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Clusters meet Regions event “A sustainable approach to raw materials” – the case of East and North Finland

Input paper

An initiative of the European Union





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Executive Summary

The following paper presents observations on the cluster landscape of East and North Finland and outlines some key considerations for the future development of the region. These considerations may pose some open strategic questions, that can be addressed in the workshops of the “Clusters meets Regions” event. The following key takeaways are summarised below:

Context: Economic profile of East & North Finland

- The **economic structure** of the East & North region of Finland is characterised by industries that have historically focused on forestry & mining. Yet in recent years, the service sector has experienced significant growth, becoming an increasingly important player in the region’s overall economic landscape. Particularly the industrial ecosystems “Health” and “Electronics” show a high degree of specialization.
- The 2021 **Regional Innovation Scoreboard** classifies East & North Finland as a “Strong Innovator +”. This is demonstrated by exceptional performances in several categories including “R&D expenditures public and business sector”, “Innovations expenditures per person employed”, and “PCT applications”. This underlines the region’s strong competencies in research and science-driven development, coupled with the commitment to efficiently transfer knowledge and expertise to the private sector.
- East & North Finland performs above the EU average in the **Regional Competitiveness Index** which can be linked to a particularly good rating in dimensions related to Institutions, education and innovation.

Clusters in East & North Finland and their importance for regional economic development

- East & North Finland reports the highest absolute number of cluster organisations registered on the ECCP of all regions in Finland. Its **21 registered cluster organisations** cover 9 out of 14 EU Industrial Ecosystems.
- The **raw materials** sector is crucial for the region’s economic development. Many cluster organisations are engaged in providing assistance to lead the transition to a circular economy and digitalisation.
- Clusters are supported by well-established but continuously evolving **cluster policies** at the national level, as well as new programmes at the regional level.

Cross-border cooperation and the involvement of East & North Finnish clusters in European networks and support initiatives

- In the **2014-2020 funding period**, three cluster organisations from East & North Finland participated in the **three ESCP-4i projects** REINA PLUS, PIMAP Partnership and PIMAP PLUS with partners coming from 7 countries. Target markets were Mexico, Brazil, Colombia, Chile, North America, North Africa, China and Japan. The thematic focus of the partnerships was on photonics & (renewable) energy businesses covering different value chains.
- One cluster organisation was involved in the two **INNOSUP-1 projects** MINE.THE.GAP and DigiCirc focusing on (raw) materials, new digital technologies to better track their location and quality as well as the reinforcement of existing value chains in the raw materials and mining sector.
- In the **current 2021-2027 funding period**, two cluster organisations from the region are involved in two **Euroclusters**. While the Eurocluster CirclnWater focuses on smart solutions for industries regarding water shortages, the Eurocluster PIMAP4SUSTAINABILITY is cooperating on the application of technologies such as photonics, advanced manufacturing and advanced materials to support European SMEs in the field of metalworking and aerospace.

Smart Specialisation in East and North Finland

- A total of 35 priority areas have been identified in the Smart Specialisation Strategies (S3) of the **7 underlying regions** of East and North Finland, covering a wide range of topics (including raw materials).
- The joint **S3 2019-2023** of East & North Finland defines overarching priority areas for East & North Finland, some of which are also directly related to the topic of “raw materials”. Cluster organisations in East & North Finland contribute to all overarching priority areas of the joint S3 2019-2023. The importance of priority areas related to the Green and Digital Transition for cluster organisations stands out.



01

Context: Economic profile of East and North Finland



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1. Context: Economic profile of East and North Finland

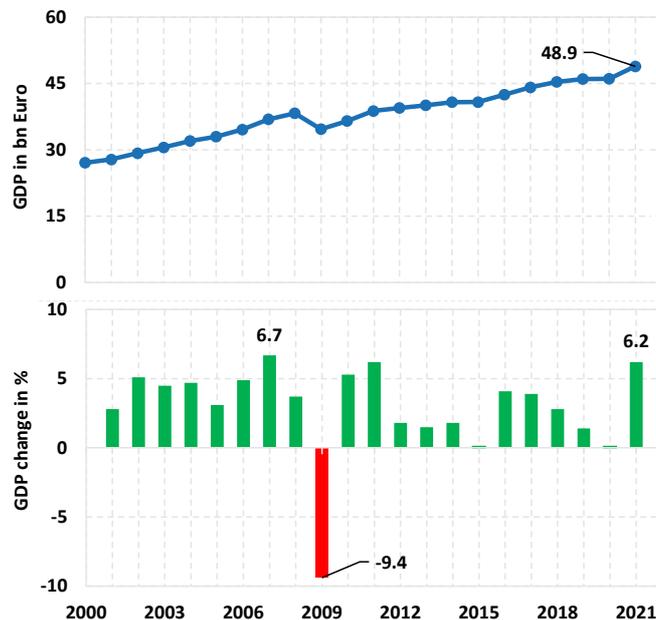
This section will provide a short context about the socio-economic profile of East and North Finland.

Macroeconomic profile of East and North Finland

The region of East and North Finland (traditionally named *Pohjois-ja Itä-Suomi*) is considered one of the largest regions of Finland in terms of size, as it encompasses the provinces of Etelä-Savo, Pohjois-Savo, North Karelia, Kainuu, Central and Northern Ostrobothnia, and Lapland. Accounting for a population of 1.27 million people¹ as of 2022 and covering an area of 227,120 km², thus making up 67%² of the entire land, East and North Finland is further known for its traditional industry in forestry and mining.

The figure below (Figure 1), displays a steady increase in the **economic capacity** of East and North Finland over the past two decades, with the GDP at current market prices peaking at €48.9 billion in 2021³. The region has been largely resilient to crisis, apart from the global financial crisis which caused a significant economic downturn of -9.4% in annual GDP change in 2009. Despite the COVID-19 pandemic causing widespread disruption of economies in the world, East and North Finland remained relatively stable with only a drop to 0.1% growth in the year 2020.

Figure 1: East and North Finland GDP 2000-2021 (in billion Euro)



Source: ECCP (2023), own elaboration based on Eurostat.

¹ Eurostat (2023): Population on 1 January by age, sex and NUTS 2 region. Available under:

https://ec.europa.eu/eurostat/databrowser/view/REG_AREA3/default/table?lang=en&category=reg (last accessed 09.03.2023).

² Eurostat (2023): Area by NUTS3 region. Available under:

https://ec.europa.eu/eurostat/databrowser/view/demo_r_d2jan/default/table?lang=en (last accessed 09.03.2023).

³ Eurostat (2023): Gross domestic product (GDP) at current market prices by NUTS 2 regions. Available under:

https://ec.europa.eu/eurostat/databrowser/view/NAMA_10R_2GDP/default/table?lang=en&category=na10.nama10.nama10reg.nama_10r_gdp (last accessed 21.03.2023).



According to the 2021 Regional Innovation Scoreboard, the GDP per capita output of East and North Finland was recorded at €28,000, which is lower than both the national (€34,700) and EU (€31,200) averages⁴. However, the region exhibits a greater per capita growth rate (3.7%) compared to the national (3.3%) and EU (3.2%) averages. Despite this upward trend, the overall lower account of GDP per capita can be attributed to various factors such as lower population density, smaller labour force, aging population or limited access to markets, all of which can present challenges to economic activity. In contrast, the Helsinki-Uusimaa region exhibits a higher GDP (€98 billion)⁵ and GDP per capita of €45,000, due in part to its population of 1.7 million and higher population density. It is also located in the southern part of Finland, which allows for closer geographical proximity to European markets.

East and North Finland's sector specialisations and employment levels

When discussing the economic characteristics of East and North Finland, it is crucial to examine how these factors are demonstrated in the distribution of industries and the number of people employed in them. The Regional Innovation Scoreboard report of 2021 indicates that the service industry is leading in terms of employment in the region, with 66.1% of the workforce employed in this sector. In comparison, the Manufacturing industry employees compose only 12.4% of the workforce, while the Utilities and Construction (9%) as well as the Agriculture and Mining (7.8%) sectors account for much smaller shares of employment in East and North Finland. Nevertheless, it is worth noting that the Agriculture and Mining sector performs well, surpassing national and EU averages, emphasising its vital role in contributing to the East and North Finland economy. This can also be linked to other research that emphasises the availability of various raw materials in Finland, especially in East and North Finland.⁶

The graph on the left in the following Figure 2 presents data pertaining to the ten most prominent sectors in East and North Finland in terms of **employment**. It highlights the significance of the services sector, with "Human health activities", "Education", "Social work activities without accommodation", "Retail trade, except of motor vehicles and motorcycles" and "Public Administration and defence; compulsory social security" among the most represented sectors by the number of persons employed (See Figure 2).

To analyse the **specialisation** in the region, this paper looks at the regions regionally relevant specialisation nodes.⁷ As part of its Industrial Strategy (March 2020), the European Commission has selected 14 industrial ecosystems that are particularly relevant in Europe and encompass all players operating in a value chain.⁸ The classification of the 14 industrial ecosystems have been calculated by aggregating NACE 2-digit activities,

⁴, ⁵ Regional Innovation Scoreboard (2023): Pohjois- ja Itä-Suomi (F11D). Available under: <https://ec.europa.eu/docsroom/documents/46012> (last accessed 10.03.2023).

⁶ see <https://www.europe-geology.eu/scientific-themes/mineral-resources/mineral-resources-map/critical-raw-materials-map/> and <https://esdac.jrc.ec.europa.eu/content/map-indicating-availability-raw-material-soils-european-union-organic-soil-material-b-soil>

⁷ Specialisation can be measured through Location Quotients (LQ) that reflect the relative specialisation of an activity in a region compared to the EU average. If the LQ for a given activity-region combination is above 1.5, it is considered a specialisation node and if the activity accounts for at least 1 % of total employment in the region, it is considered regionally relevant.

⁸ see here for more information <https://clustercollaboration.eu/in-focus/industrial-ecosystems> (last access 19.04.2023).



following the methodology established by the European Commission.⁹ North & East Finland exhibits eight regionally relevant sectoral nodes and two regionally relevant ecosystem nodes. Notably, the industrial ecosystems "Health" and "Electronics" display a distinct specialisation. The "Health" industrial ecosystem employs 21% of the region's employment across all ecosystems, thus surpassing both the Finnish average of 19% and the EU27 average of 13% (see Figure 18 in the Annex). This specialisation is further evident in the sectoral nodes "Human health activities," "Residential care activities," and "Social work activities without accommodation" which are key sectors for the industrial ecosystem "Health". Similarly, the sectoral node "Manufacture of electronic & optical products" and the ecosystem node "Electronics" signify a specialised industry that centers on electronics. This specialisation is likely due to the sector's high employment share of 1.6% across all industrial ecosystems, compared to the Finnish average of 1.3% and the EU average of 0.9%. The region's reliance on traditional industries such as forestry is also evident, with regionally significant nodes in sectors like "Forestry & logging" and "Manufacture of wood forestry".

Figure 2: Top 10 sectors for employment (left) and gross value added (right) in East and North Finland (in 2020)



Source: ECCP (2023), own elaboration based on Eurostat.

The graph presented on the right in Figure 2 illustrates the top ten sectors in East and North Finland that have made the most significant contribution to **value added** at basic prices in 2020. Notably, the sector of "Real estate activities" stands out as the most prominent, accounting for a value of €5.4 billion. This is followed by sectors such as "Public administration and defence; compulsory social security" and "Education", accounting for €2.7 billion and €2.5 billion, respectively. As demonstrated in the prior graph, said sectors appear in the top ten sectors by employment and therefore underscore their importance to the economy of East and North Finland. The sector of "Forestry and logging" is positioned as the fifth highest contributor to value added at basic prices, having accounted for €1.8 billion. This underscores the aforementioned geo-economic importance of the traditional industry of forestry in the region. It is further noteworthy to mention that the sector of "Specialised construction

⁹ see European Commission (2021): Annual Single Market Report, SWD (2021), available online https://commission.europa.eu/system/files/2021-05/swd-annual-single-market-report-2021_en.pdf (last access 19.04.2023)



activities” is positioned as the sixth highest contributor to value added at basic prices, having accounted for a total of €1.6 billion. This observation is consistent with the statistical data available on employment figures, thus emphasising the significance of the “Utilities & Construction” sector in the overall economy of East and North Finland.

