

# Smart Specialisation in North Karelia





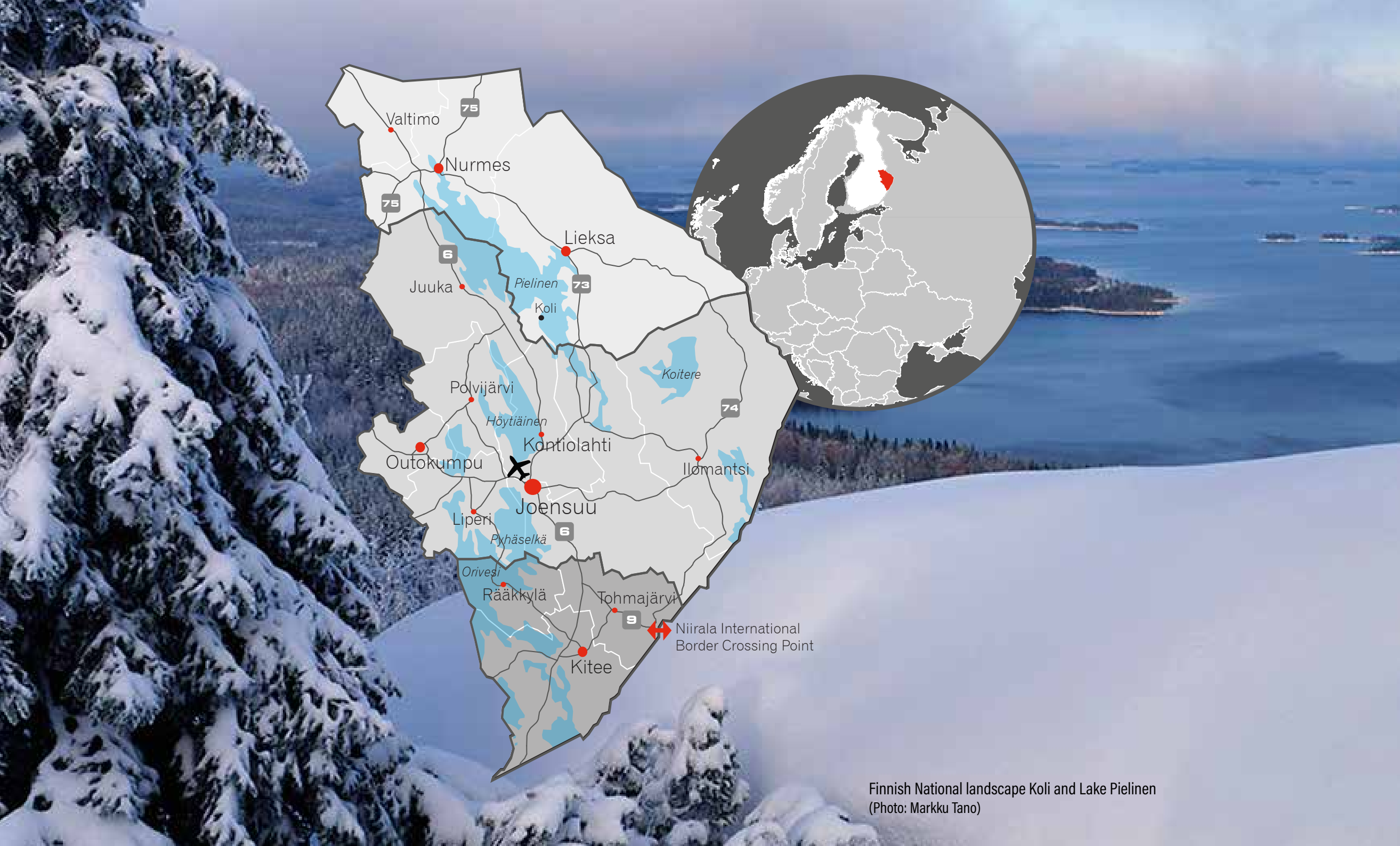
# The definition of smart specialisation



Smart specialisation is part of the EU's cohesion policy and the Europe 2020 strategy that focuses on each region's strengths and the activities that support these strengths. From an international perspective, smart specialisation – regional strategic development and renewal that focuses on special regional strengths – is one policy that will help Europe and its diverse regions remain competitive in a global marketplace.

