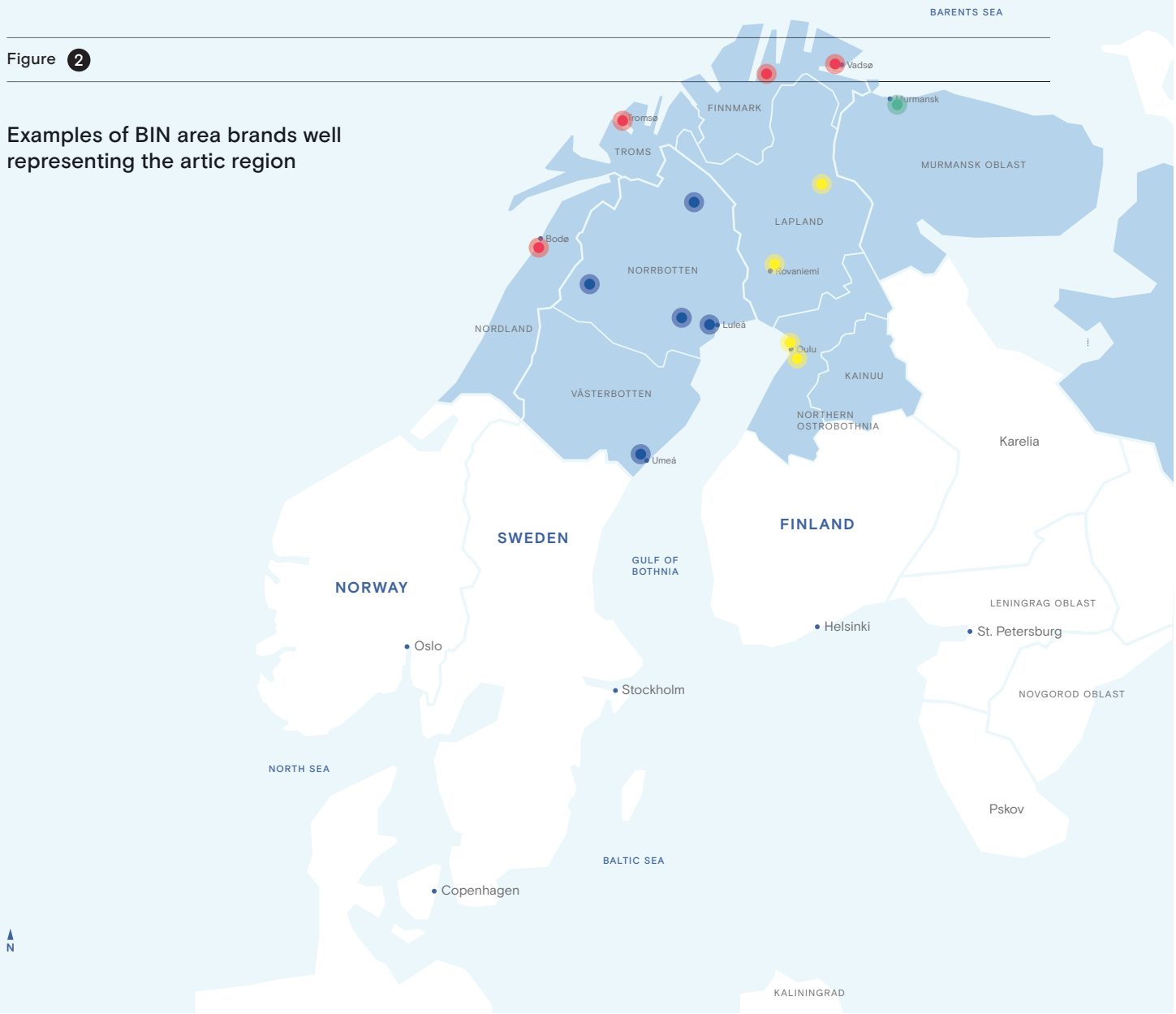
Other noteworthy Finnish examples include the Kajaani cluster of data centres with absolute readiness for business in terms of brownfield space, pre-zoned greenfield land and "green" power, and the "Oulu health technology cluster". The OuluHealth ecosystem comprises several stakeholders from academia, the public sector and the private sector. The ecosystem approach enables the combination of expertise from wireless information technologies and life sciences to introduce smart ICT solutions for delivering advanced, personalized, connected health service solutions.

In the Russian part of the BIN area, tourism is also gaining in popularity with growing numbers of tourists coming to the Murmansk Region from Asia. The tourism and recreation cluster of the Murmansk region has been formed on the basis of the tourist attractions and operators throughout in the whole area with 10 territorial sub-clusters. Using the official portal "Murman Tourism" (available in Russian, English, and Chinese) guests can plan and book their overall trip to the area. The tourism industry is one of the main growth industries in the Murmansk region. Among other things, there is a unique opportunity for cruising on board a nuclear-powered icebreaker from Murmansk via Franz Josef Land and further to the North Pole.

The following are examples of clusters in Northern Norway. "NCE Aquaculture" is a cluster focusing on value creation and innovation associated with the commercial production of farmed fish and seafood for the global market. The cluster consists in 2018 of 12 partners covering the entire supply chain within aquaculture. "Biotech North" is a blue biotech industry and innovation cluster. Biotech North members generally operate in the biomarine and biotechnology sectors with a broad focus on marine bioprospecting and marine rest raw materials. The "Smart Construction Cluster" is a cooperative owned by its members and aiming to develop the cluster into the leading Norwegian force in the implementation of the national "Digital Roadmap" for the building and construction industry. The cluster currently has 26 member companies from the ICT and building, construction and real estate industries. In addition to these three emerging clusters, we mention "The Mo Industrial Park", the leading industrial development zone in Northern Norway with 2,335 employees in 110 companies. The Mo Industrial Park is a world-class industrial park that creates value through a focus on environmentally friendly and energy-efficient services and solutions.

Figure 2

Examples of BIN area brands well representing the artic region



Sweden

Blue dots are represented by *Polarbröd; Icehotel; Max hamburger; Leos Lekland, Kalix löjrom* and *Rapunzel.*

Norway

Red dots represent *TIFF – Tromsø International Film Festival; Finnmarksløpet;. Nordland Musikkfestuke* and *The Arctic Race of Norway.*

Finland

Yellow dots represent *Rovaniemi Lappset Group; Polar; Fingersoft* and *Igloo hotel.*

Russia

Green dot represents *Biokontur.*

Brand names

Brand name refers to the name that symbolizes a product or multiple products. Brand name is sometimes synonymous with a company name or is hard to distinguish from a company. Brand names are important in many ways as they symbolize something specific.

The BIN area hosts a number of brand names carried by a company or sometimes by the entire region. We have introduced a number of brand names in the sense of a symbol because many of these are also prominent because they strongly symbolize the entire country. We intentionally mention a number of brand names related to food and tourism which are visible on tables and images nationwide.