The analysis suggests that the sectoral composition in the economy of East and North Finland presents an array of prospects that can be leveraged to bolster regional growth through the support of economic and cluster structures. Said growth can be fostered through cross-border collaboration, in which clusters assume a pivotal role. Notably, sectors such as “Forestry and logging” as well as “Specialised construction activities” are well-aligned with the East and North Finland S3 strategy of 2019-2023, which prioritises key areas such as “Sustainable Mining” and “Industrial Circular Economy”. The fourth chapter of this paper will examine the alignment between the various specialisations of the economic sectors, the cluster networks, and cross-border initiatives in East and North Finland.

Regional innovation level of East and North Finland

This paper aims to examine the economic performance of the East and North Finland region with a specific focus on clusters and how these are organised. To complement this chapter on the region’s economic profile, the Regional Innovation Scoreboard (RIS) provides an avenue for assessing its level of innovativeness. The RIS framework is structured into the following four categories: “Framework Conditions”, “Investments”, “Innovation Activities” and “Impacts”¹⁰.

The East and North Finland region is classified as a “**Strong Innovator +**”¹¹, with an impressive 18% increase in innovation performance from 2014 to 2021. This is a noteworthy observation that underscores the significance of the region’s innovation capabilities. Figure 3 presents a radar graph highlighting the strengths of the region relative to Finland and the EU. Notably, East and North Finland demonstrates proficiency in research and science-driven development, as evidenced by an above-average EU score in “International scientific co-publications” and “Public-private co-publications”. Other areas, such as “R&D expenditures public and business sector”, “Innovations expenditures per person employed”, and “PCT applications” also stand out with high innovation scores. This is supported by the cohesion policy report of 2022 on the Northernmost Regions of the European Union. According to the report, the region of North Ostrobothnia and its capital city have accounted for 11% of overall R&D expenditures in Finland, positioning the region as the second most significant Finish hub for R&D after Helsinki¹². These findings potentially suggest that East and North Finland support research in institutions whilst prioritising the successful transfer of knowledge and expertise to the private sector, ultimately driving innovation and economic growth¹³.

¹⁰ European Commission (2021): Regional Innovation Scoreboard 2021 – Methodology report. Available under: <https://ec.europa.eu/docsroom/documents/46012> (last accessed: 13.03.2023).

¹¹ “Strong Innovator +” implies that the region is found between 125% and 150% of the EU average of “innovators”.

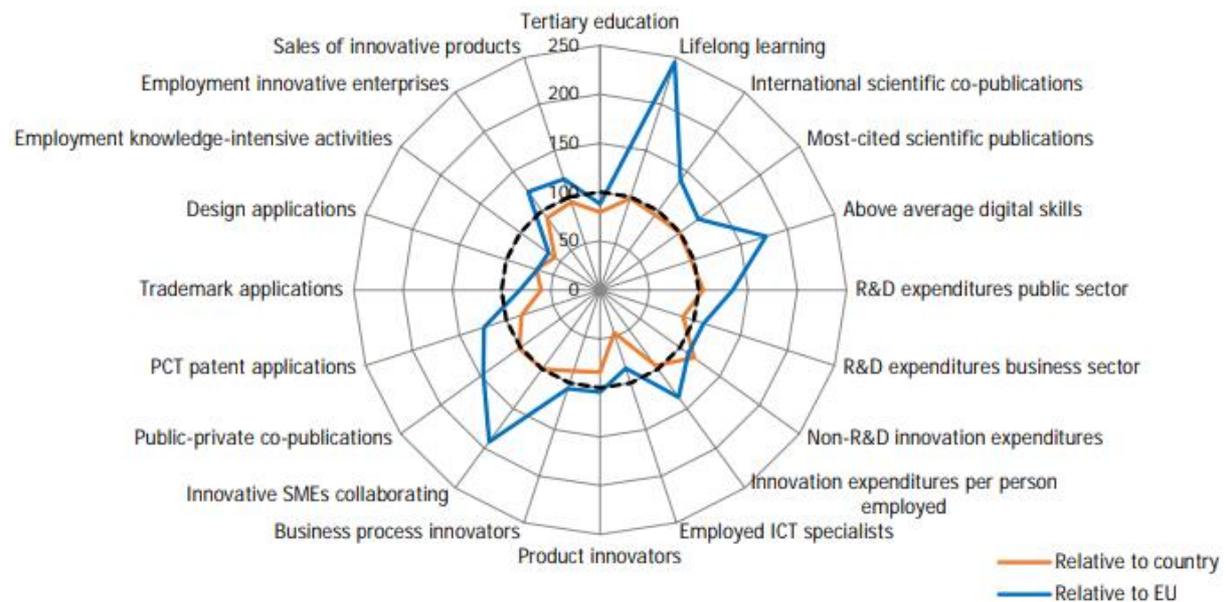
¹² European Parliament (2022): Cohesion Policy in Northernmost Regions of the EU: North Sweden, North & East Finland. Available under: [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/699657/IPOL_STU\(2022\)699657_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/699657/IPOL_STU(2022)699657_EN.pdf) (last accessed: 14.03.2023).

¹³ Hunady, J. & Pisar, P. (2021): Innovation and invention in the EU business sector: the role of the research and development expenditures. Available under: <https://www.indecs.eu/2021/indecs2021-pp168-188.pdf> (last accessed 13.03.2023).



Meanwhile, a high level of innovativeness can be seen in “Innovative SMEs collaborating” and “Employment in innovative enterprises”, respectively. This is potentially indicative of a thriving business environment, as high a high degree of employment in innovative enterprises collaboration can lead to the development of new products and services, increased productivity and improved competitiveness.

Figure 3: Innovation performance of East and North Finland in the Regional Innovation Scoreboard (2021)



Source: European Commission (2021): [Regional Innovation Scoreboard 2021: Finland](#)¹⁴

On a broader scale, it is interesting that East and North Finland’s performances across nearly many categories falls at or below the national average, with exception of “Non-R&D expenditures per person employed”. While the region’s strengths in science-driven development are not as evident in the national context, it is important to point to challenges faced in other areas, for example with indicators pertaining to “Employed ICT specialists” and “Employment knowledge-intensive activities” which are both scoring below the national and EU averages. Low scores in these categories could indicate that East and North Finland is faced with the challenge in attracting and retaining highly skilled workers, which can limit the region’s potential in participating in the knowledge-based economy in the future. To address this challenge, targeted policies and strategies could be developed to foster knowledge-based economic activities, invest in education and training programmes, and create an environment that is attractive to highly skilled workers and businesses.

Regional competitiveness level of East and North Finland

To conclude this chapter on the region’s economic profile, the ranking of East and North Finland in the **Regional Competitiveness Index**¹⁵ is examined. The Regional Competitiveness Index measures key aspects of competitiveness among regions across the EU in three dimensions: a Basic Sub-Index, an Efficiency Sub-Index and an Innovation Sub-Index.

¹⁵ https://ec.europa.eu/regional_policy/assets/regional-competitiveness/index.html#/FI/FI1D (last accessed 12.04.2023)



Figure 17 in the Annex provides an overview of the performance of East and North Finland in the different dimensions and indicators of the Regional Competitiveness Index. Overall, East and North Finland performs slightly above the EU average and ranks 86th out of all 234 regions assessed in the Regional Competitiveness Index. Thereby, East and North Finland displays an above average ranking in the Basic Sub-Index as well as the Innovation Sub-Index. In the Basic Sub-Index, especially the indicator for institutions in the region outperforms the EU average. For the Innovation Sub-Index, all underlying indicators for East and North Finland are above the EU average. In particular, the indicators for technological readiness and business sophistication in East and North Finland are rated well above the EU average. The good performance of East and North Finland in the Innovation Sub-Index of the Regional Competitiveness Index is in line with the previously outlined rating of the region in the Regional Innovation Scoreboard.



02

**Clusters in East and North
Finland and their
importance for regional
economic development**



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2. Clusters in East and North Finland and their importance for regional economic development

The involvement of clusters in regional economic governance, policy design and implementation at the regional level is of central importance for regional economic development. This chapter will provide an overview of the cluster landscape in East and North Finland and the policy framework under which cluster organisations are operating in the region.

Clusters in East and North Finland

The European Cluster Collaboration Platform serves as a one-stop-shop for cluster organisations at the European level. Therefore, the number of registered cluster organisations and other innovation actors in East and North Finland on the ECCP gives the first impression of the intensity of organisation in regional industrial networks.

Figure 4 below displays the geographical distribution of the cluster organisations in the region. **Out of the total 1,094 registered EU-27 cluster organisations on the ECCP, there are 34 Finnish ones, of which 21 are located in East and North Finland.** Broken down to the subregions, Lapland and Northern Ostrobothnia both host six cluster organisations, mostly centred on the regional capital cities of Rovaniemi and Oulu. Next, North Savo shows five cluster organisations, centred again at the administrative seat of Kuopio. Two cluster organisations each are localised in North Karelia and South Savo, while Central Ostrobothnia and Kainuu have no registered cluster organisations. **Finnish authorities list a total of 46 cluster organisations** for the regions of East and North Finland.¹⁶ The full list of cluster organisations in East and North Finland can be consulted in the Annex.

Looking at the ECCP-registered cluster organisations from a comparative perspective, the region of East and North Finland shows a **relatively high number of cluster organisations** registered on the platform compared with other Finnish and European regions. Against the 21 cluster organisations there, West Finland shows five, South Finland four and the capital region of Helsinki-Uusimaa equally four cluster organisations.

Looking at the **sectoral focus**, the cluster landscape of East and North Finland has been organised around **five thematic areas**:¹⁷

1. Forest Bioeconomy
2. Industrial Circular Economy
3. Water Technology
4. Agrifood
5. Digital Solutions & ICT (Cross-cutting services)

Cluster organisations from East and North Finland registered on the ECCP cover **9 out of 14 EU Industrial Ecosystems**. Most prevalent are Renewable Energy (6), Agri-food (5) and Energy Intensive Industries (4). The latter comprises in particular the industries active in the extraction and processing of natural resources. Some cluster organisations, especially those in the notable area of Water Technology, can cover more than one