On the regional level, smart specialisation can be understood as representing part of a regional innovation policy that guides and focuses resources to the themes that contain the most potential for the future of the region. Smart specialisation choices can help prioritise the region's key areas of expertise and research and innovation-oriented strengths as well as apply them for the needs of the region's business sector. Smart specialisation is an operating method that helps seek out financial benefits and create a competitive edge for the region. The focus is especially on supporting the commercialisation of the expertise of such fields that contain opportunities for creating international business. The goal of smart specialisation is to facilitate the creation of products, services and solutions that will stimulate the region's growth.

Smart specialisation is a method that aims for economic change by combining the expertise of the region's business and research sectors that will help improve the region's success factors. Instead of solely focusing on strong individual fields, it is essential to assess the top expertise of different fields that can be utilised in a more widespread sense or combined in novel ways. It is also essential to focus these assessment on the fields and themes that are in global demand.



Finnish National landscape Koli and Lake Pielinen  
(Photo: Markku Tano)

# North Karelia

## - The easternmost region in Finland

North Karelia has always been a place where east and west meet. The Niirala border crossing point is the third busiest in Finland with 1.5 million crossings a year. The easternmost point of the continental part of the European Union is located on an island in the Virmajärvi lake in Iloimantsi.

The competence-based growth industries of the future, forest bioeconomy and new technologies and materials, have taken off in North Karelia. The region's traditional strong fields of business include the forest, metal, extractive and food industries. North Karelia's regional centre Joensuu has many educational institutions, such as University of Eastern Finland and Karelia University of Applied Sciences. Number of students in the region totals up to 20 000.

North Karelia invests in the welfare of people and the environment. The carbon footprint of North Karelians is up to 36% smaller than that of the average Finn. The region is a frontrunner in the use of renewable and, in particular, bioenergy: Renewable energy accounts for 66 percent of the total energy consumption, which is a high percentage even on an international scale. North Karelia is also a model area in energy self-sufficiency: approximately 63% of the energy used is produced in the region.

Hilly landscapes covered with trees and dotted with meandering rivers and many lakes are characteristic of North Karelia. One of Finland's best-known national landscapes is the Koli area with its many hills located in Lieksa by the Pielinen lake. In North Karelia, the four seasons have a distinctive characteristics and a snowy winter is guaranteed every year.

### North Karelia in a nutshell

- Population 164 000
- NUTS 3 statistical level in EU
- Number of municipalities 13, of which 5 are towns
- Regional centre Joensuu is a university city (University of Eastern Finland, Karelia University of Applied Sciences)
- Headquarter of the European Forest Institute is situated in Joensuu
- Total area 21,585 square kilometers (almost the same as Slovenia or Israel)
- Forests cover 70 % of the surface
- The region has 2,200 lakes of which Pielinen is Finland's fourth largest lake
- Finnish National landscape Koli is the highest point of Southern and Central Finland (347 m)
- North Karelia shares a 302 km stretch of frontier with Russia
- Distance to Helsinki, capital city, is 450 km which is covered e.g with one hour flight or five hours by car.