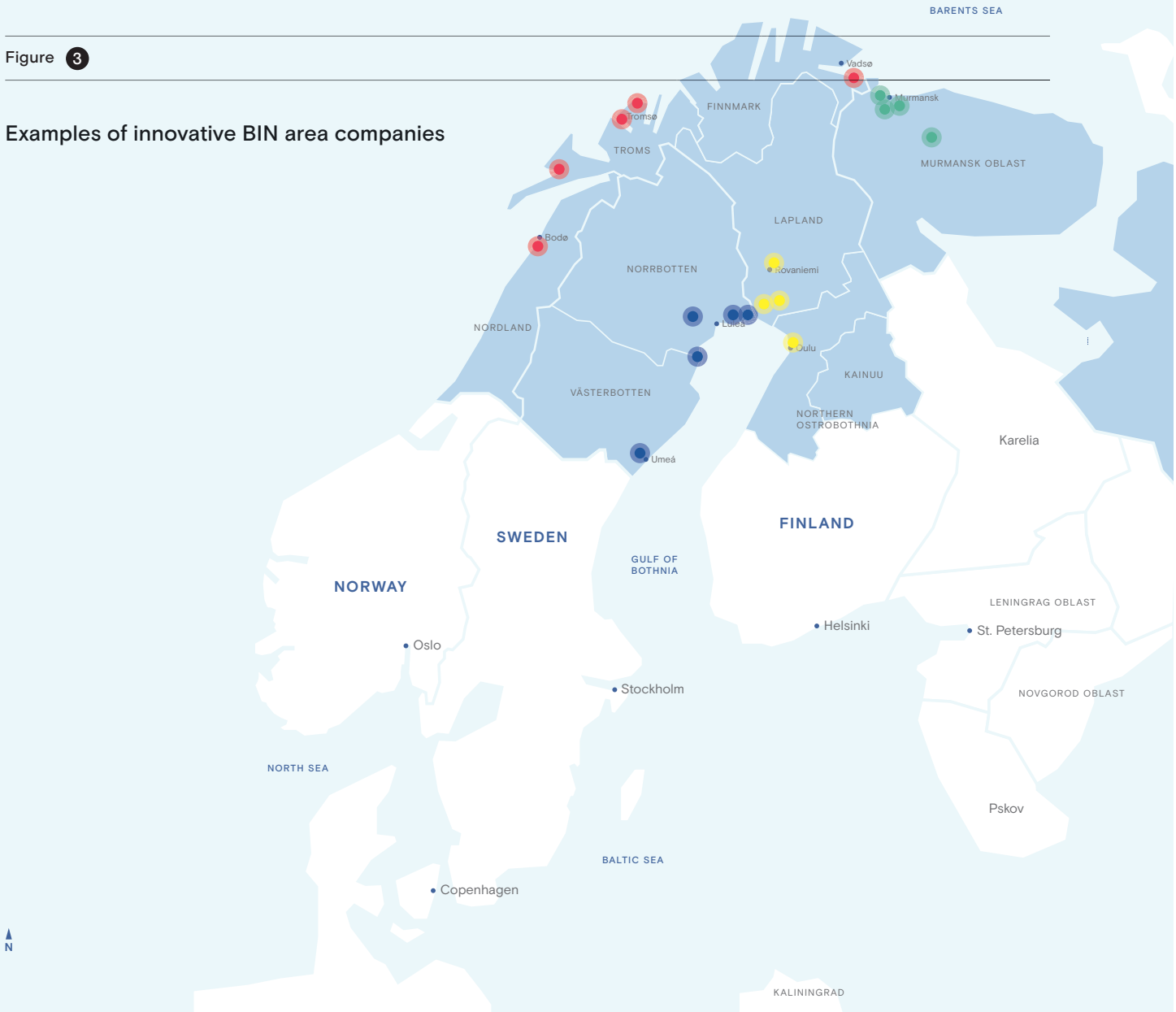
In the Swedish BIN region, for instance, we have Västerbotten cheese produced by Norrmejerier. Bread is often considered very local but Polarbröd is today among the biggest exporting companies in Sweden. In addition, the Swedish BIN region hosts Kalix löjrom, which is similar to Russian caviar and is often served in select restaurants to symbolize the very best that Sweden has to offer. The brand Kalix löjrom is offered by certain fisheries along the Swedish coast, which also process. Attracting tourists from all over the world, Icehotel is a company but also a strong brand name for the entire region. From the Luleå region originates brand names such as Max Hamburger and Leos Iekland. The rapidly expanding Rapunzel of Sweden started in Umeå and is now exporting hair extensions all over the world. These are growing fast and are recognized in Sweden and abroad. Originating from the Finnish part of the BIN area is Rovaniemi Lappset Group which is a leading designer, manufacturer and supplier of children's playground equipment and outdoor exercise solutions for people of all ages. The company was established in 1970. This family-owned company sells its products to over 50 countries. Moreover, Polar, the Oulu-based producer of heart rate monitors employs 1,200 people worldwide, has 26 subsidiaries globally and manages a distribution network supplying over 35,000 retail outlets in more than 80 countries.
Oulu Fingersoft game development studio and a publisher located in Oulu, Finland, have published games like Hill Climb Racing 2, Make More!, Javelin Masters 3 and Fast Like a Fox.

Norway is represented with branded cultural and sport events with North-Norwegian identity, all held on an annual basis. The TIFF - Tromsø International Film Festival screens challenging quality films for a local, national and international audience and serves as a meeting point for representatives of the Norwegian and international film industries. The total number of admissions in 2017 was 60,135. Finnmarksløpet is the world's northernmost dogsled race running through amazing Arctic nature. The Finnmarksløpet webpage has about 1 million visitors during the race. In 2018 there were 126 contestants from 16 countries divided into 3 race classes with teams of 6, 8 and 14 dogs. Nordland Musikkfestuke is a music festival combining natural and cultural landscape. This is one of the most important venues for classical music in Norway. Around 25,000 people attend the event. The Arctic Race of Norway is a multiple stage bicycle race held since 2013. The race is an official UCI-sponsored event, and has been included as part of the Europe Tour. The race of 2017 was televised in 190 countries and got about 3 million online media views; it involved 1300 riders and a live audience of 150,000 people.

On the Russian side we would like to highlight Baikonur, which is a brand for fish oil products developed and produced by the Murmansk based company Polaris (a a member of the PolarFarm group). The company is one of the leaders in the Russian Federation in the production of dietary supplements based on fish oil and vegetable oils in soft gelatin capsules.

Figure 3

Examples of innovative BIN area companies



Sweden

Blue dots represent *Älvsbyhus; Brokk robots, Lindbäcks bygg, Tree hotel, Vinter, Hybricon* and *Polarica*.

Norway

Red dots represent *DIPS; Lofotprodukt; ArcticZymes; Kongsberg Satellite Services* and *Kimek*.

Finland

Yellow dots represent *Balmuir; Hätälä; Arctic Warriors* and *Tornion Panimo*.

Russia

Green dots represent *Tundra; BR Electornics; Systemy promyshlennoi bezopasnosti* and *Kolaland*.

Companies

Companies constitute a unique for-profit formal unit. We selected a number of companies that differ from the conventional way of viewing the BIN area. In the Swedish BIN region, we note Polarica, offering local foodstuffs such as berries, fish and meat. To exemplify a growing number of high technology companies we mention Brokk offering robotics for industrial purposes, Lindbäcks bygg developing sustainable constructing, and Hybricon with electric buses that can function in the challenging arctic climate. Among the new emerging companies. The map also includes the communication agency Vinter and the concept destination Treehotel, to symbolize a growing focus on services and creative industries.

In Norway we would like to exemplify innovative companies from various industries. DIPS is the leading supplier of eHealth systems to Norwegian hospitals. Lofotprodukt is a producer of fish food which achieved tremendous growth during the last decade, and now has its products on sale in stores in every municipality in Norway. ArcticZymes develops and markets recombinant enzymes derived from cold-water marine species for use in life science research and in the molecular diagnostics sector. Kongsberg Satellite Services is a world lead of ground station services for polar orbiting satellites. Barel develops and manufactures electronics within the global markets for the international lighting and heating industry. Strategically located in Kirkenes, the company Kimek has a network of partners in Russia and is one of the largest northernmost mechanical environments.