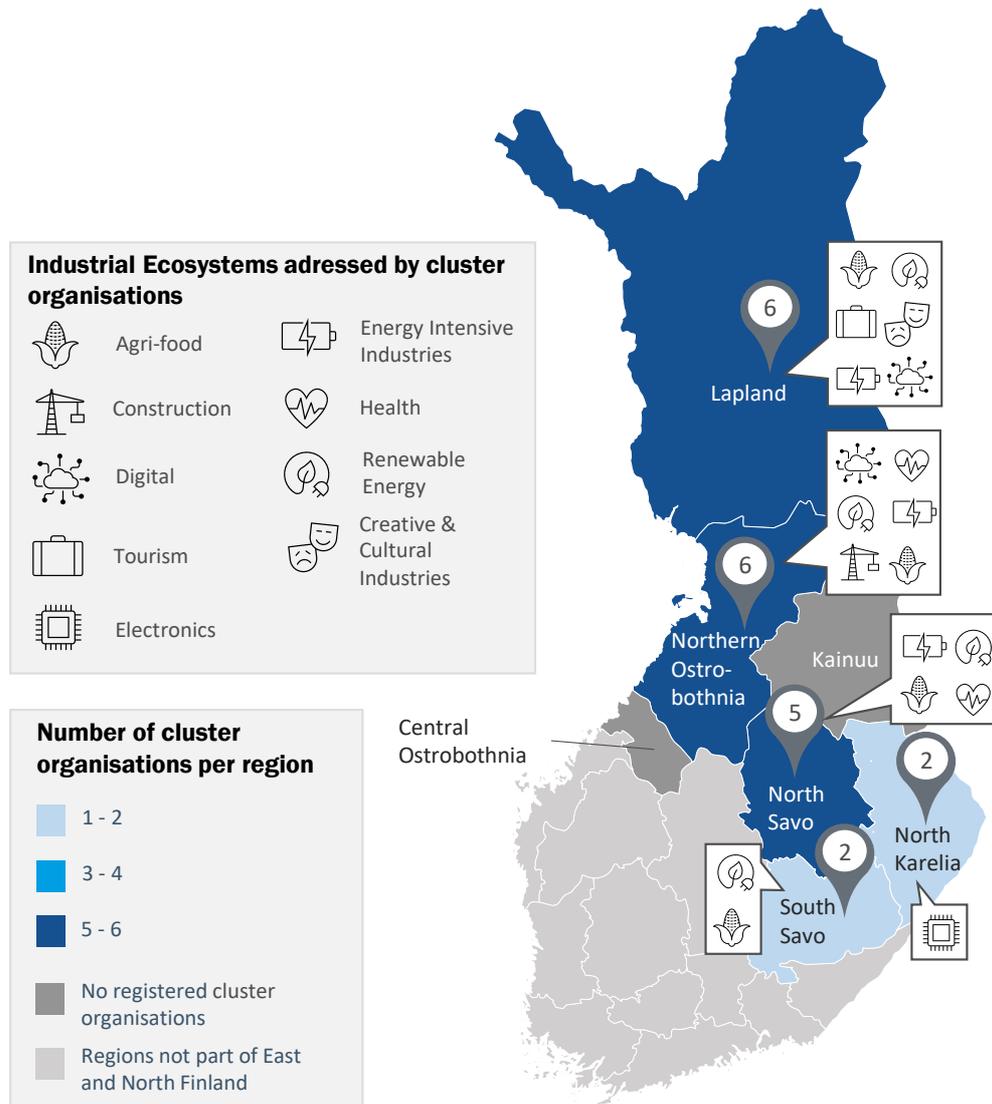
¹⁶ Based on data provided by ELMO and local cluster managing organisations.

¹⁷ See <https://elmoenf.eu/2021/03/04/reinforcing-cluster-collaboration-in-east-and-north-finland/> (last access 02.03.2023).



ecosystem. A list of all cluster organisations from East and North Finland, including those not registered on ECCP, and their Industrial Ecosystems can be consulted in Table 2 in the Annex.

Figure 4: Overview of ECCP-registered cluster organisations as well as regional and sectoral distribution of active cluster organisations in East and North Finland



Source: ECCP (2023). Own elaboration based on <https://reporting.clustercollaboration.eu/all> (last access 02.03.2023). A full overview of the East and North Finnish clusters is provided in Table 2 in the Annex.

The **raw materials sector** is of central importance for East and North Finland.¹⁸ Metal extraction and refining, metal products and wood processing make up more than half of the regions industrial turnover and about a third of the cluster organisations in the region which are registered on the ECCP are linked to the sector. Historically, mining and forestry were leading sectors of the Finnish economy. As such, they were also one of the first sectors to get organised through a deliberate cluster policy with the aim of intensifying collaboration and innovation, in

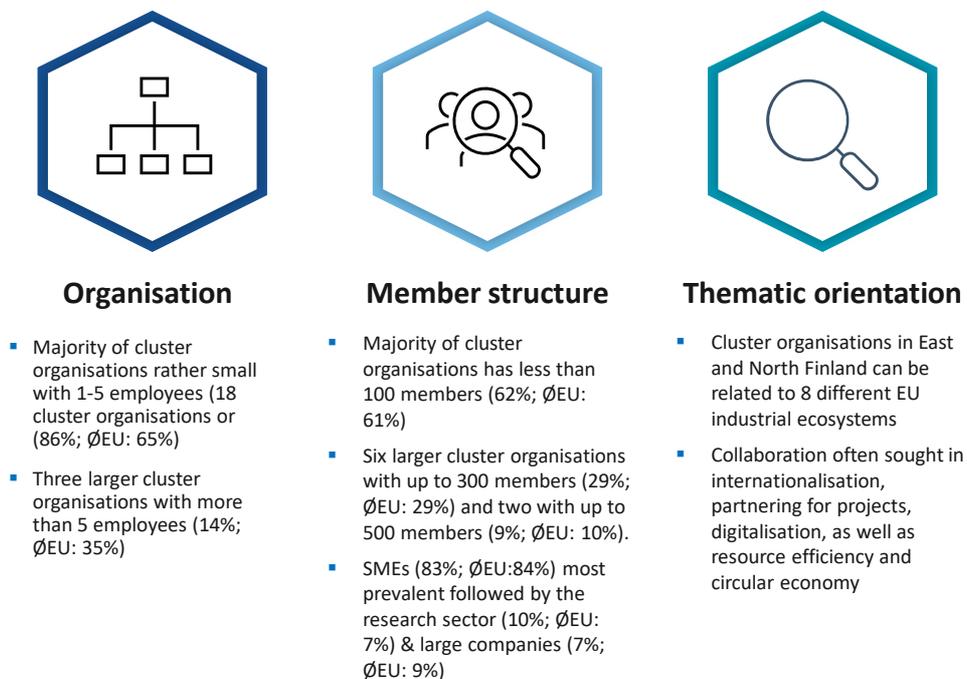
¹⁸ See <https://elmoenf.eu/smart-east-and-north-finland/> (last access 27.03.2023).



order to maximise spill-overs and become global leaders in specialised niche markets.¹⁹ The raw materials sector is important not only because of the extraction and processing of resources itself, but also because of the technical and industrial solutions developed in Finland and exported worldwide. **A crucial topic, where cluster organisations from East and North Finland are positioning themselves as leaders today, is how to make the transition towards sustainable resource extraction integrated into a broader concept of the circular economy.** Closely linked to the topic of sustainable and circular resource extraction is the cluster cooperation for water management and mining in East and North Finland.²⁰

A second topic is the **digitalisation** of resource extraction and refinement industries connected with Industry 4.0 developments. Cluster organisations foster the institutional environment for Finnish companies to position their solutions in the world market.

Figure 5: Overview of organisation, structure, and thematic orientation of ECCP-registered cluster organisations in East and North Finland



Source: ECCP (2023). Own elaboration based on ECCP data.

As shown in Figure 5, cluster organisations in East and North Finland are **mostly small in size**. Regarding their **number of employees**, there are much more cluster organisations with maximal five employees than it is the EU average. With regard to their **number of members**, however, the East and North Finnish cluster organisations are almost precisely at the EU average with eighteen (62%, ØEU: 61%) of them with up to 100 members, six (29%; ØEU: 29%) with up to 300 members, and two (9%; ØEU: 10%) with up to 500 members.

¹⁹ OECD (2017): Local Content Policies In Minerals-Exporting Countries: The Case of Finland. Trade Policy Note, December 2017. Available at: <https://www.oecd.org/trade/topics/trade-in-raw-materials/documents/trade-raw-materials-finland-country-note.pdf> (last access 15.03.2023).

²⁰ See <https://elmoenf.eu/2021/03/04/reinforcing-cluster-collaboration-in-east-and-north-finland/> (last access 13.04.2023).



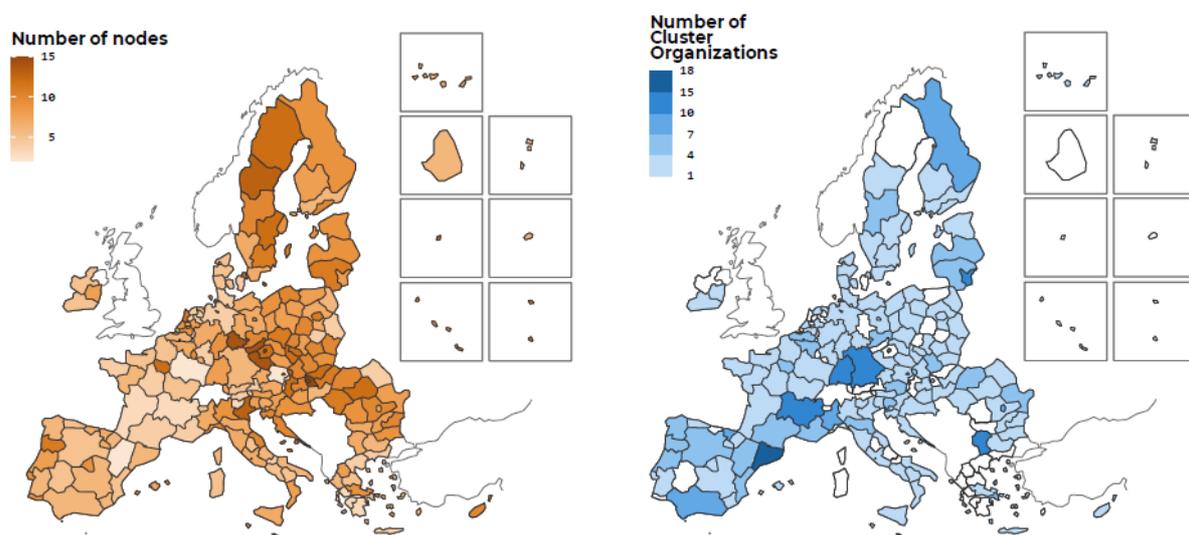
Looking at their **membership composition**, in line with the EU average a large majority of members consist of SMEs (83%; ØEU:84%). There is, however, a **significantly higher share of research organisations** among the membership of East and North Finnish cluster than the EU average (10%; ØEU: 7%). On the other hand, the share of large companies is well below the EU average (7%; ØEU: 9%).

Cluster organisations from East and North Finland **seek collaboration** primarily in the areas of internationalisation, partnering for projects, digitalisation, as well as resource efficiency and circular economy. Moreover, two cluster organisations have been awarded with the Silver **Label of Cluster Excellence**, four with the Bronze Label.

The importance of clusters for regional economic competitiveness

The European Cluster Panorama Report (2021) examines the relationship between clusters and regional competitiveness. The stand-out findings of this report showcase how **the presence of cluster organisations is positively correlated with economic indicators such as GDP per capita, labour productivity, as well as business R&D expenditure**. While public R&D expenditure is merely positively correlated with industry-relevant nodes²¹, it does indicate how regions could earn greater public support, when certain industries have a local significance. Particularly indicators of R&D expenditures are key in measuring economic performance concerning innovation. Figure 6 as seen below, one can see how industries in East and North Finland form a slightly above-average number of region-relevant specialisation nodes²², but a clearly above-average number of cluster organisations, in comparison to other European regions.

Figure 6: Distribution of region-relevant sector specialisation nodes and cluster organisations in EU-27



Source: European Cluster Panorama (2021).

²¹ From the European Cluster Panorama Report (2021): Industry-relevant specialisation nodes: When the region is specialised in the sector (or industrial ecosystem) and regional employment in the sector is relevant in the EU context (industry employment share > 1%).

²² From the European Cluster Panorama Report (2021): Region-relevant specialisation nodes: When the region is specialised in the sector and the employment share of that sector is relevant for the region (regional employment share > 1%).



Next to clusters having an enabling and facilitating effect on economic performance and growth, other studies have provided complementary information on the impact clusters can have. For example, Ketels & Protsiv (2021)²³ provide a thorough account of the positive relationship between cluster presence and industry-level wages across European regions. Key takeaways emphasise how particular clusters relate to sector-specific industries, as opposed to the mere “concentration of economic activity in a specific field” (p. 217). On top of that, the data showcases how the influence and strength of clusters have an independent relationship with economic outcomes. Their findings suggest how the degree and nature of competitiveness within clusters must be understood on a location-to-location basis. This further reflects on what they refer to as the “business environment quality” that can have striking knock-on effects on wage levels. Most importantly, Ketels & Protsiv delineate how **“cluster strength” has a significant impact on “wages and prosperity”**.