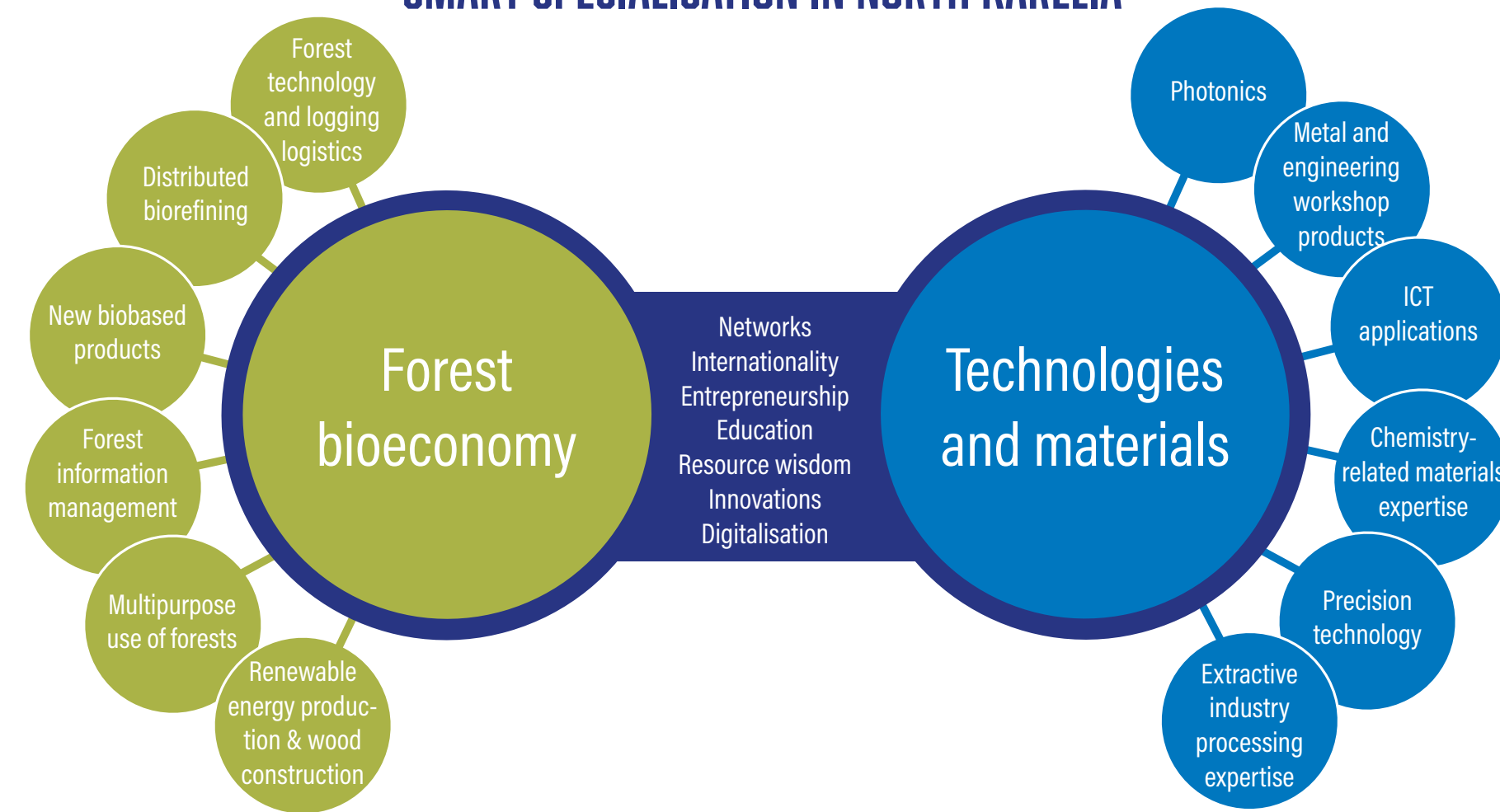
Students from the University of Eastern Finland observing the phenomena of photonics (Photo: Varpu Heiskanen)

# Choices for smart specialisation

The core of North Karelia's smart specialisation is comprised of two essential elements

1. New solutions for the forest bioeconomy
2. Technologies and materials as enablers of growth

## SMART SPECIALISATION IN NORTH KARELIA





# Forest bioeconomy

The forest bioeconomy represents the strongest sector for research and expertise in the entire region. Around 600 experts with various educational backgrounds – from vocational education schools to doctoral degree programmes and research institutes – work in the region's forest bioeconomy sector. Many strong national and international actors are involved in the field, such as the Natural Resources Institute Finland (Luke), the Finnish Forest Centre, the University of Eastern Finland, the European Forest Institute (EFI), Karelia University of Applied Sciences, the Finnish Environment Institute and North Karelia Vocational College of Valtimo. The region contains strong leading companies as well as promising growth companies that focus on global export markets. The forest bioeconomy sector is strongly collaborative in nature. The experts of the field are also well-networked, both at home and abroad.