Examples of successful innovative companies from Northern Finland include Balmuir, a lifestyle brand offering interior decoration items and fashion accessories made from the finest natural materials while Oulu based Hätälä is a Nordic market leader in premium fish products. Rovaniemi Arctic Warriors is an arctic superfoods company and Tornion Panimo reopened a brewery with 140-year traditions manufacturing the beer known as Lapin Kulta. On the Russian side (Murmansk Region), we note numerous successful SMEs in various sectors. For example, Tundra is a reindeer herding enterprise dating from 1930 and the main business for the town of Lovozero populated by indigenous people – the Saami. High quality meat and food products are produced and marketed in the region and beyond. In 2015 the company won the all-Russia contest competition "Quality star". BR Electronics is a Russian subsidiary of the Norwegian company Barel handling high volumes and work-intensive products in Murmansk. For more than a decade Barel companies we have been manufacturing world-class electronic, electromechanical and cable products. "Systemy promyshlennoi bezopasnosti" provides planning and design of environmental protection systems for the petroleum industry with clients in many regions of Russia. All the key experts of this entrepreneurial company are women and, according to the director general, this works well since most of the company's clients and partners are "male-companies". Kola Land is a young, modern and dynamic company dealing in the harvesting of northern wild-growing and garden cultivated berries. Their range of products includes cloudberry, blackberry, cowberry, cranberry, crowberry, black currant, red currant, buckthorn, raspberry and cherry. Since 2008 Kola Land has gradually branched out and has already taken its place among the primary packers with an average turnover of 300-400 tons per season and has expanded to a reliable client base in Murmansk Region, Arkhangelsk Region, Pskov Region, Vologda Region and other regions of Russia.

Key performance indicators

This section introduces a number of self-reported key performance indicators (KPI) by BIN area companies. These KPIs are growth opportunities, innovativeness, innovation, performance, exports, newness and regional support. To identify a KPI on each dimension we worked with so-called composite measures. A composite measure is based on multiple indicators to form a broader perspective than only focusing on one single indicator. The indicators were collected from the BIN area companies by means of a survey.

The survey results are based on a sample of 263 observations collected from BIN area companies in Sweden (113), Norway (66), Finland (68) and Russia (16). We included companies with more than five employees and with a significant regional impact. As the region spans a large geographical area we made a stratification that should be representative of size, industry and location. We also listed through our expert panel a number of companies that have a specific impact in the region. Most of these companies participated in the survey. Here we present results of the survey.

Figure 4

Business and innovation survey results

BIN – area

Competition	3,40	🟡
Regional support	3,31	🟡
Growth opportunities	3,41	🟡
Innovative competitiveness	3,36	🟡
Value performance	3,60	🟢
Organizational performance	3,64	🟢
Exports	2,86	🔴
Newness	2,56	🔴

Finnish part of BIN

Competition	3,45	🟡
Regional support	3,29	🟡
Growth opportunities	3,33	🟡
Innovative competitiveness	3,43	🟡
Value performance	3,72	🟢
Organizational performance	3,75	🟢
Exports	3,26	🟡
Newness	2,48	🔴

Swedish part of BIN

Competition	3,41	🟡
Regional support	3,37	🟡
Growth opportunities	3,47	🟡
Innovative competitiveness	3,35	🟡
Value performance	3,57	🟢
Organizational performance	3,68	🟢
Exports	2,49	🔴
Newness	2,54	🔴

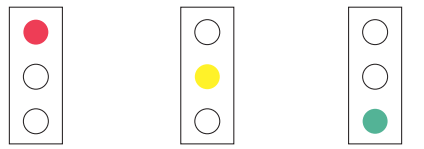
Russian part of BIN*

Competition	3,61	🟢
Regional support	3,06	🟡
Growth opportunities	3,11	🟡
Innovative competitiveness	3,62	🟢
Value performance	3,63	🟢
Organizational performance	3,60	🟢
Exports	3,27	🟡
Newness	3,30	🟡

**Murmansk Region only*

Norwegian part of BIN

Competition	3,28	🟡
Regional support	3,29	🟡
Growth opportunities	3,45	🟡
Innovative competitiveness	3,23	🟡
Value performance	3,51	🟢
Organizational performance	3,46	🟡
Exports	2,99	🔴
Newness	2,50	🔴



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Challenges and findings

Implications for the BIN area

For Policy:

A This chapter endeavours to describe the BIN area holistically with a strong representation from the entire region. We have broadened the perspective to focus not only on the geographical aspect but also to illustrate the significance of companies, brand names and clusters. To do this we mapped the region by noting clusters, brand names and companies that may in part explain the key business activities in the region. This mapping passed through several stages with experts meeting and offering a representation of symbols that may explain innovative initiatives beyond known sectors such as the forest, fisheries and extraction industries. Policy-makers are therefore invited to address further development of significant innovative potential of the BIN area and its regions.

B This report moreover provides an overview of KPIs measuring perceived regional support, competition, growth opportunities, innovativeness, innovation competitiveness, organizational performance, exports and newness. This is a unique data set that describes key business activities in the BIN area. This set of KPIs is also an inventory of existing activities that can support policy-makers in targeting and stimulating certain activities.

C Our findings also suggest that there are minor differences in the values of KPIs of companies within the BIN area, which is an indication that the area is fairly homogeneous across all these aspects. This has to be taken into account by policy-makers in the BIN countries if they are to work together towards a common innovation policy for the area.

For Investors:

D Establishing a business in the BIN area offers vivid view of opportunities and innovative ideas. We claim that the many emerging clusters and innovative companies that not only present a unique idea but also become a globally growing profitable company offer a different view of a known extraction industries region. These companies find it difficult to grow organically because of lack of financing. In countries like Germany and Japan companies are supported to a greater extent by banks. Many banks in the BIN area, however, are reluctant and have fewer opportunities to support businesses. Investors are therefore crucial to support any business. We have shown that companies like Max, Polarbröd, Icehotel etc. have grown strong and over a long period of time even with limited access to investors. Therefore, more knowledge is needed to develop an awareness of companies which operate far from the known capital markets.

E We have therefore mapped entire clusters such as car testing in Arjeplog, server plants such as Facebook in Luleå, tourism in Levi and Rovaniemi and the way an entire fish industry exports significant quantities globally. Investors may therefore not only recognize individual companies but also clusters, brand names and industries in the BIN area.

F Our group was surprised as we developed this inventory of innovative companies. The rich variation in types of industries and companies with origins in the BIN area is likely not known at this point and much work still remains to be done. Therefore we invite investors to look at the BIN area as an area with significant, already developed innovative potential.

For Businesses:

G Our report has taken a first step to explain how companies with limited access to financial and human capital resources grow and prosper globally. This is important as it may not only serve to change the investor perspective but also inspire confidence among young entrepreneurs in the artic regions. Examples of domestic and global companies developed in the BIN area may also stimulate a second generation of innovative companies.

H Initially developing a business means developing an idea. The first strategic choice of a company is to decide what products to make and the second where to operate. This report offers some basic information on the entire BIN area. In particular, it is shown that innovative and unique companies can only grow and prosper if their value performance is supported by sales and profits.

Photo: iStock

Innovations

"The Stone Age did not end because humans ran out of stones.
It ended because it was time for a re-think about how we live."