A visual depiction that highlights this trend can be seen in Figure 18 in the Annex. In the context of East and North Finland, the statistical data and analysis of Ketels and Protsiv show a high cluster portfolio strength (share of payroll accounted for by strong clusters) but a weak cluster mix (bias towards cluster categories with higher wages). Put differently, clusters play an important role in East and North Finland’s economy but they are most prevalent in activities that on an EU-wide base are associated with lower wages, i.e., in our case activities in the raw materials sector like forestry and mining. Here, an important role for clusters is to organise the value chain in a way as to generate high added value with quality products within the region.²⁴

Cluster policy at national and regional level

The remainder of this chapter will, first, look at the policy context for cluster development at the national as well as the regional and local level and evaluate the success of cluster policy in strengthening regional economic development.

Finland’s national policies supporting cluster development

Finnish cluster policy at the national level has been present for a long time as Finland developed its own approach towards cluster development. Beginning in the 1990s, Finland’s industrial policy was rearranged around the concepts of both national innovation systems and clusters.²⁵ Already then clusters were conceived at a national level, emphasising the transregional networks of large and small companies, research institutions and public bodies often organised around export-oriented large corporations.²⁶

²³ Ketels, C. & Protsiv, S. (2021): Cluster presence and economic performance: a new look based on European data, *Regional Studies*, 55:2, 208-220, DOI: 10.1080/00343404.2020.1792435. Available at: <https://www.tandfonline.com/doi/full/10.1080/00343404.2020.1792435> (last access 06.03.2023).

²⁴ See, e.g., Gereffi, G. (2019): Economic upgrading in global value chains, chapter 14 in: Ponte, S.; Gereffi, G.; Raj-Reichert, G.: *Handbook on Global Value Chains*, Edward Elgar Publishing. Available at: https://www.researchgate.net/profile/Gary-Gereffi/publication/337023562_Economic_upgrading_in_global_value_chains/links/5dc166d34585151435e9c636/Economic-upgrading-in-global-value-chains.pdf (last access 09.03.2023).

²⁵ Romanainen, J. (2001): The cluster approach in Finnish technology policy. In: *Innovative Clusters: Drivers of National Innovation Systems*, 377-388, Paris, OECD.

²⁶ Rouvinen, P. & Ylä-Anttila, P. (1999): Finnish cluster studies and new industrial policy making. In: *Boosting Innovation: The Cluster Approach*, 361-376, Paris, OECD.



An **extensive evaluation** conducted by an international expert group in 2009²⁷ showed how, on the one hand, the cluster-related policy approach was highly successful in developing pre-existing and emerging strengths in its two main clusters during the 1990s and 2000s: forestry and ICT. On the other hand, however, it warned of the backsliding of the Finnish innovation system just as it reached its peak success – a warning shared by another international expert report.²⁸ Critical points were the low internationalisation of Finnish companies and companies alike as well as the relatively weak commercialisation, i.e., the transfer from R&D to marketable innovative products.

The double shock of the financial crisis of 2008 and the demise of Nokia as the globally leading mobile phone company soon after led to several years of stagnation and a **rethinking of Finland's approach to innovation policy**. The emerging policy framework has been building on the characteristic Finnish approach but updated it in crucial aspects. Like the clusters around leading export corporations in the 1980s and 1990s, the new **"innovation ecosystems"**²⁹ were to be networks constructed by and around **"platform companies"** which have a globally competitive position in the world market. Unlike the old clusters, however, the ecosystems are now designed to cross-regional and industrial boundaries. In particular, in the **Growth Engines**³⁰ programme,

"[t]he selected companies are expected to construct a globally strong ecosystem around them by mobilising an extensive network of companies of different sizes, including research organisations and public actors, to identify and achieve a common set of concrete business goals."³¹

These enterprise-driven networks are organised around a leading corporation and the mission to find solutions to specific challenges. Funding for these networks is provided through "challenge competitions".³² A second anchor of Finland's current ecosystem-centred cluster policy are **university towns**. The government concludes "ecosystem agreements" with university towns "regarding the strategic allocation of public and private RDI funding to strengthen globally competitive ecosystems".³³ These **urban ecosystems** are further complemented by the national innovation and skills network and together form the Innovative Cities and Communities programme.³⁴

²⁷ Veugelers, R.; Aiginger, K.; Edquist, C.; Breznitz, D.; Murray, G.; Ottaviano, G.; Hyytinen, A.; Kangasharju, A.; Ketokivi, M.; Luukkonen, T.; Maliranta, M.; Maula, M.; Okko, P.; Rouvinen, P.; Sotarauta, M.; Tanayama, T.; Toivanen & O. Ylä-Anttila, P. (2009): Evaluation of the Finnish National Innovation System – Full Report. Helsinki; Taloustieto Oy. Available at: https://www.etla.fi/wp-content/uploads/InnoEvalFi_FULL_Report_28-Oct-2009.pdf (last access 07.03.2023).

²⁸ Sabel, C. & Saxenian, A.-L. (2008): A Fugitive Success: Finland's Economic Future, report 80, Helsinki, Sitra. Available at: <https://www.sitra.fi/app/uploads/2017/02/raportti80-2.pdf> (last access 07.03.2023).

²⁹ Valkokari, K.; Hyytinen, K.; Kutinlahti, P.; Hjelt, Mari (2021): Collaborating for a sustainable future – ecosystem guide. VTT Technical Research Centre of Finland. Available at:

https://publications.vtt.fi/julkaisut/muut/2021/Collaborating_for_a_Sustainable_Future.pdf (last access 06.03.2023).

³⁰ See <https://www.businessfinland.fi/en/for-finnish-customers/services/funding/growth-engines> (last access 07.03.2023).

An overview of all services offered by Business Finland to support ecosystems can be consulted at:

<https://www.businessfinland.fi/en/for-finnish-customers/services/ecosystems> (last access 13.03.2023).

³¹ Sotarauta, M.; Kolehmainen, J.; Laasonen, V. (2022): Innovation Policy in Finland. Tampere University, Sente Working Papers 50/2022, p. 10. Available at: https://www.researchgate.net/profile/Markku-Sotarauta/publication/364789114_Innovation_Policy_in_Finland/links/635a780e8d4484154a3d9ae2/Innovation-Policy-in-Finland.pdf (last access 07.03.2023).

³² See <https://www.businessfinland.fi/en/for-finnish-customers/services/funding/funding-for-leading-companies-and-ecosystems> (last access 07.03.2023).

³³ See <https://tem.fi/en/ecosystem-agreements> (last access 07.03.2023).

³⁴ See <https://tem.fi/en/-/boost-from-eu-funding-for-urban-innovation-agreements-and-area-innovation-networks> (last access 13.03.2023).



Both the Growth Engines and the Ecosystem agreements follow a **new policy rationale**, representing a “shift from the programme to the contractual mode of operations”.³⁵ Together, they aim at constructing strong networks around leading corporations and universities that are transcending industrial or regional boundaries and driven by concrete challenges. From an international perspective, the Finnish innovation and cluster policy approach links up to larger trends, situating itself between challenge- or mission-driven innovation policy and a cluster policy that aims to create “superclusters”³⁶ – here centred on leading companies – that can lead national ecosystems on the global markets. While developing and modernising its policy mix, the **increasing complexity** poses the challenge for Finnish policymakers to align the different policy initiatives across levels of governance according to a coherent strategy.³⁷

The **most recent policy programmes**³⁸ for regional development confirm and continue this path. The **Updated National Roadmap for Research, Development and Innovation (2021)**³⁹ aims to strengthen regional specialisation, the role of cities as innovation development platforms and the construction of internationally networked innovation clusters through instruments such as the aforementioned “ecosystem agreements” between the central government and university towns and cities and other regional funding instruments including EU financial instruments. Implementation is supported through “Centres for Economic Development, Transport and the Environment”⁴⁰ regarding regional development and “Centres of Excellence”⁴¹ regarding scientific research. Furthermore, in the **National Priorities for Regional Development 2020-2023** decision titled **Sustainable and Vibrant Regions**⁴² the commitment to cluster support to strengthen innovation ecosystems is confirmed on a strategic level.

Additional dedicated cluster support is provided through **NordicHub** run by Viexpo and should be named as a **platform and networking partner for Finnish cluster activities**. It aims at linking Finnish clusters with clusters from other Nordic countries and facilitating Nordic cross-border business activity in general.⁴³

Regional cluster development support in East and North Finland

Policies and programmes to support cluster development in East and North Finland in general take place **at the level of its constituent regions**. Each of the seven regions, at least, mentions clusters in their regional development plans. Some have elaborated cluster programmes in place. An example is the Arctic Smartness

³⁵ Sotarauta et al. 2022, p. 11.

³⁶ Rangen, Christian (2021): Rise of Innovation Superclusters. Available at: <https://www.strategytools.io/rise-of-innovation-superclusters/> (last access 13.03.2023).

³⁷ Sotarauta et al. 2022, p. 12.

³⁸ For a full overview of current cluster policies, see the most recent ECCP Factsheet: <https://clustercollaboration.eu/in-focus/policy-acceleration/country-factsheets-on-cluster-policies-and-programmes> (registration required; last access 19.04.2023).

³⁹ Ministry of Education and Culture of Finland (2021): Updated National Roadmap for Research, Development and Innovation. Available at: <https://okm.fi/documents/1410845/22508665/Updated+RDI+Roadmap+2021.pdf/2ddb19a7-0e2e-a24f-69b8-51638dcaea02/Updated+RDI+Roadmap+2021.pdf> (last access 19.04.2023).

⁴⁰ See <https://www.ely-keskus.fi/web/ely-en> (last access 19.04.2023).

⁴¹ See <https://www.aka.fi/en/research-funding/programmes-and-other-funding-schemes/finnish-centres-of-excellence/> (last access 19.04.2023).

⁴² Ministry of Economic Affairs and Employment of Finland (n.d.): National Priorities for Regional Development 2020-2023: Sustainable and Vibrant Regions (Available at: <https://tem.fi/documents/1410877/2212317/Aluekehitt%C3%A4misp%C3%A4%C3%A4t%C3%B6s+2020-2023/5e7e6d3c-04a1-2a65-8e75-e3cd7605a178/Aluekehitt%C3%A4misp%C3%A4%C3%A4t%C3%B6s+2020-2023.pdf> (in Finnish; last access 19.04.2023).

⁴³ See <https://nordichub.fi/> (last access 11.04.2023).



Clusters initiative in Lapland which developed originally five, now six thematic clusters aligned with the region's Smart Specialisation strategy:⁴⁴

1. Arctic Industry and Circular Economy
2. Arctic Smart Rural Community
3. Arctic Development Environments
4. Arctic Design
5. Arctic Safety
6. Smart and Sustainable Arctic Tourism

Those sectoral cluster organisations were complemented by cross-cutting support programmes the Arctic Smart Growth project, and the Arctic Smart RDI-Excellence, or – ongoing – the Arctic Investment Platform.⁴⁵

Policies covering the whole of East and North Finland are focused on facilitating inter-regional cooperation to overcome common challenges and to develop common industrial ecosystems and trans-regional clusters. The central institution here is the **ELMO collaboration**. It was founded as part of the “Regions in Industrial Transition” pilot programme, launched by the DG GROW of the European Commission in collaboration with DG REGIO and the OECD in 2017, with the aim to support regions particularly affected by industrial transition to “foster regional economic transformation, identify collaboration and funding opportunities and connect with other regions in regional and cluster partnerships.”⁴⁶

The **first phase of the ELMO pilot** produced the East and North Finland in Industrial Transition Smart Specialisation Strategy (S3) 2019-2023 (see also chapter 4).⁴⁷ One example of a High Impact Action financed within the ELMO pilot was to create a cross-regional voucher system that would allow SMEs to acquire innovation support services in “collaborative projects to co-develop investment projects with research and technology organization” in the agro-forestry sector.⁴⁸ Overall, the first phase aimed to develop the cluster landscape of East and North Finland around common industrial ecosystem strengths as represented in the S3 strategy. **The second, ELMO II phase** is currently producing an evaluation of the S3 strategy 2019-2023 to inform the development of the S3 strategy for the years 2024-2027.⁴⁹

In **conclusion**, East and North Finland has a **strong cluster landscape** and an **extensive cluster support system** stretching national, regional and inter-regional levels. Evidence from the EU Cluster Panorama Report (2021) in connection with Ketels & Protsiv (2021) further supports the case for cluster organisation as a proven method to stimulate long-term growth and innovative activity on a regional level.