The challenges of the forest bioeconomy sector include the transfer of expertise and research knowledge and their application for the needs of business life, as well as including an entrepreneurial angle to the sector's development work. The forest industry has not traditionally been a hotbed for new entrepreneurial activities, e.g. startups. One reason for this is that the university does not contain a faculty of engineering or strong industrial processing-related expertise. The challenge of the forest bioeconomy sector is in creating products and services that contain an exceptionally high level of added value. The mobility and transfer of experts from research institutes and educational organisations to companies should be increased and used to create a spill over effect for the entire industry.

## THE REGION'S AREAS OF EXPERTISE FOR THE FOREST BIOECONOMY:

### Forest technology and logging logistics

Forestry machinery manufacturing, utilisation of logging methods and technologies

### Distributed biorefining

Raw material chains for distributed biorefining, the utilisation of side streams, and the refinement technologies and growth of value chains

### New biobased products

Biobased, high added value products, materials and production technology

### Forest information solutions

Service activities that are based on electronic forest information and other wide-ranging utilisation of databanks

### Multipurpose use of forests

The refinement of the material and immaterial value of forests and the matching of their different forms of use

### Renewable energy production and wood construction

Distributed energy production and hybrid solutions that are based on renewable energy sources, knowledge environments and demonstration targets for wood construction

## THE REGION'S AREAS OF EXPERTISE FOR TECHNOLOGIES AND MATERIALS:

### Photonics

Scientific research, technological applications as well as commercialised solutions

### Machinery and engineering workshop solutions

Machinery and engineering design expertise, manufacturing processes and technologies

### ICT applications

Digital solutions in products, services and processes, game development expertise

### Chemistry-related materials expertise

Scientific research on functional materials and biomaterial analytics

### Precision technique

Precision work expertise in the manufacture of optical, mechanical and biomedical components

### Extractive industry processing expertise

Analytics and processing expertise that serve the stone and extractive sector

Testing new device for mixed reality  
(Photo: Tuukka Pakarinen)

# Technologies and materials

Technologies and materials represent a corporately driven entity that focuses on the technology industry. The technology industry is North Karelia's most important RDI sector, as 53 % of all RDI activities are conducted in the companies of the field. The expertise of business life is complemented by the University of Eastern Finland's natural science departments (computer science, chemistry, physics and mathematics), the engineering-related educational expertise of Karelia University of Applied Sciences and North Karelia Municipal Education and Training Consortium, as well as the research and testing environments of these fields.

For technologies and materials, the top expertise that can be found in the region is exceptional, but achieving critical mass is something of a challenge. The region contains many ICT and technology companies as well as some spin off companies from university-level research initiatives that have helped commercialise regional expertise. However, when it comes to volume and mass, the greatest emphasis is still on more traditional engineering workshops and metal companies that feature strong expertise and the flexibility for novel initiatives as well.



# Thematic development entities

The key areas of expertise for smart specialisation have been assessed through more extensive societal change factors. These changes are national and/or global in nature and present opportunities as well as renewal challenges for the creation of business that is based on expertise.