William MacDonough, American designer

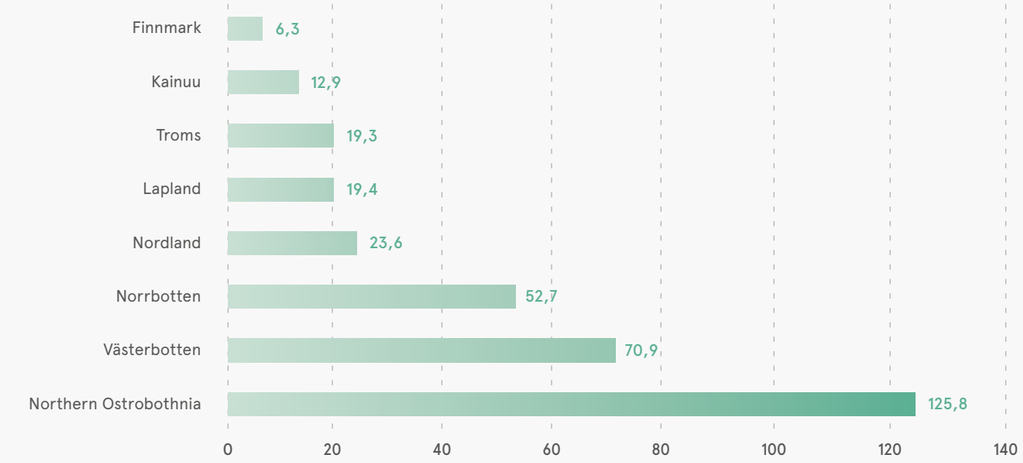
Innovation has crucial importance for the industry competiveness and it is recognized as the most important driver of economic growth. Nordic Innovation – an international institution promoting business sector innovations - defines innovation as new products, services, markets, processes or organizational models that create financial benefits or otherwise are of value to society. This chapter assesses innovative capacity of businesses within the BIN area. According to the Institute for Strategy and Competitiveness at Harvard Business School, the innovative capacity of a nation or region is heavily rooted in its microeconomic environment, in areas such as the intensity of scientists and engineers in the workforce, the degree of protection of intellectual property, and the depth of clusters. Patenting activity, associated with protection of intellectual property, is one of the key indicators of companies' innovative capacity for development of new competitive products. We use this indicator to measure the innovative capacity of companies operating in the BIN area. In our analysis, we utilize patent applications submitted to the European Patent Office (EPO) and national industrial property offices (patent offices) in Norway, Sweden, and Finland. We consider patent applications statistics over a long term from the early 1990's to 2014–15, look into the ownership structure of the patents, and trace their technical specifications. Our key findings are as follows:

- Three of eight BIN counties - Northern Ostrobothnia, Norrbotten and Västerbotten have a relatively high level of patenting activity. The level of patenting activity in the five other counties (Nordland, Troms, Finnmark, Lapland, and Kainuu) is rather low.
- EPO patents made in Northern Ostrobothnia and Norrbotten have a low degree of local ownership. For each region, proprietors of around 80 % of patents applied for are companies headquartered outside. The degree of local ownership in Västerbotten is about 58%.
- Besides externally owned innovations, there is still a substantial number of local innovative companies and entrepreneurs in the BIN counties. These companies may benefit from cross-border cooperation and focused political support with a suitable degree of coordination by a third party.
- Potential areas for cooperation between the local BIN innovative companies are: electric communication, computing and calculating, measuring, electric elements, medical or veterinary science and hygiene, vehicle engineering and mechanics, handling and processing, construction engineering, and solutions to deal with human necessities.

The remainder of this chapter is structured as follows: We start with patenting trends overview and then move on to the analysis of the industrial property ownership in the BIN area. Further, we present our findings regarding common front-edge competence areas for the BIN companies. The chapter ends with an outline of possible practical implications of our analysis, as well as a note on its limitations and opportunities for further studies.

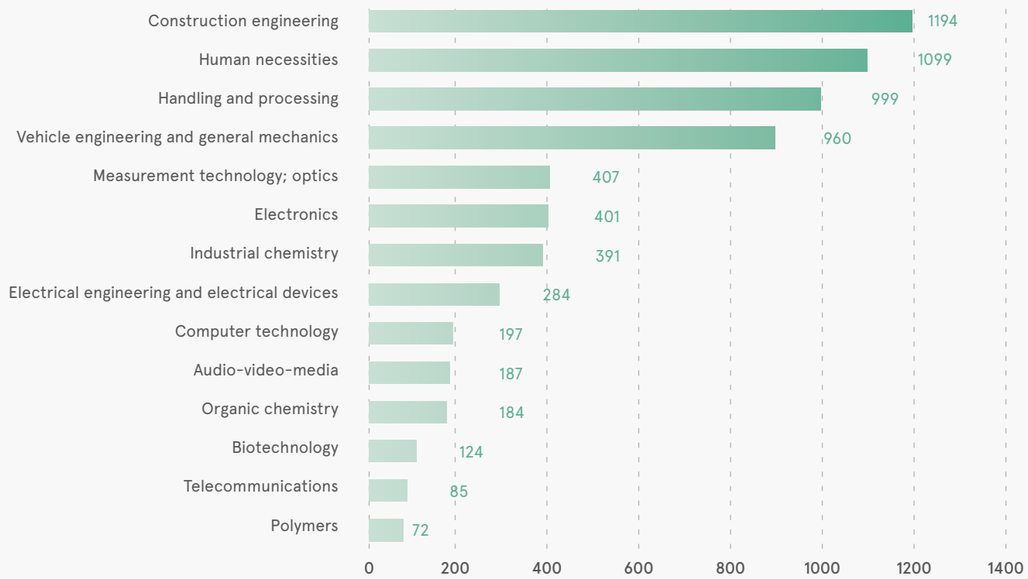
Ranking – patenting activity in the BIN area

Average number of European and national patent applications per year



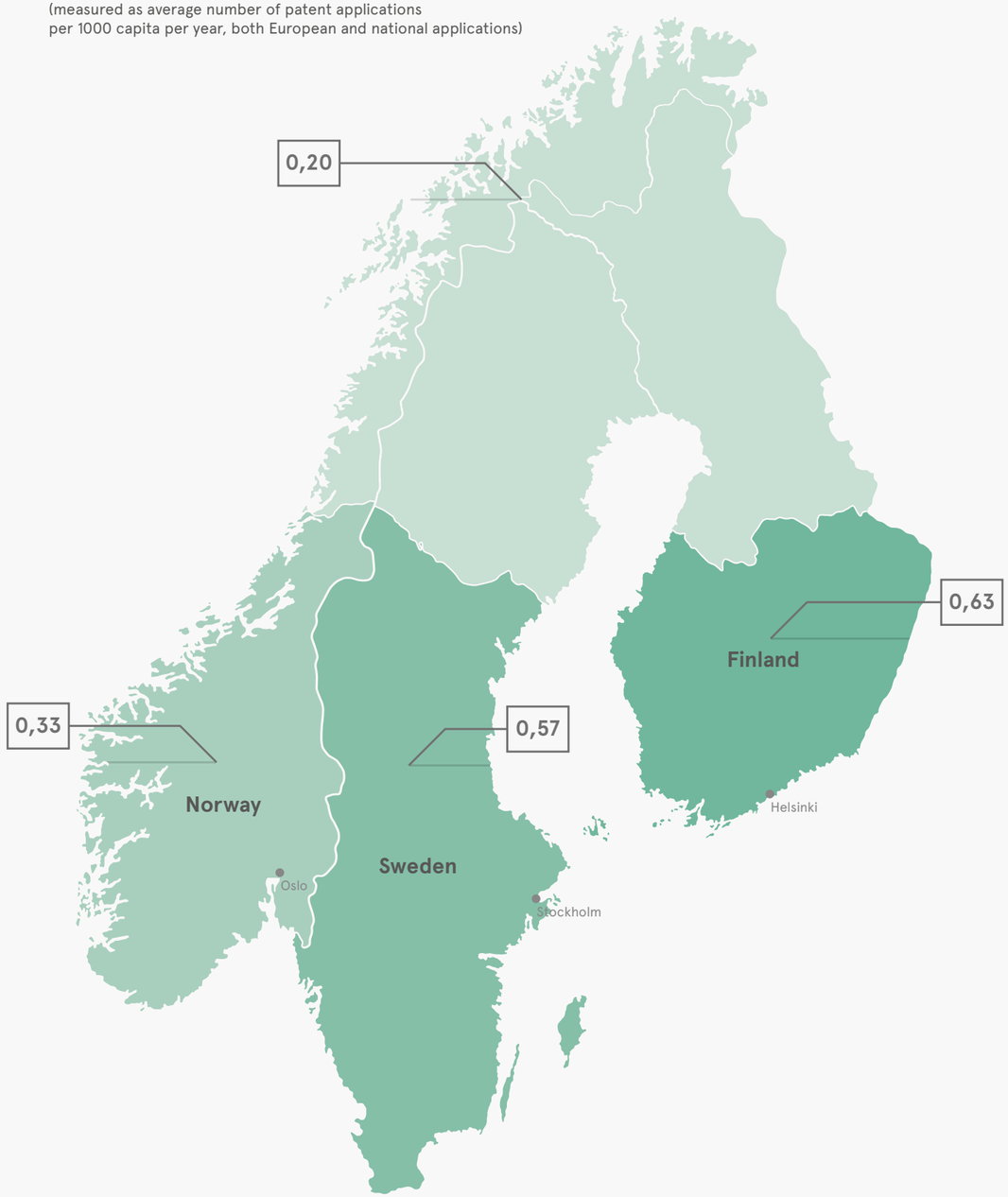
Types of technology developed and patented – BIN area

Number of applications to national patent offices the last 25 years



Intensity of patenting activity in the BIN area compared to countries averages.