⁴⁴ See <https://arcticmartness.eu/> (last access 14.03.2023).

⁴⁵ See <https://arcticmartness.eu/projects/> (last access 14.03.2023).

⁴⁶ EOCIC (2019): Policy Briefing – East & North Finland. European Observatory for Clusters and Industrial Change. Available at: [https://clustercollaboration.eu/sites/default/files/news_attachment/eocic - policy briefing - east_north_finland.pdf](https://clustercollaboration.eu/sites/default/files/news_attachment/eocic_-_policy_briefing_-_east_north_finland.pdf) (last access 14.03.2023).

⁴⁷ Havukainen, I.; Jokelainen, K.; Paldanius, Lasse ; Sivonen, Pirkko (2019): East and North Finland in Industrial Transition – Smart Specialisation Strategy 2019-2023. ELMO East and North Finland. Available at: https://issuu.com/ip-suomi.elmo/docs/elmo-strategy_english_web (last access 14.03.2023).

⁴⁸ European Commission (2019): Regions in Industrial Transition – No region left behind. Available at: https://ec.europa.eu/regional_policy/en/information/publications/brochures/2019/industrial-transition-no-regions-left-behind (last access 14.03.2023).

⁴⁹ See <https://elmoenf.eu/about-elmo-project/> (last access 14.03.2023).

03

Cross-border cooperation and the involvement of East & North Finnish clusters in European networks & support initiatives



EUROPEAN CLUSTER
COLLABORATION PLATFORM

Strengthening the European economy through collaboration



3. Cross-border cooperation and the involvement of East and North Finnish clusters in European networks and support initiatives

Findings from the Evaluation Study of and Potential Follow-Up to Cluster Initiatives under COSME, H2020 and FPI of the European Commission (2021) show that cross-border cooperation is perceived by innovation stakeholders as a highly relevant activity for clusters to support sustainable growth and resilience-building of their SME members.⁵⁰ To gain an overview of the existing cross-border cooperation of East and North Finnish clusters, a closer look will be taken in this chapter at the involvement of East and North Finnish clusters in European support initiatives with a focus on the **2014-2020** funding period, as well as the Joint Cluster Initiatives (Euroclusters) for Europe's recovery of the **2021-2027 funding period**⁵¹ (see Figure 7).

Figure 7: Overview of EU support initiatives in the funding period 2014-2020 and 2021-2027

2014-2020 funding period				
 INNOVATION	 INTERNATIONAL	 EXCELLENCE	 SMART SPECIALISATION	 EURO CLUSTERS
INNOSUP-1	ESCP-4i	ESCP-4x	ESCP-S3	Euroclusters
<ul style="list-style-type: none"> Horizon 2020 initiative Development of new-crosssectoral industrial value chains across the EU 	<ul style="list-style-type: none"> COSME initiative Development and implementation of joint internationalisation strategies to support SME internationalisation 	<ul style="list-style-type: none"> COSME initiative Boost the cross-cluster networking and learning within the EU and development of cluster management excellence 	<ul style="list-style-type: none"> COSME initiative Boost cluster cooperation in specific thematic areas in the field of regional smart specialisation strategies 	<ul style="list-style-type: none"> Single Market Programme Support the implementation of the EC industrial strategy through cross-sectoral, interdisciplinary and trans-European cluster initiatives

Source: ECCP (2023)

Involvement of East and North Finnish cluster organisations in the European Strategic Cluster Partnerships (ESCP)

In the 2014-2020 funding period, one relevant EU support initiative to increase cross-border cooperation of EU cluster organisations and other intermediary organisations was the European Strategic Cluster Partnership (ESCP) initiative funded under the EU Programme for the Competitiveness of Enterprises and Small and Medium-sized Enterprises (COSME). The ESCP initiative established partnerships of European clusters and intermediary organisations from the different EU Member States or associated countries. Those partnerships focused on three different thematic areas which were internationalisation (ESCP for Going International), cluster excellence (ESCP for Excellence) and smart specialisation (ESCP for Smart Specialisation).⁵²

⁵⁰ Prognos et al. (2021): Evaluation Study of & Potential Follow-Up to Cluster Initiatives under COSME, H2020 & FPI (DG GROW, Unit D2 - Industrial Forum, alliances, clusters). Study on behalf of the European Commission. Available under: <https://op.europa.eu/en/publication-detail/-/publication/a2c3e9e1-3deb-11ec-89db-01aa75ed71a1/language-en/format-PDF/source-241039860> (last access on 10.01.2023).

⁵¹ For more information on the Euroclusters see: https://eisma.ec.europa.eu/funding-opportunities/calls-proposals/joint-cluster-initiatives-euroclusters-europes-recovery_en (last access on 10.01.2023).

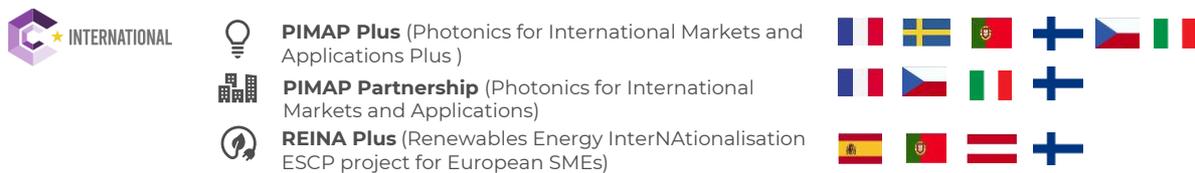
⁵² For more information on the European Cluster Partnerships see: <https://clustercollaboration.eu/eu-cluster-partnerships> (last access 13.01.2023).



In total, the three cluster organisations Joensuun Tiedepuisto OY, OY Merinova AB and Business Joensuu OY from East and North Finland participated in 3 ESCP-4i projects with partners coming from 7 countries (PT, FR, IT, ES, SE, CZ, AT). The thematic focus of the partnerships was on application of photonics for international markets (PIMAP Plus & PIMAP Partnership)⁵³ as well as the creation of a critical mass to support internationalisation of SMEs coming from European regions with a strong focus on (renewable) energy business in different value chains (REINA Plus)⁵⁴. For the REINA Plus project, target markets of the ESCP-4i partnerships were Mexico, Brazil, Colombia, Chile, North America and North Africa, while the focus of the PIMAP project was on the United States, Canada, China and Japan.

Figure 8 gives an overview of the three different ESCP-4i partnerships with involvement of the Finnish cluster organisations Joensuun Tiedepuisto OY, OY Merinova AB and Business Joensuu OY.

Figure 8: Overview of ESCP-4i partnerships with involvement of cluster organisations from East and North Finland



Source: ECCP (2023), based on data extracted from the COSME data hub (03.03.2023).

Involvement of East and North Finnish cluster organisations in the INNOSUP-1 initiative

Apart from the ESCPs, the INNOSUP-1 initiative “Cluster facilitated projects for new value chains”, funded under the EU programme Horizon 2020, was a relevant EU support initiative that addressed the challenge to develop new cross-sectoral industrial value chains in Europe through European cooperation of cluster organisations and other relevant intermediaries.⁵⁵ The INNOSUP-1 initiative aimed at boosting the cross-sectoral and cross-border cooperation in consortia of European cluster organisations and other relevant innovation intermediaries.⁵⁶ An innovative approach of the INNOSUP-1 initiative was that it consisted of the so-called cascade funding approach, meaning that cluster organisations served as intermediaries to support their SME members through different support instruments, like direct financial support or capacity-building training. Findings from the Evaluation Study of and Potential Follow-Up to Cluster Initiatives under COSME, H2020 and FPI of the European Commission

⁵³ While the PIMAP Plus project was an ESCP-4i strand 1 project focusing on the elaboration of a common internationalisation strategy, the PIMAP partnership was the follow up strand 2 project implementing the developed internationalisation plan. For more information on the PIMAP project see: <https://profile.clustercollaboration.eu/profile/cluster-partnership-initiative/59c482dd-d814-4a82-a7ec-c4fee6f44a32> (last access on 03.03.2023).

⁵⁴ For more information on the REINA Plus project see: <http://www.clusterenergia.com/reina-plus> (last access on 03.03.2023).

⁵⁵ For more information on the ESCPs and the INNOSUP-1 initiative see: <https://clustercollaboration.eu/eu-cluster-partnerships> (last access 04.02.2022).

⁵⁶ European Commission (2020): Study on the effectiveness of public innovation support for SMEs in Europe . Annex E, INNOSUP evaluations. Available under: <https://op.europa.eu/en/publication-detail/-/publication/888d351a-9d97-11eb-b85c-01aa75ed71a1/language-en> (last access 10.01.2023).



(2021) confirm that the transnational component of the cluster initiatives was perceived by beneficiaries as an EU added value with high mutual learning effects for cluster organisations and the supported SMEs.

From East and North Finland, the cluster organisation Kemin Digipolis OY was involved in the two INNOSUP-1 projects with the names “MINE.THE.GAP”⁵⁷ and “DigiCirc”⁵⁸. The thematic focus of the projects was on (raw) materials, new digital technologies to better track their location and quality as well as the reinforcement of existing value chains in the raw materials and mining sector. Kemin Digipolis OY cooperated in the projects with a total of 23 partner organisations coming from 10 different countries (ES, PT, DE, BG, PL, HU, FR, IT, IE, CH). The total requested grant per project was between EUR 4.9 – 5.4 million.

Figure 9 shows an overview of the two INNOSUP-1 partnerships with involvement of the Finnish cluster organisation Kemin Digipolis OY.

Figure 9: Overview of INNOSUP-1 partnerships with involvement of cluster organisations from East and North Finland



Source: ECCP (2023), based on data extracted from the INNOSUP data hub (03.03.2023).

Involvement of East and North Finnish cluster organisations in the Euroclusters initiative

With regards to 2021-2027, the European Commission has launched the implementation of the EU Industrial Strategy. In this context, so-called Euroclusters are funded under the Single Market Programme. The Euroclusters initiative aims at supporting cross-sectoral, cross-regional European industry clusters cooperating with other economic stakeholders such as companies or business organisations.

From East and North Finland, the two cluster organisations Photonics Finland and Mikkelin Kehitysyhtio are involved in two Euroclusters. The Eurocluster “CircInWater” aims at addressing the lack of water in order to offer smart solutions for industries and European SMEs in need.⁵⁹ The Eurocluster “PIMAP4SUSTAINABILITY” has set its project’s focus on the application of technologies such as photonics, advanced manufacturing and advanced materials to support European SMEs in the field of metal working and aerospace.⁶⁰ In total, 11 partner organisations from seven countries (ES, NL, FR, CZ, SE, PT, IT) are involved in the two Euroclusters (see Figure 10).

⁵⁷ For more information on “MINE.THE.GAP” see: <https://h2020-minethegap.eu/> (last access on 06.03.2023).

⁵⁸ For more information on “DigiCirc” see: <https://digicirc.eu/project/> (last access on 06.03.2023).

⁵⁹ For more information on “CircInWater” see: <https://zinnae.org/en/circinwater-2/> (last access on 06.03.2023).