1. Industrial renewal
2. Agile innovation activities
3. The public sector as a platform for experimentation and growth
4. Networks and partnerships for top expertise



## Industrial renewal

Industrial renewal refers to the ongoing and extensive global process of changing industrial competitiveness factors, renewed revenue models, and technological solutions that are revolutionising the operating methods of the manufacturing industry. North Karelia's traditionally strong metal cluster and machine and equipment manufacturing industry are a cornerstone of the region's industrial sector and represent an area where industrial renewal includes the utilisation of e.g. automation, robotics and machine sight applications, as well as other technologies. The business logic of companies is increasingly based on a value creation of customer needs and a business through service solutions.

To be able to utilise the benefits of digitalisation, North Karelia is especially keen on finding ICT and technology-oriented prowess as well as a strategic vision on how these can be used to create business and added worth for customers. For its size, North Karelia contains a strong and versatile ICT cluster whose expertise should be utilised as extensively as possible to help drive this change. Technology solutions and know-how must also be acquired through various networks nationally and globally. The application of new solutions on the interfaces of industry and the ICT sector provides the opportunity for new kinds of growth and the development of new business. From the perspective of the service business industry, ICT-related expertise can be used to innovate new kinds of products for industrial service businesses, e.g. for after sales activities.

The materials-related expertise in photonics and chemistry that can be found in North Karelia represents an especially promising area for gaining high tech perspectives and creating application methods for manufacturing processes as well as product and service solutions in several fields. The university-level basic research that is conducted in these industries and the applications that have been created form a strong expertise-oriented basis that should be utilised even more vigorously in industrial-level innovation activities. The mechanisms for transferring expertise and the connections between high technology experts and the companies in the region should be developed to the level that e.g. expert communities around the university and different companies are formed where key people can feel free to exchange information and ideas on the application possibilities of different technologies.

## Agile innovation activities

On the national level, innovation activities are increasingly being directed towards activities that occur through so-called innovation ecosystems. In an innovation ecosystem, business life, companies, research institutes and educational organisations interact within a common network to create new expertise and innovations. The key features of this type of operating model are trust, openness and the exchange of information. North Karelia is host to the Green Hub open innovation platform, where research information is transferred and applied to the product development activities and operations of the companies in the region's forest bioeconomy sector.

The characteristics of the ecosystems are e.g. complementary resources and areas of expertise, dynamism and rapidly changing business relationships. On a larger scale, north Karelian companies may act as a part of national and global ecosystems that are not dependent on geographical areas. Nevertheless, the region's stakeholders involvement in ecosystems and the creation of added value, for example through the knowledge of forest bioeconomy, may open up new networks and science to business opportunities.

The starting point for the region's innovation activities is the talented and skilled individuals who have the opportunity to apply what they know and learn from others. To enhance and facilitate the collaboration between business and research, the key people involved should be able to move freely between different organisations, companies and educational organisations. One essential method for transferring technologies and expertise would be to enable the mobility and transfer of key experts from e.g. the scientific sector to businesses and vice versa. The region should increasingly utilise the "visiting doctor" model to increase the amount of interaction and number of meetings that focus on different challenges.

Agile innovations require open testing environments as well as laboratory infrastructures and equipment. The more extensive utilisation of public research infrastructures requires functional collaborative models for companies and various organisations. The region's testing and laboratory environments are located in e.g. the University of Eastern Finland, Karelia University of Applied Sciences, the

Geological Survey of Finland (GTK) and the North Karelia Municipal Education and Training Consortium. The marketing of equipment infrastructure environments to companies and the commercialisation, marketing and sales of any related expertise require provincial collaboration. In addition, an easily accessible, low-threshold operating model that is aimed towards companies should be formed. Demonstrations usually require very specific equipment, of which only a few may be available in the entire country. It is thus essential to ensure that the region's platforms and research infrastructure are connected to other expertise clusters, both nationally and internationally. In the high tech sector, a certain type of testing environment or research infrastructure can present an attractiveness and competitiveness factor for new business in the region.

Electronic materials form a new type of testing platform and innovation environment. For example, the forest resource inventory carried out by the Finnish Forest Centre and the Natural Resources Institute Finland enable the utilisation of forest-related information in digital applications and services. The utilisation of digitalisation in innovation activities should be tested more extensively in conjunction with e.g. the scientific work of universities, by using the industrial hackathon model for instance.