(measured as average number of patent applications per 1000 capita per year, both European and national applications)

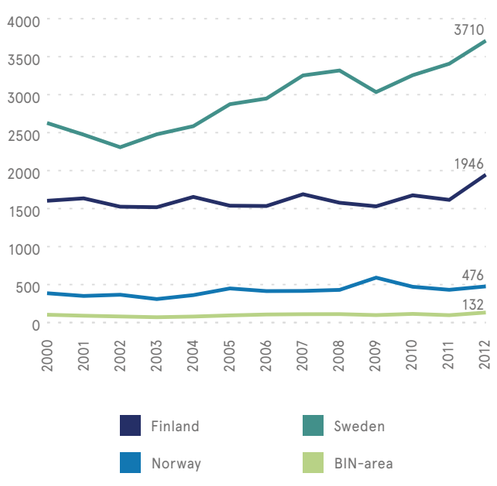


Trends overview

Patenting can be done through either international, regional or national offices. The protection of property rights in the European region (through EPO patenting) is a characteristic way for local businesses to develop front-edge products and technologies demanded in markets far beyond their physical geographic location[1]. The protection of intellectual property rights in the European market by Nordic countries has gained importance since joining the EU Patent Convention in 1996. The annual number of European patent applications submitted to EPO after 2010 has increased nearly 4 times in Sweden and Finland and doubled in Norway compared to the early 1990s. In addition to this, Nordic applicants tend to use their national patent offices both as a point of destination for acquiring a national patent and as an entry to the filing rout towards international patent authorities in Europe and beyond. The number of applications to the national patent offices has declined during the recent decade in Finland and Sweden, but remained rather stable in Norway. Historically, the total number of patent applications (both European and national ones) has been highest in Sweden and lowest in Norway, with Finland placed in between.

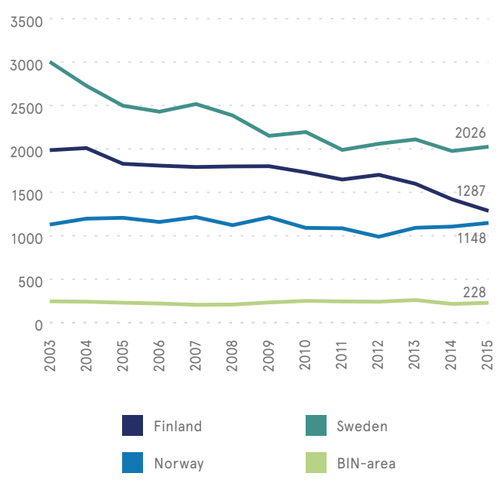
The total number of both EPO and national patent applications from the BIN area is significantly lower than the total for any Nordic country to which BIN counties belong (figures 1 and 2).

Figure 1 — Patent applications to the EPO (2000–2012)



The figure shows the sum of direct applications to EPO and international applications submitted to EPO (regional phase), based on priority date timescale (date of "conceiving" the actual invention). Background data source: OECD patent statistics.

Figure 2 — Patent applications to national offices

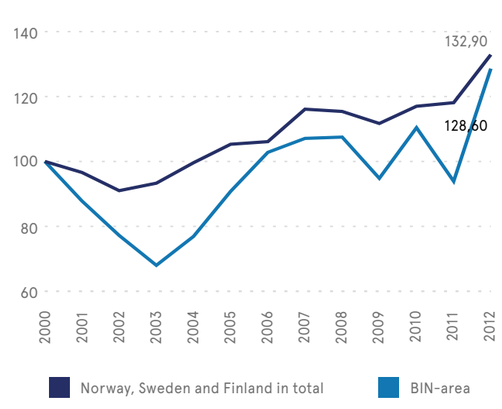


The figure shows the sum of direct and PCT national phase applications by country residents, based on the year of filing. Background data sources: National industrial property offices in Finland, Norway, and Sweden.

[1] The number of EPO applications is used here as an indicator of international orientation of companies. However, only the national validation figures would give a precise measure of in which countries patents are actually entering into force.

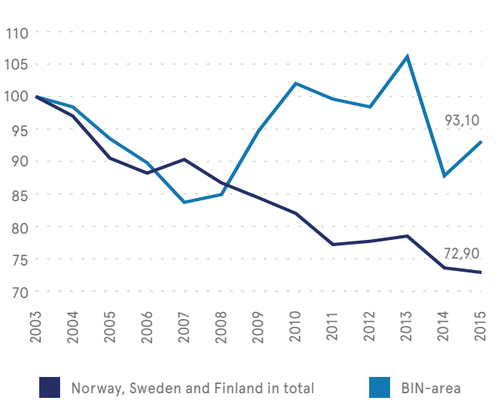
Figure 3 compares development in the number of applications to EPO in the BIN-area as well as the total for Norway, Sweden and Finland. The international orientation of the BIN area innovators is generally progressing along with the general trend for Sweden, Finland and Norway. Although the growth for the BIN area is not as steady[2] as for the three countries' totals. Figure 4 shows that in 2003–2008, the number of national patent applications from the BIN area was declining along with the general trend for Norway, Sweden, Finland, while in 2009–2015 the BIN innovators were more oriented towards protecting property rights on the national markets than the three countries in general. A possible hypothesis for future research based on this last observation is whether the BIN innovators are companies with niche products seeing opportunities in the domestic markets.

Figure 3 — Development in number of applications to EPO: BIN-area and total for Norway, Sweden and Finland (2000–2012). Index 2000 = 100%



The figure shows the sum of direct applications to EPO and international applications submitted to EPO (regional phase), based on priority date timescale (date of "conceiving" the actual invention). Background data source: OECD patent statistics.

Figure 4 — Development in number of applications to national patent offices: BIN-area and total for Norway, Sweden and Finland (2003–2015). Index 2003 = 100%



The figure shows the sum of direct and PCT national phase applications by country residents, based on the year of filing. Background data sources: national industrial property offices in Finland, Norway, and Sweden.

[2] Consider "drops" for the BIN area in 2003, 2009, 2011 shown on the figure 3. Relatively low volume of total patenting activity may be a reason for less smooth shape of the development line.

Intensity of patent applications is measured as patent applications to EPO or national offices per thousand capita. Figure 5 shows that patent intensity in the BIN area is below any Nordic country represented, compare 0.08 in the BIN area in 2012 with Finland close to 0.4. Patent intensity to EPO for Sweden and Finland is at least three times higher than in Norway. Low patent intensity in the BIN area is observed for both EPO and national patent applications (figures 5–6). Lower intensity of patent application can be attributed to a lower population in the BIN area compared to Norway, Finland, and Sweden in general. For inventions patented at the national offices, intensity in Finland has generally been higher than in Norway and Sweden (those two have been at approximately the same level) but seems to have dropped since 2012 (figure 6).