⁶⁰ For more information on “PIMAP4SUSTAINABILITY” see: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/how-to-participate/org-details/999999999/project/101074331/program/43252476/details> (last access on 06.03.2023).



Figure 10: Overview of Euroclusters partnerships with involvement of cluster organisations from East and North Finland



CircInWater (Support the European industry to tackle the water challenges of consumption and pollution and contributing to Europe's economic sovereignty)



PIMAP4SUSTAINABILITY (Connect together all key stakeholders along the photonics value chains to enhance the resilience capacities of European SMEs and their industrial ecosystems)



Source: ECCP (2023), based on information from the Funding & Tenders Portal.

04

Smart Specialisation in East and North Finland



EUROPEAN CLUSTER
COLLABORATION PLATFORM

Strengthening the European economy through collaboration



4. Smart Specialisation in East and North Finland

Cluster organisations (can) play an important role in the design and implementation of smart specialisation strategies (S3) since in both concepts, the facilitation of economic growth and competitiveness through regional proximity, are key elements. Box 1 provides some good practices of cluster involvement in S3 from other European regions and especially in the Entrepreneurial Discovery Process⁶¹ (EDP). Against this background, this chapter focuses on the current S3 in East and North Finland. Before delving into the examination of S3 in East and North Finland, it needs to be highlighted that in Finland the S3 are traditionally designed at a granular regional level (NUTS3). Hence, the region East and North Finland (NUTS2) encompasses the following seven regions for which S3 have been developed:

- Central Ostrobothnia
- Kainuu
- Lapland
- North Karelia
- Northern Ostrobothnia
- North Savo (Pohjois-Savo)
- South Savo (Etelä-Savo)

In the following sections, the priority areas of the respective S3 of the seven underlying regions of East and North Finland are presented as well as the overarching priority areas of the joint S3 2019-2023 of East and North Finland. To complement this chapter, the results of an online survey conducted among cluster organisations in East and North Finland regarding their competencies and involvement in Smart Specialisation are presented.

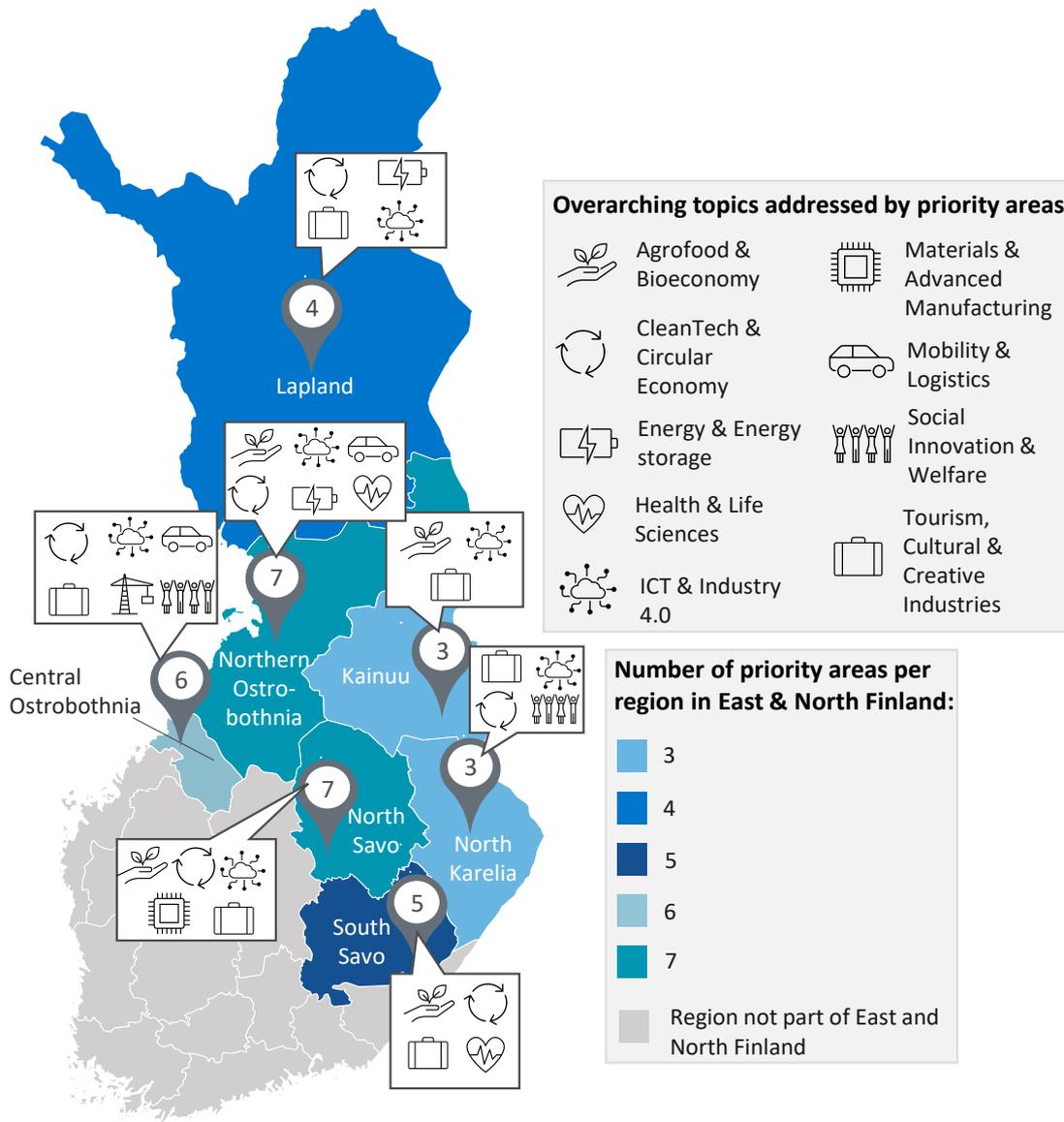
S3 of the 7 underlying regions of East and North Finland

The number of priority areas that are identified in the S3 of the seven sub-regions of East and North Finland in their respective S3, as well as addressed overarching topics of these priority areas, are presented in the figure below. A full overview of the priority areas in the different regions is displayed in Table 3 in the Annex. Overall, the number of priority areas of the different S3 in the regions of East and North Finland range between three (North Karelia, Kainuu) and seven priority areas (in North Savo and Northern Ostrobothnia). These priority areas address a wide range of topics, ranging from “Food products” over “Wellness and experience economy services from nature” to “Energy production and storage”.

⁶¹ The entrepreneurial discovery is an interactive and inclusive process in which the relevant actors identify new and potential activities and inform the government. The government assesses this information and empowers those actors most capable of realising the potential. See <https://s3platform.jrc.ec.europa.eu/edp> (last access on 13.01.2023)



Figure 11: Overview of the number priority areas of the S3 of the 7 underlying regions of East and North Finland and their addressed overarching topics



Source: ECCP (2023), Note: overarching topics addressed by the S3 priority areas have been established in the [Study on prioritisation in Smart Specialisation Strategies in the EU](#); see Table 3 in the Annex for a detailed overview of the priority areas of the regions in East and North Finland

A number of these priority areas also have a direct link to the topic of **raw materials**. These include the following (see also Table 3 in the Annex):

- **Central Ostrobothnia:**
 - Minerals, bio-based materials and processes for new energy technologies, circular economy
 - Advanced material: construction and building based on wood material
- **South Savo (Etelä-Savo):**
 - Forest
 - Water
- **Kainuu:**
 - Excavation Industry



- **Lapland:**
 - Circular economy as a foundation for sustainable growth
- **North Karelia**
 - Clean Solutions & Green Transition
- **Northern Ostrobothnia**
 - Innovative bio and circular economy
- **North Savo (Pohjois-Savo)**
 - Intelligent water system
 - Biorefining
 - Forest industry

Box 1: Good practices of cluster involvement in S3

Good practices of cluster involvement in S3

Berlin/Brandenburg – Cluster ‘Master Plans’:

In Berlin/Brandenburg cluster organisations developed ‘Master Plans’ for priority areas in which specific objectives and actions for implementation were laid out. Thereby, an important element of these ‘Master Plans’ is the highly participatory and consultative process in which the various stakeholders are involved and can postulate their opinions on the priorities.

Lombardy – Technology clusters and biannual work programmes:

While priority areas are defined in a rather generic manner in the strategy, Lombardy has foreseen biannual Work Programmes that structure priorities into macro-themes and macro-themes into development themes. The establishment of these biannual work programmes is the result of a continuous Entrepreneurial Discovery Process (EDP) to identify more specific domains of the priorities. Thereby, especially technology cluster organisations played a crucial role in the S3 process and were involved in identifying areas for further development and the further refinement of the priority areas in biannual Work Programmes.

Slovenia - Strategic Research and Innovation Partnerships and the role of clusters (SRIPs):

In Slovenia, lasting partnerships between different types of stakeholders were created to implement the S3 through action plans. Cluster organisations can get involved in this process and these Strategic Research and Innovation Partnerships (SRIPs). There, priority areas are implemented through one SRIP per priority area and constitute long-term partnerships between different actors such as the business communities, research organisations, and the state.

Overarching priority areas of the joint S3 2019-2023 of East and North Finland

In the following, the joint S3 of East and North Finland 2019-2023 will be analysed. The baseline for this examination is the joint S3 of East and North Finland for the years 2019-2023 that was developed by the ELMO-collaboration⁶² in the context of the “Regions in Industrial Transition”-pilot.⁶³ It needs to be highlighted that a new S3 for the years after 2023 is currently being developed. However, no further information on the new S3 for the years after 2023 is available at this point in time.

⁶² see <https://elmoenf.eu/about-elmo-project/> (last access 11.04.2023)

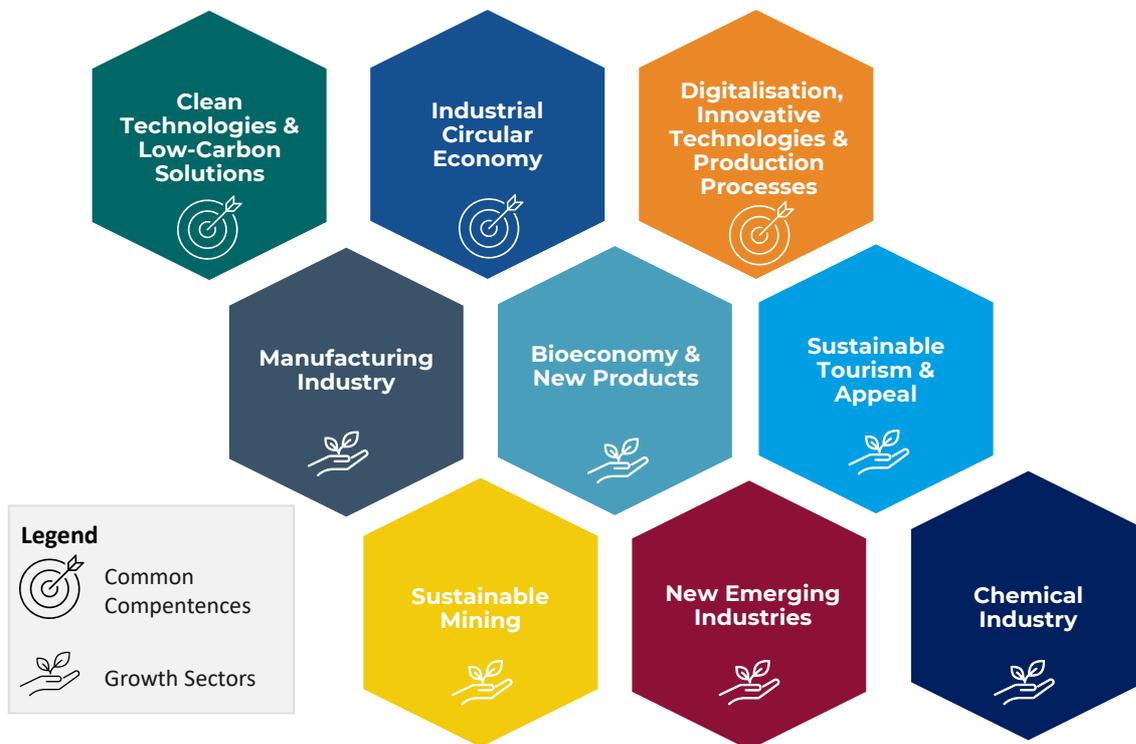
⁶³ ELMOENF (2019): East & North Finland in Industrial Transition. Smart Specialisation Strategy 2019-2023. Available online: https://issuu.com/ip-suomi.elmo/docs/elmo-strategy_english_web (last access 16.03.2023)



Joint cluster activities play a pivotal role in the joint S3 of East and North Finland for the years 2019-2023. Here, the creation of a lasting operating environment was set as a development priority. This means that cluster organisations should be further enabled to meet the needs of enterprises. The joint S3 of East and North Finland for the years 2019-2023 identifies overarching priority areas on the level of East and North Finland. These overarching priority areas are in the focus of the following sections.