## The public sector as a platform for experimentation and growth

As the populace increasingly migrates towards urban regions and centres, these more densely populated urban environments can provide a new kind of experimentation and growth platform for new innovations and business. With reference targets and various pilots, businesses can achieve a competitive advantage and test new solutions. In Joensuu, these kinds of opportunities are related to e.g. the development of a symmetrical city centre and the Green Park business area. The City of Joensuu is implementing city growth agreement with partners to promote these objectives.

Many public buildings that are owned by cities and municipalities, such as schools, libraries and offices, could provide a great deal of opportunities for e.g. piloting energy efficiency solutions or renewable energy technologies. In addition, public sector procurements can be used to develop the marketplace for local actors and make their services more widely known. The data that is collected from urban and residential environments as well as their users and making this data available to the public would promote the implementation of new kinds of experiments.

In connection with learning environments, a very strong forum that combines educational pedagogy, educational technology and educational exports is being formed in Joensuu. The volume of teacher training and the number of teacher training experts at the University of Eastern Finland are expected to grow at a strong pace during the near future. At the same time, educational technology companies and educational exports are being strengthened. The gamification of learning environments and learning is a global trend that should also involve the ICT and game development expertise that can be found in the region.

Wooden, energy-efficient multi-story apartment building in Joensuu  
(Photo: Sari Kaija)



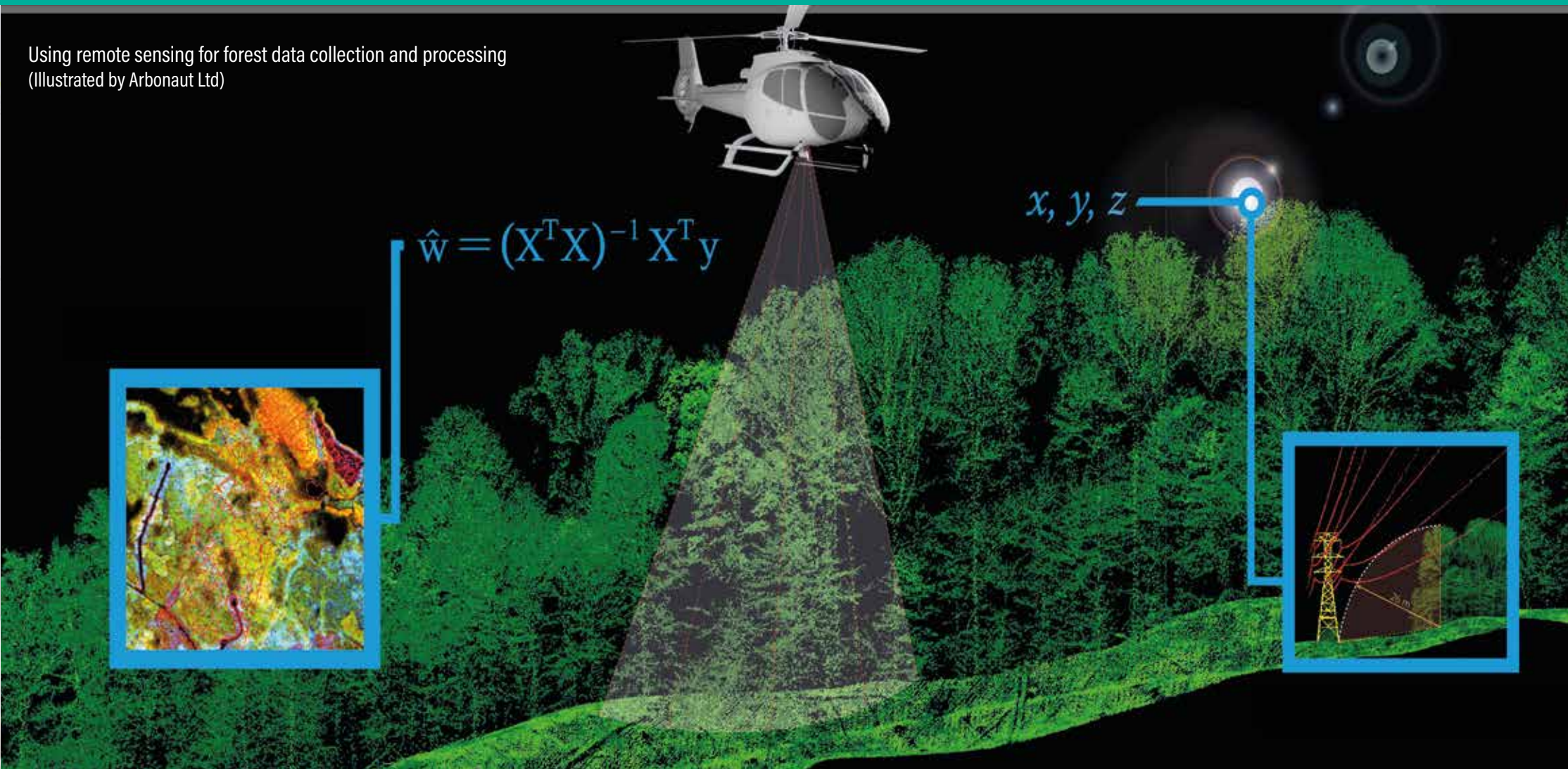
## Networks and partnerships for top expertise