Figure 5 — Patent applications to EPO per 1000 capita

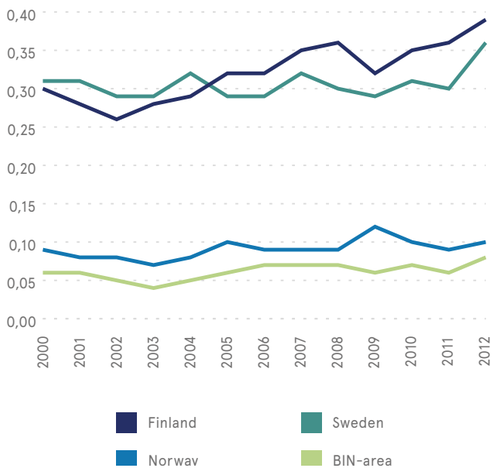
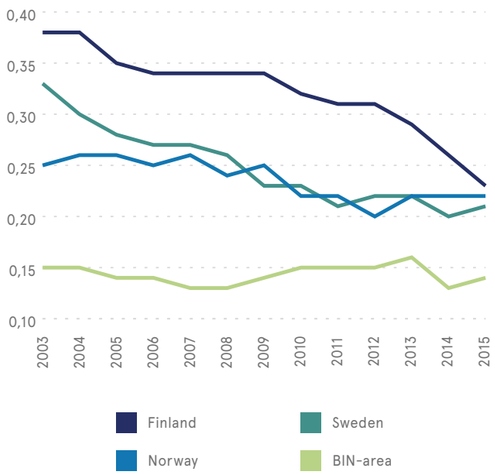


Figure 6 — Patent applications to national offices per 1000 capita



Data sources: OECD, national patent offices and statistics offices in Finland, Norway, Sweden

Analysis at the county level demonstrates that Northern Ostrobothnia, Norrbotten and Västerbotten are leaders within the BIN area in terms of patent applications (Figure 7). The intensity of patent applications from these three counties put together is still lower than total for Norway, Sweden, and Finland, but higher than for Norway (Compare these three regions presented in figure 7 with the same indicator for Norway shown on the figures 5 and 6). The intensity of EPO applications grew in these three BIN regions along with the trend for Norway, Sweden, and Finland. The intensity of national patent applications for the three countries is clearly declining (perhaps due to increased internationalization of businesses).

Data sources: OECD, national patent offices and statistics offices in Finland, Norway, Sweden

Figure 7 — Patent applications to national offices and to EPO per thousand capita, 2000–2012, total for Norway, Sweden, Finland and total for Northern Ostrobothnia, Norrbotten and Västerbotten

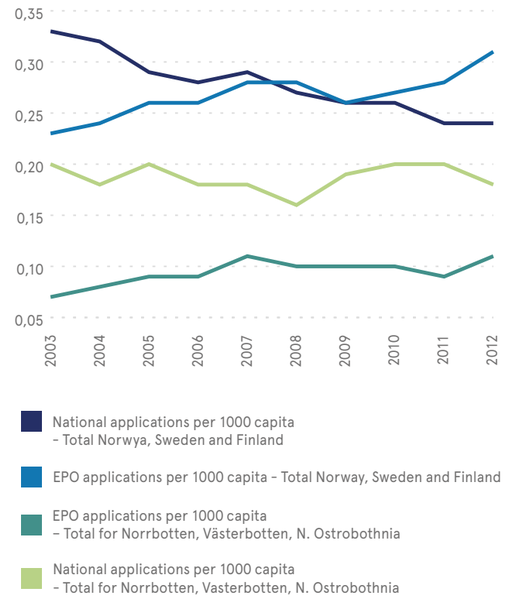
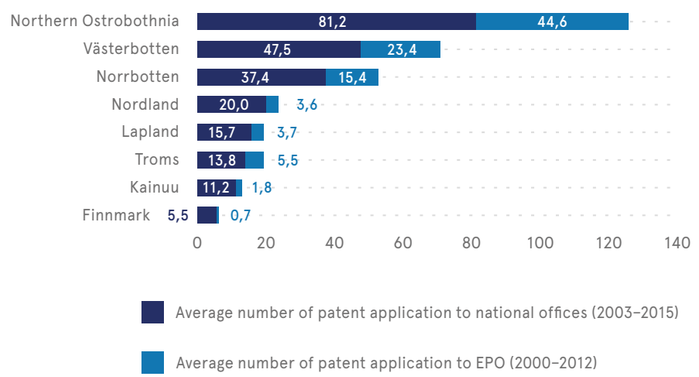


Figure 8 — Average number of patent applications per year – BIN-regions



Northern Ostrobothnia has the highest average number of applications per year in the BIN area, followed by Norrbotten and Västerbotten; the level of patenting activity in the rest of the BIN area (Nordland, Troms, Finnmark, Lapland, and Kainuu) is rather low.

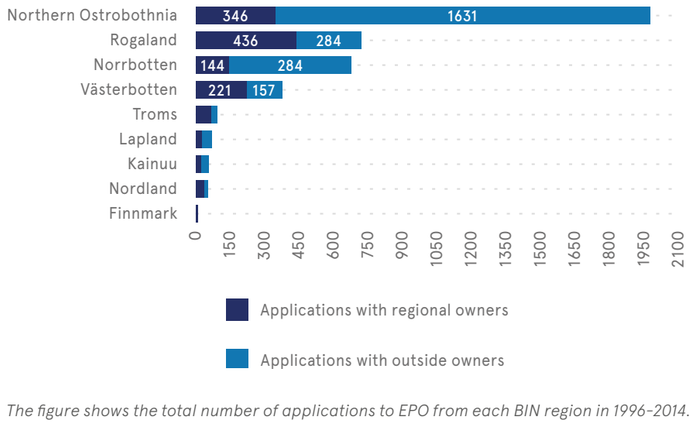
About 75 % of BIN patent applications (total for EPO and national offices) come from Northern Ostrobothnia, Norrbotten and Västerbotten. In these regions, the share of EPO applications in total number of applications (sum of EPO and national ones) is at least 30% (in the rest of the BIN area it is less than 20%).

The figure shows averages for both EPO and national patent applications. Data sources: OECD, national industrial property offices in Finland, Norway, Sweden. Average numbers of applications per year are calculated for a 13 years period (2003-15 for national applications, and 2000-2012 for EPO applications).

Intellectual property ownership in the BIN-area

According to the EPO classification , the applicant is proprietor - owner of the invention. The owner can be either a company(/ies) or an individual(s). The inventor is an individual(s) who conceived the invention. In our analysis, we focused on the EPO applications during 1996–2014 assigned to the BIN counties, and traced those with inventor and owner (applicant) from the same county and those with regional inventor but an outside owner.

Figure 9 — EPO patent applications (1996–2014) with inventors from BIN counties and owners – residents and non-residents to BIN counties



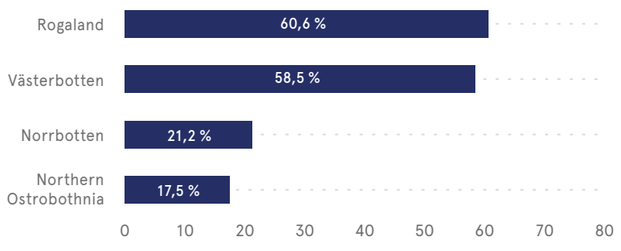
The figure shows the total number of applications to EPO from each BIN region in 1996-2014. The inventors assigned to the applications are residents of the BIN counties. The applications are classified into having regional and outside owners respectively (residents and non-residents). Data source: EPO database EPAB with statistics.

The figure illustrates the ownership structure of the patented inventions from the BIN counties. For comparison, we also include Rogaland from South Norway, which is a key region in the Norwegian oil and gas cluster, a good example of a county with rapid economic growth.