The following Figure 12 displays an overview of the overarching priority areas for East and North Finland in the joint S3 2019-2023 that was developed by the ELMO-collaboration⁶⁴. Here, the strategy differentiates between Common Competences and Growth Sectors. The three identified Common Competences support sustainable development and increase the degree of processing in East and North Finland. The Growth Sectors show the region's thematic strengths in Smart Specialisation. The three Common Competences include Clean Technologies and Low-Carbon Solutions, Industrial Circular Economy as well as Digitalisation, Innovative Technologies and Production Processes. The six Growth Sectors address topics such as the chemical industry, bioeconomy or tourism. Moreover, with priority areas such as "Sustainable Mining" or "Industrial Circular Economy" the topic of **raw materials** is also directly included in the priority areas of East and North Finland.

Figure 12: Overview of the priority areas for East & North Finland in the joint S3 2019-2023



Source: ECCP (2023), own elaboration based on the East & North Finland S3 2019-2023. Available online: https://issuu.com/ip-suomi.elmo/docs/elmo-strategy_english_web (last access 16.03.2023)

Outlook: Competencies and involvement of the East & North Finland cluster organisations in Smart Specialisation

The results of an online survey conducted among cluster organisations in East and North Finland show that the majority of cluster organisations in the region are contributing very highly to the overarching priority areas of the joint S3 2019-2023 of East and North Finland related to Digitalisation, Innovative

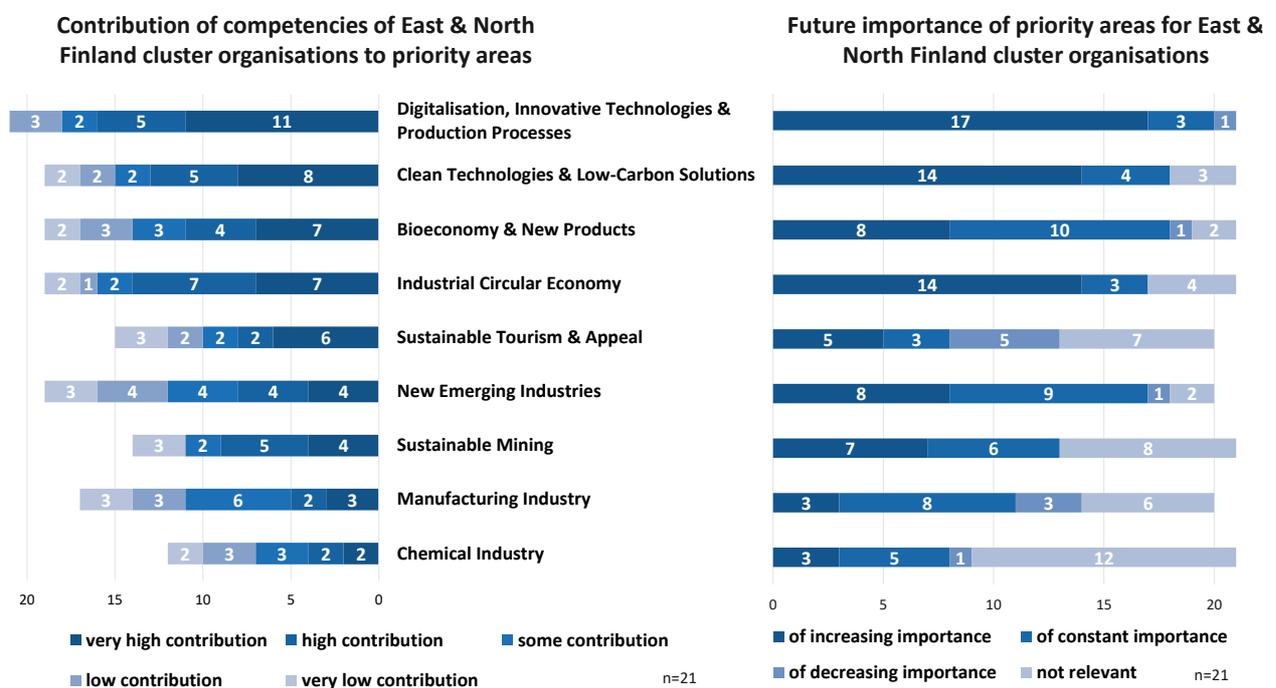
⁶⁴ see <https://elmoenf.eu/about-elmo-project/> (last access 11.04.2023)



Technologies and Production Processes, Clean Technologies & Low-Carbon Solutions, Bioeconomy & New Products as well as Industrial Circular Economy (see Figure 13). Overall, it can be said that the cluster organisations in East and North Finland are contributing to all priority areas which can be regarded as an indicator of a functioning EDP as well as priority setting in the region.

With regards to the future importance of the priority areas of the joint S3 2019-2023 of East and North Finland, the importance of the Digital and Transition stands out. Here, the majority of cluster organisations expect the priority areas Digitalisation, Innovative Technologies and Production Processes, Clean Technologies & Low-Carbon Solutions as well as Industrial Circular Economy to increase in importance in the future. Other priority areas of the joint S3 2019-2023 of East and North Finland where numerous cluster organisations expect an increasing importance are Bioeconomy & New Products, New Emerging Industries and Sustainable Mining.

Figure 13: Survey results - Priority areas of the joint S3 2019-2023 of East & North Finland



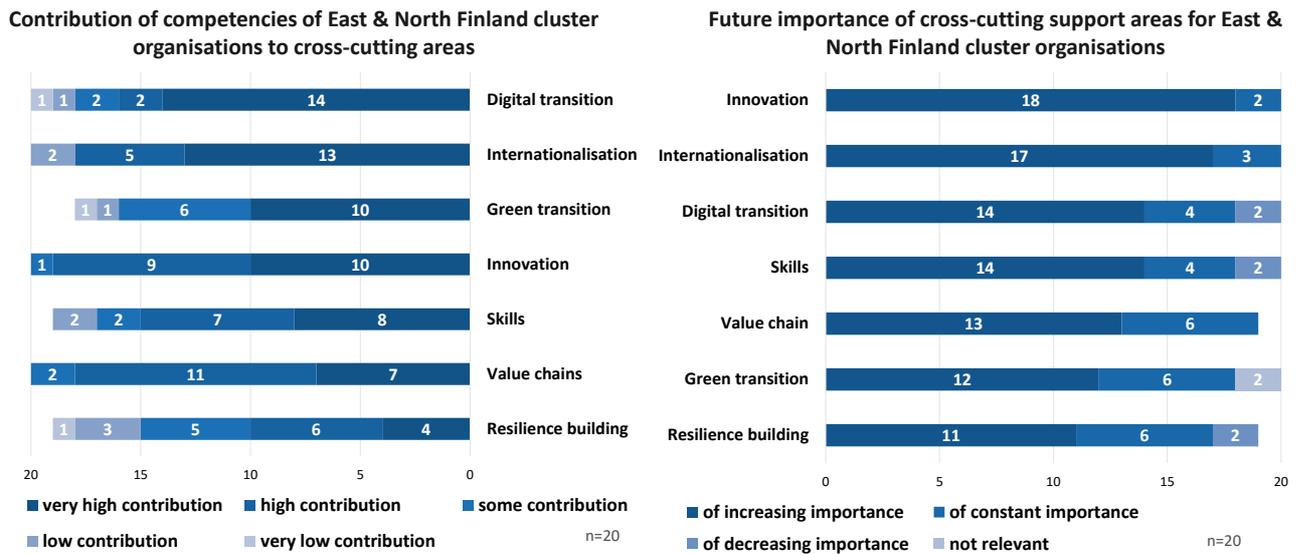
Source: ECCP (2023), Results are based on the self-assessment of East & North Finland cluster organisations. Survey conducted in March & April 2023. Note: participants could select multiple priority areas

Cross-cutting support areas and strategic challenges

Figure 14 displays the results of the survey concerning the cross-cutting support areas and strategic challenges of the East and North Finland cluster organisations. Most cluster organisations are very highly contributing to the area of Digital Transition followed by the internationalisation and Green Transition as well as Innovation. For the cross-cutting support areas that will be of increasing importance for East and North Finland cluster organisations in the future innovation plays key role but also the importance of the areas internationalisation, Digital Transition and skills is underlined. This shows the relevance of innovation for the cluster ecosystem in East and North Finland as well as the relevance of the Green and especially the Digital Transition.



Figure 14: Survey results - Cross-cutting support areas and strategic challenges

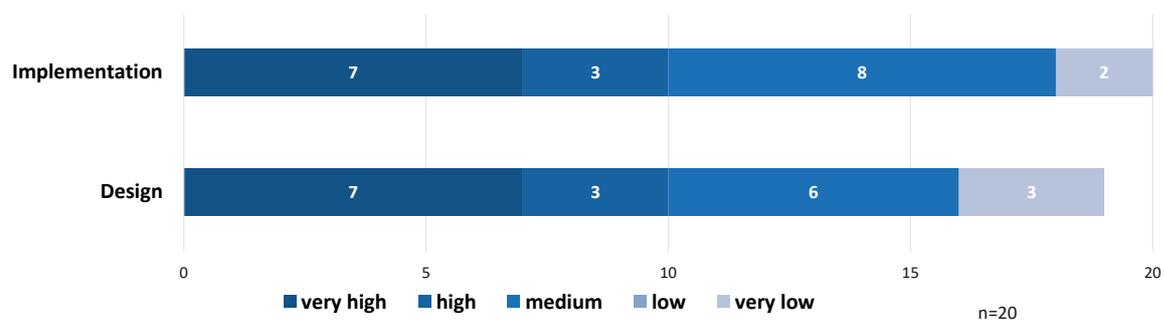


Source: ECCP (2023), Results are based on the self-assessment of East and North Finland cluster organisations. Survey conducted in March & April 2023. Note: participants could select multiple items.

Involvement of East and North Finland clusters in regional initiatives

Cluster organisations can be involved in regional initiatives such as regional economic governance, policy design and implementation at the regional level. For cluster organisation in East and North Finland, the survey results show that these cluster organisations are generally involved in both the implementation and design of regional initiatives. Nonetheless, cluster organisations in East and North Finland have slightly been more intensely involved in the policy implementation (see Figure 15).

Figure 15: Survey results - Level of involvement in regional initiatives of East & North Finland in the 2014-2020 funding period



Source: ECCP (2023), Results are based on the self-assessment of East & North Finland cluster organisations. Survey conducted in March & April 2023.