RDI activities are conducted through networks, various partnerships and collaborative networks. The key factors for the implementation of smart specialisation include networks and partnerships that support the region's top-level expertise. These networks and partnerships should act on both the national and international level. The RDI activities should also include contractual collaborative initiatives and in-

volvement in strategically significant alliances. On the EU level, the S3 platform for smart specialisation helps gather and connect different regions and their expertise. For North Karelia, this activity provides the opportunity for utilising the EU's direct funding instruments and being involved with top-level collaborative consortiums.

Operating through innovation and ecosystem models will challenge the region to develop a comprehensive and novel type of PPP collaboration model. North Karelia should become even more involved in national pilot projects. Participation in Business Finland innovation and internationalisation projects and the preparation work for the programmes that will implement these represent key national channels.

Using remote sensing for forest data collection and processing  
(Illustrated by Arbonaut Ltd)





# The implementation of and objectives for smart specialisation

The implementation of the key and thematic areas of smart specialisation will involve both private and public sector activities. The innovation activities, growth and renewal capacity, as well as internationalisation of companies will be supported with different business funding instruments. The public sector's corporately-oriented RDI activities could be implemented with the help of e.g. the EU's structural funds and separate funding or through the Business Finland or national programmes. Since innovation activities occur in increasingly diverse networks, the available resources and funding instruments must act in a complementary manner so that adequately diverse and impactful entities can be formed around key expertise areas.

The implementation of North Karelia's smart specialisation aims for collaboration and concrete activities between the region's business sector and public actors, through which the businesses in the region will have the opportunity to develop themselves and utilise the region's expertise and networks to their fullest extent. The most essential goals include the development of sales and exports in key