Compared to Rogaland (720 applications in total), there is a very high level of invention activity among local entrepreneurs or company employees residing in Northern Ostrobothnia (1,997 applications in total) and a rather good level in Norrbotten (678 applications). Total number of EPO applications with a local inventor in Västerbotten was 378.

The relatively low level of patenting activity in 5 out of 8 BIN regions (Troms, Lapland, Kainuu, Nordland and Finnmark) may put local businesses in danger in the course of global production systems extending to the north.

Figure 10 — Degree of local ownership (%) in Northern Ostrobothnia, Norrbotten, Västerbotten compared to Rogaland



Degree of local ownership is defined as number of patented inventions with proprietors - regional residents divided by total number of inventions made in the county.

Degree of local ownership for the inventions made in Northern Ostrobothnia and Norrbotten is low: 17,5 % and 21,2 % respectively; while it is relatively high in Västerbotten - 58,5% (close to the reference county Rogaland - 60,6%).

The low degree of local ownership signalizes that commercial results of the inventions (materialized as innovations) are not retained locally.

The other five BIN regions are not included due to rather low total volume and the sparse character of the patenting activity. Although the degree of regional ownership there would be close to 100%, which means lack of R&D investments by larger companies from the outside.

Table 1 — Top owners of the EPO patended inventions and location of their headquarters (HQ)

Norrbotten		
Top Owners, 72,4% Of Total Applications	HQ	Applications
Telefonaktiebolaget Lm Ericsson Publ	Non-Resident	398
Gestamp Hardtech AB	Subsidiary	30
Telia AB	Non-Resident	25
Operax AB	Resident	14
Accra Teknik AB	Non-Resident	13
Telia AB Publ	Non-Resident	11

Northern Ostrobothnia		
Top Owners, 72% Of Total Applications	HQ	Applications
Nokia Corporation	Non-resident	730
Nokia Siemens Networks Oy	Non-resident	186
Nokia Solutions And Networks Oy	Non-resident	152
Nokia Networks Oy	Non-resident	144
Nokia Telecommunications Oy	Non-resident	104
Nokia Mobile Phones Ltd	Non-resident	37
Kemira Oyj	Non-resident	23
Nokia Technologies Oy	Non-resident	22
Polar Electro Oy	Resident	21
Pulse Finland Oy	Resident	20

Västerbotten		
Top Owners, 31% Of Total Applications	HQ	Applications
Swetree Technologies AB	Resident	15
Telefonaktiebolaget L M Ericsson Publ	Non-resident	13
Sqs Security Qube System AB	Resident	8
Sekab E Technology AB	Non-resident	7
Stock Of Sweden AB	Non-resident	7
Bioendev AB	Resident	6
Abbott Laboratories	Non-resident	5
Bae Systems Hagglunds Aktiebolag	Non-resident	5
Betagenon AB	Non-resident	5
Fumex AB	Resident	5
Komatsu Forest AB	Resident	5
Bergteamet AB	Non-resident	4
Airgrinder AB	Resident	3
Alimak Hek AB	Resident	3
Alo AB	Resident	3
Ascom Network Testing AB	Resident	3
Ascom Network Testing Inc	Non-resident	3
Element Six Pty Ltd	Non-resident	3
Konftel AB	Resident	3
Li Haibo	Resident	3
Omnio Healer AB	Resident	3
Outotec Oyj	Non-resident	3
Umecrine AB	Resident	3

Data source: EPO database EPAB & Statistics

The top owners (close to 70 % of total applications) in Norrbotten and Northern Ostrobothnia are multi-national telecommunication companies headquartered in Stockholm (Ericsson) and Espoo in the Greater Helsinki metropolitan area (Nokia). Although these companies are non-residents to the regions in focus, they are originally from the same countries as the regions (Nokia is Finnish and Ericsson is a Swedish company, respectively).

Local innovative companies worth mentioning are Polar Electro and Pulse Finland, both based in Kempele (Northern Ostrobothnia, Finland). A Norrbotten-based innovative company, Gestamp Hard-Tech AB (30 applications), manufactures safety components for car manufacturers in Europe, North America, and Asia. Today this company operates as a subsidiary of a Spanish-based group. However, the company was established locally, in Luleå (Norrbotten), in 1990.

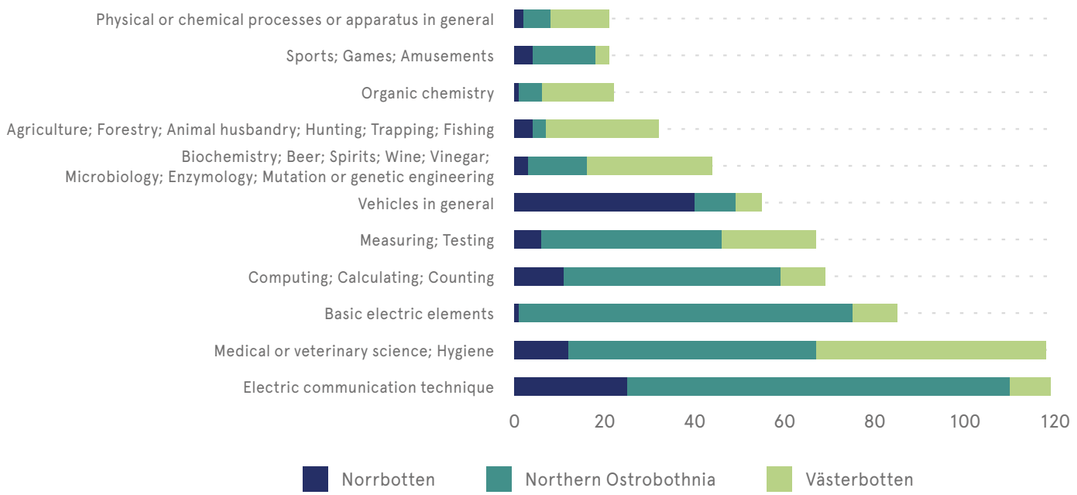
The region of Västerbotten has a dispersed ownership profile. There, top owners of inventions (with 3 or more patent applications per company) cover 30 % of the total and are either resident or non-resident companies. The largest innovator is a resident company, Swetree Technologies (15 applications), specializing on forest biotechnology innovations. 70 % of the EPO patent applicants in the region of Västerbotten had 1 or 2 EPO applications during the period extending from 1996–2014.

Front-edge areas of the local companies

Besides externally owned innovations, there is a substantial number of local innovative companies and entrepreneurs - residents of the three high performing BIN counties. Through our analysis of the EPO patent applications filed by residents of these counties, we identified 11 front-edge competence areas[3] common for the applicants (Figure 12).

Figure 12 — Common front-edge competence areas in Norrbotten, Nothern Ostrobothnia and Västerbotten

The most intensive areas of European patenting are related to electric communication, basic electric elements, computing, calculating, counting and measuring techniques. A probable historical reason for this is the presence of large telecommunication and IT companies such as Nokia and Ericsson. Another common competence area is medical and veterinary science[4].



The figure shows the total number of mentions of different areas of technology in EPO patent applications filed in 1996-2014 from Northern Ostrobothnia, Norrbotten, Västerbotten. The areas of technology are classes from the International Patent Classification (IPC). Data source: EPO EPAB database and statistics.

[3] These 11 competence areas correspond to different types of technology called classes in International Patent Classification (IPC). The 11 IPC classes were mentioned 653 times in the patent applications from the three regions (which constitutes 64 % in total number of 1015 analyzed applications).

[4] Mentioned 118 times in patent applications by 97 local companies or entrepreneurs.