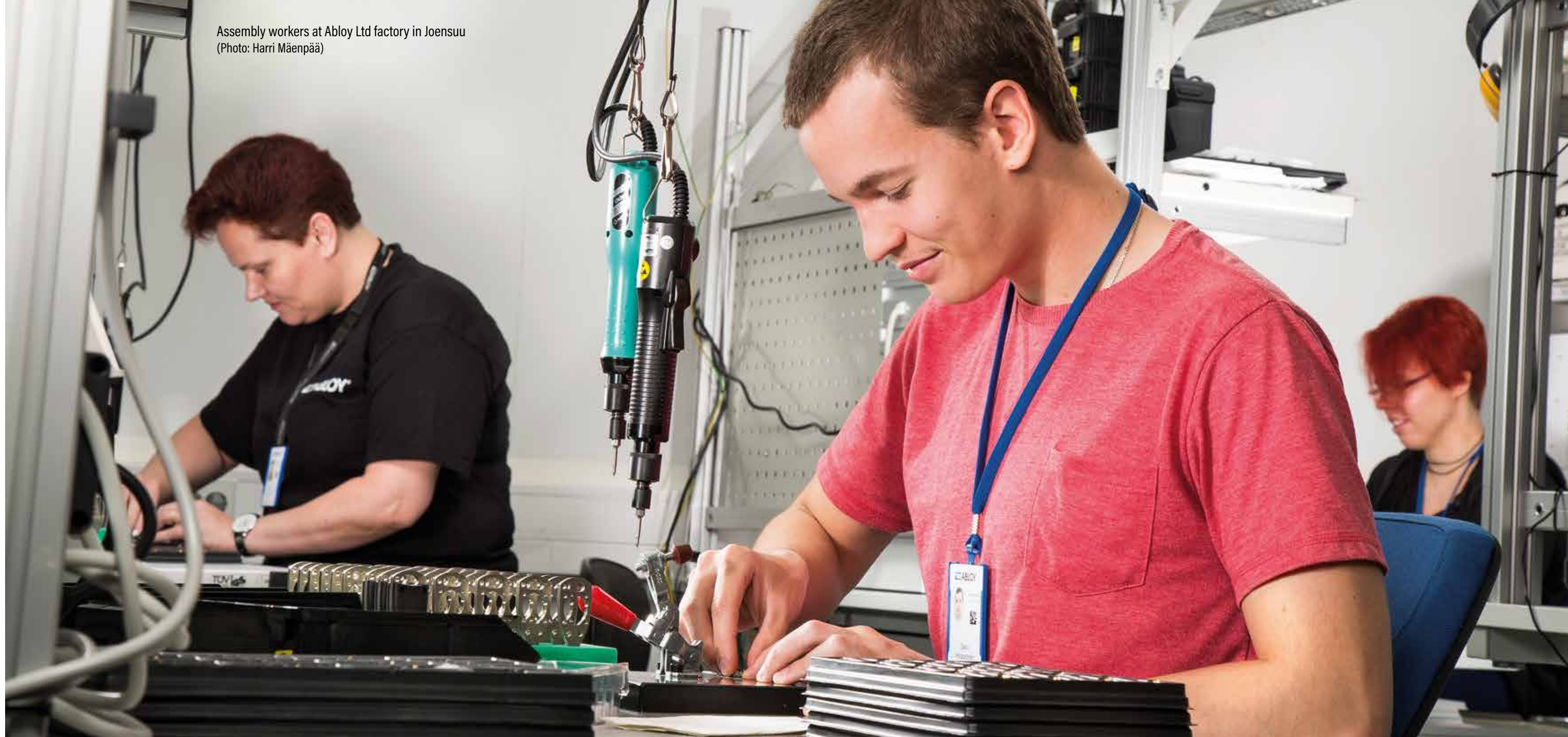
areas, as well as the creation of new, expertise-based business activities. These measures must be able to systematically activate companies to participate in RDI activities and create a common goal and operating models that the business sector can commit itself to.

Some indicators for smart specialisation delivery in the region are as follows:

- Turnover and exports of companies
- Knowledge-intensive new business generation
- Amount of external RDI funding
- RDI intensity in the region
- Amount of public pilot platforms and references

The significance and status of public actors (e.g. research and educational organisations) as the key players for RDI activities must be strengthened. It is crucial for the region that high-quality research activities and international networks that are significant for the business sector can be made available for companies as well. The common goal should be a dynamic, entrepreneurially-oriented ecosystem that supports growth and new ideas.

Assembly workers at Abloy Ltd factory in Joensuu  
(Photo: Harri Mäenpää)







REGIONAL COUNCIL OF  
**North Karelia**

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