Table 2 — Medical or veterinary science or hygiene – an example of a common front-edge area of competence accumulated by local companies in the BIN counties[5]

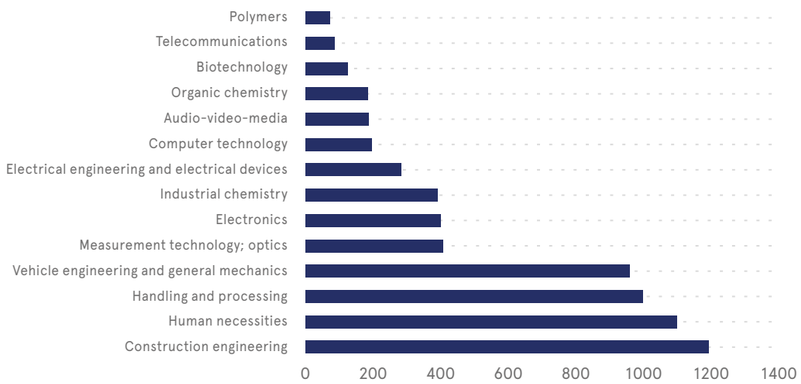
Region	Number of companies	Total number of EPO patent documents (A1, A2 type)	Examples of companies[8]
Västerbotten	50	51	**Umecrine AB** – R&D of pharmaceutical agents against negative mental and physical symptoms. ***www.umecrine.se***
Northern Ostrobothnia	35	55	**Polar Electro Oy** - a well-known manufacturer of sports training computers. ***www.polar.com***
Troms	16	39	**Lytix Biopharma** – a life science company developing technology for cancer immunotherapy that activates the patient`s own immune system. ***www.lytixbiopharma.com***
Norrbotten	12	12	**Arctic City Counting House AB** – a manufacturer of sport goods for outdoor nature activities. ***http://www.acc-ab.com/***
Nordland	5	3	**Slaateng AS** - A company aiming at development, production and sales of solutions for disposal of materials (e.g. solid pharmaceuticals) in the health care sector. Seponett®. ***www.slaateng.no***
Lapland	3	4	**Aromtech (Arctic Omega Technology)** – a berry oil innovator to provide people with natural, clinically tested solutions that improve health at any age. ***www.aromtech.com***
Kainuu	3	2	**HighRoller® Finland LTD** - development and production of product for personal muscle care, a company owned by five entrepreneurs who all have background in sports. ***https://highrollerofficial.com/eng***
Finnmark	0	0	N/A
Totals	124	166	

Data source: EPO EPAB database and statistics, companies' websites

[5] Companies for this presentation are not selected as a result of ranking or any kind of benchmark. Our aim was only to show some examples of innovating companies from the BIN area, ranging from globally established companies like Polar to small local companies with niche products.

Figure 13 — Common fields of patented technology[6], BIN area, 1990-2015

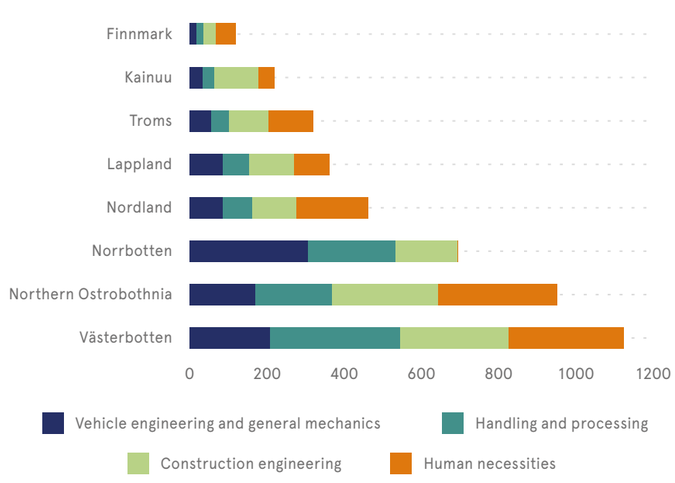
An analysis of patent applications filed by BIN residents to national patent offices showed that the biggest innovative potential common for the BIN area is accumulated in the following technology areas: construction engineering, human necessities, handling and processing, vehicle engineering and mechanics.



The figure shows 14 fields of technology and the total number of patent applications, classified for each field, filed by residents of the BIN area to domestic patent offices in 1990-2015. Data sources: national industrial property (patent) offices in Finland, Norway, and Sweden.

Figure 14 — Top 4 common fields of patented technology by BIN county, 1990-2015

Figure 14 demonstrates a rather balanced composition of the four top fields throughout the BIN area: construction engineering; human necessities; handling and processing; vehicle engineering and mechanics. Norrbotten has quite high vehicle engineering and general mechanics. The county of Västerbotten has the highest total number of applications.



The figure shows four fields of technology and total number of patent applications, classified for each field, filed by residents of the BIN area to domestic patent offices in 1990-2015. Data sources: national industrial property (patent) offices in Finland, Norway, and Sweden.

[6] Here we used classification of patents by 14 fields of technology (the classification provided by World Intellectual Property Organization). Each field includes a combination of various IPC sub-classes. An IPC sub-class is a particle of an IPC class. For more details on IPC classifications, please refer to the website of the World Intellectual Property Organization - http://www.wipo.int/classifications/ipc/en/

Implications and further studies

Based on the analysis presented, our policy recommendation is to stimulate cross-border cooperation on innovation in the BIN territory, aiming at further development of the identified competence areas and fields, as well as nurturing the underdeveloped ones. The goals of such cooperation would be to increase the volume and specter of BIN innovations, as well as to increase in the regional invention ownership rate. The innovation policy for the BIN territory has to be developed through collaboration between national, international, regional authorities and involve representatives of both the industry and academia. The first step in this direction could be a more detailed study (a feasibility study) with the following objectives.

- Mapping of the BIN companies with innovation, looking for potential technical and technological complementarities[7]
- Assessment of market for cooperative solutions
- Identification of common challenges for innovating companies
- Mapping of the existing instruments supporting innovations
- Development of more detailed/focused policy recommendations

The next step could be the establishing of a third-party organization to foster cooperation on innovation in the BIN area. The strategy, structure, legal form and resources required of this organization are to be defined based on the results of the proposed feasibility study. The organization may serve as a platform for exchange of knowledge and experience between innovative companies, provide informational support on market and cooperation opportunities, and offer legal advice and administrative resources associated with patenting and commercialization of inventions. Apparently, the latter can be crucial for SME's, as the cost of development and maintenance of a patent is rather high. Maybe the aforementioned third-party organization would be needed to provide brokerage for establishing new innovation consortia.

This work has to be coordinated with and correspond to principles of such institutions as the Nordic Council of Ministers (Nordic Arctic Program), the governments of the BIN counties, the Arctic Economic Council and the Arctic Council, Nordic Innovation, the Norwegian-Russian Cross-Border Commission, regional industry-related multiplying organizations in the BIN area (for example Business Oulu and Petro Arctic and others), as well as national, regional and international patent offices.

Patenting data used in our analysis is just one possible way of highlighting regional activities in innovation. We recognize that patents are suitable indicators for certain types of industries, however, not for all. The lack of patent applications suggests a lack of companies characterized by patent-intensive production and innovation, but one still may have healthy enterprises and industries with other types of innovation. In the future, our analysis of regional innovation could be extended with mapping of new emerging technologies and fields, e.g. health sector innovation (Oulu Health), iHealth movement and food sector innovation. Furthermore, since patenting does not, by and large, cover innovation in the service sector, it would be beneficial to develop a database of trademarks for the BIN area. According to OECD, "trademarks could contribute to measuring relevant aspects of innovation, especially non-technological innovation and innovation in the service industries". Other opportunities to study innovation considered for the next issues of the BIN report are the role of universities in development of innovations, the university-industry interlink, innovations in public sector and mapping of industrial clusters in the Arctic.

[7] By technical complementarity, we mean joining forces of several companies to increase production volume in the same technical field towards larger orders by big customers. Technological complementarity is about cooperation on development of new product.