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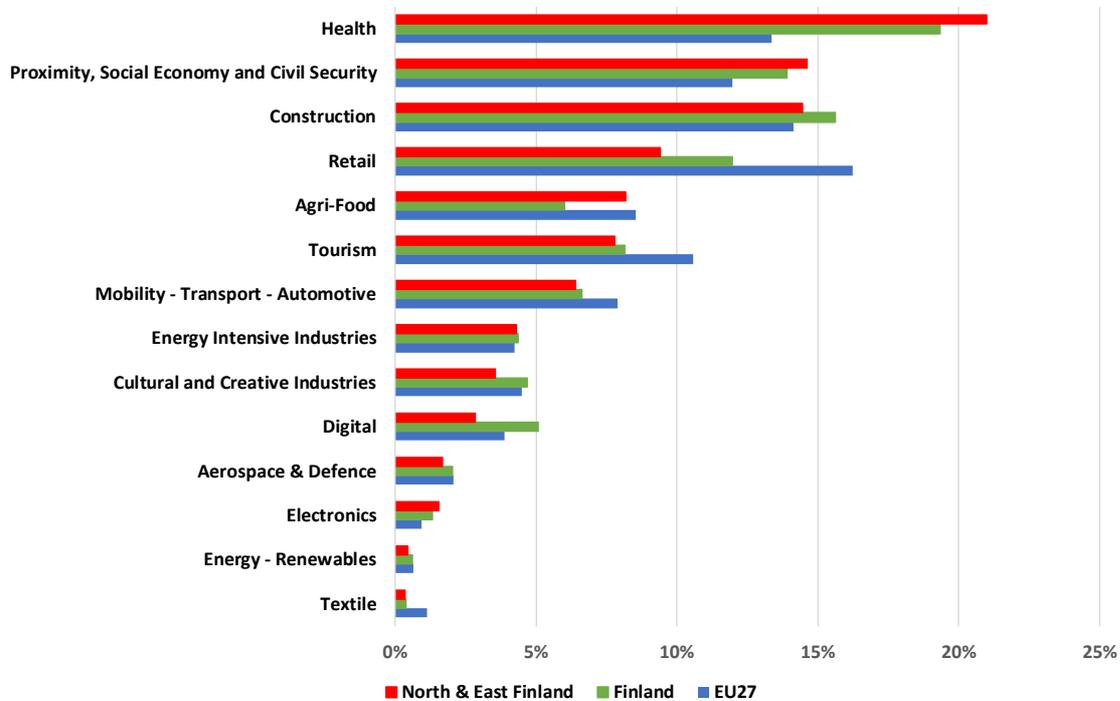
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Annex

Sector Specialisation

Figure 16: Employment in the Ecosystems



Source: Source: ECCP (2022), own elaboration based on data from Eurostat.

Regional Innovation Scoreboard

Table 1: Key socio-economic and sectoral indicators of East and North Finland, Finland and the EU

	East and North Finland	Finland	EU
GDP per capita (PPS)	28,800	34,700	31,200
GDP per capita growth (PPS)	3.7	3.3	3.21
Population density	6	18	109
Urbanisation (%)	62.0	72.9	75.3
Population size (000s)	1,280	5,530	446,450
Share (%) of employment in:			
Agriculture & Mining (A-B)	7.8	4.0	4.6
Manufacturing (C)	12.4	13.0	16.4
Utilities & Construction (D-F)	9.0	8.6	8.2
Services (G-N)	66.1	69.5	62.9
Public administration (O-U)	4.6	4.6	7.1



Average number of employed persons per enterprise	4.1	5.0	5.2
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Source: European Commission (2021): Regional Innovation Scoreboard 2021

Regional Competitiveness Index

Figure 17: East and North Finland in the Regional Competitiveness Index



Source: https://ec.europa.eu/regional_policy/assets/regional-competitiveness/index.html#/FI/FI1D (last access 11.04.2023)

List of cluster organisations in East and North Finland

Table 2: Overview of cluster organisations in East and North Finland and their addressed EU industrial ecosystems

N°	Cluster organisation	Industrial Ecosystem
1	6G Flagship Innovation & Research Centre	Digital
2	AIF Water Ecosystem	Construction; Energy Intensive Industries
3	Arctic Aviation Cluster	Aerospace & Defence
4	Arctic Development Environments Cluster	Digital



5	Arctic Design Cluster	Creative & Cultural Industries
6	Arctic Safety Cluster	Tourism
7	Arctic Smart Industry and Circular Economy Cluster	Energy Intensive Industries
8	Arctic Smart Rural Community Cluster	Agri-food; Renewable Energy
9	Bio and Circular Cluster	Renewable Energy
10	Biocluster Finland	Agri-food; Renewable Energy
11	Bio Valley Finland	Energy Intensive Industries
12	Blue Economy Mikkeli	Renewable Energy
13	Business centre North Savo	Mixed
14	Business Joensuu	Mixed
15	Callio: Mine for Business	Mixed
16	CEMIS: Centre for Measurement and Information Systems	Digital
17	Creative Saimaa	Creative & Cultural Industries; Tourism
18	DigiCenter North Savo	Digital
19	Digipolis	Mixed
20	Digitalisation and Well-Being	Digital
21	Energy Cluster North Savo	Renewable Energy
22	GreenHub (forest bioeconomy)	Energy Intensive Industries
23	Kainuu Tourism	Tourism
24	Kajaani Games cluster	Digital
25	KesTech Competence Centre (machinery and materials)	Energy Intensive Industries; Electronics
26	Kokkola Industrial Part (Chemical industry)	Energy Intensive Industries
27	Kuopio Health Co-op.	Health
28	Kuopio Water Cluster	Energy Intensive Industries; Agri-food
29	Mining cluster (Kainuu)	Energy Intensive Industries
30	Natural products cluster (Oulu university)	Agri-food
31	Northern Finland Construction Cluster	Construction
32	North Savo Agri-Food Cluster	Agri-food
33	OIA/ Digitalisation in the Changing Urban Environment	Digital
34	OIA/ OuluHealth	Health
35	OIA/ Sustainable Circular Economy and Clean Solutions	Renewable Energy; Energy Intensive Industries
36	Oulu Automotive Cluster	Mobility, Transport & Automotive
37	PropTech	Digital
38	Photonics Finland	Electronics ⁶⁵
39	PrintoCent	Electronics
40	Savonlinna Technology Park Noheva	Energy Intensive Industries
41	Smart and Sustainable Arctic Tourism	Tourism
42	South Savo Food Cluster	Agri-food
43	SuperEcosystem (North Savo)	Diverse
44	Vuokatti Sport	Tourism
45	Water Cluster Finland	Digital

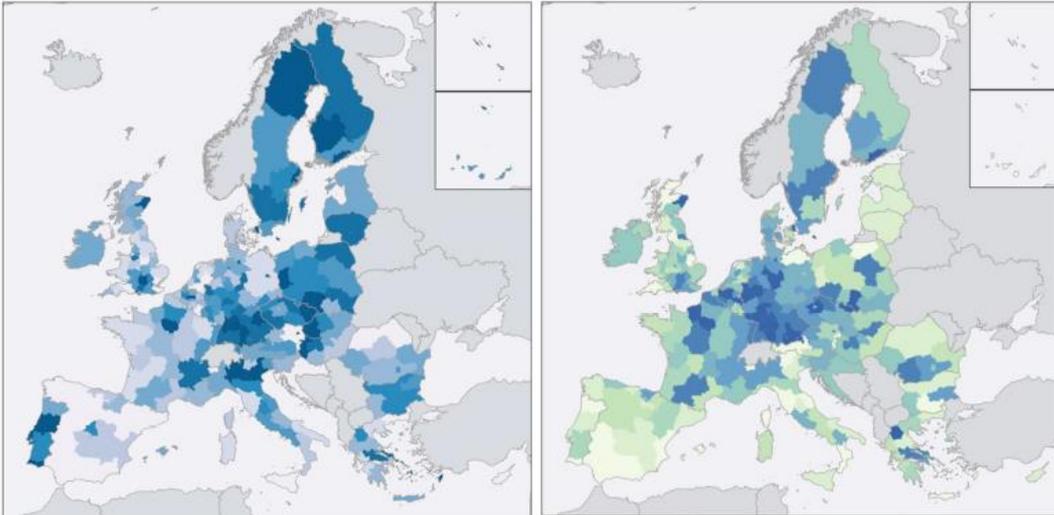
⁶⁵ [Photonics Finland](#) “helps realize the full potential of photonics in industry and society in Finland in sectors like health care, energy efficiency, safety, manufacturing, and sustainability.” Thus, it can be linked to several industrial ecosystems. However, as photonics are key to the industrial ecosystem “[Electronics](#)” it was assigned to this ecosystem.



Source: ECCP (2023) and own adaptations.

Indicators of cluster strength

Figure 18: Indicators of cluster strength: cluster portfolio strength (share of payroll accounted for by strong clusters) (left) and cluster mix (right)



Source: Ketels & Protsiv (2021): Cluster presence and economic performance: a new look based on European data. Note: Colours refer to deciles of the corresponding variables such that darker colours indicate higher values.

Smart Specialisation

Table 3: Overview of priority areas and addressed overarching topics of the S3 in East and North Finland, by region

Region	Priority area	Overarching topic
Central Ostrobothnia	Minerals, bio-based materials and processes for new energy technologies, circular economy	CleanTech & Circular Economy
	ICT solutions for green growth, e-Health, e-Medicine, e-Learning, robotics	ICT & Industry 4.0
	Multimodality, efficiency and sustainability in logistics and transport, boat design and construction	Mobility & Logistics
	Advanced material: construction and building based on wood material	Construction
	Sustainable tourism and related social innovations	Tourism, Cultural & Creative Industries
	Creative industries for education and pedagogy	Social Innovation & Welfare
	Food	Agrofood & Bioeconomy



<u>South Savo</u>	Forest	Agrofood & Bioeconomy
	Water	CleanTech & Circular Economy
	Tourism	Tourism, Cultural & Creative Industries
	Well-being	Health & Life Sciences
<u>Kainuu</u>	Bio-economy	Agrofood & Bioeconomy
	Excavation Industry	Other
	Technology industry	ICT & Industry 4.0
	Tourism	Tourism, Cultural & Creative Industries
<u>Lapland</u>	Circular economy as a foundation for sustainable growth	CleanTech & Circular Economy
	Wellness and experience economy services from nature	Tourism, Cultural & Creative Industries
	Renewable energy solutions as a promoter of self-sufficiency	Energy & Energy Storage
	Technologies as a reformer of sustainable production and services	ICT & Industry 4.0
<u>North Karelia</u>	Clean Solutions & Green Transition	CleanTech & Circular Economy
	Innovative and Sustainably produced Services	Tourism, Cultural & Creative Industries / Social Innovation & Welfare
	Renewing Industry & Emerging Technologies	ICT & Industry 4.0
<u>Northern Ostrobothnia</u>	Innovative bio and circular economy	CleanTech & Circular Economy
	Energy production and storage	Energy & Energy Storage
	Sustainable construction, logistics and movement	Mobility & Logistics
	Smart food production	Agrofood & Bioeconomy
	Digital services and products	ICT & Industry 4.0
	Field of health and well-being	Health & Life Sciences
	Renewable and low-emission industry	CleanTech & Circular Economy
<u>Pohjois-Savo</u>	Food products	Agrofood & Bioeconomy
	Machine technology and energy technology	Materials & Advanced Manufacturing
	Tourism	Tourism, Cultural & Creative Industries
	Intelligent water system	CleanTech & Circular Economy
	Biorefining	Agrofood & Bioeconomy
	Wellbeing technology	ICT & Industry 4.0
	Forest industry	Agrofood & Bioeconomy

Source: ECCP (2023), Source: ECCP (2023), Note: overarching topics addressed by the S3 priority areas have been established in the [Study on prioritisation in Smart Specialisation Strategies in the EU](#)



Overview of the industrial ecosystems

Figure 19: EU industrial ecosystems based on the European industrial strategy



14 industrial ecosystems are: aerospace and defence, agri-food, construction, cultural and creative industries, digital, electronics, energy intensive industries, energy-renewables, health, mobility – transport – automotive, proximity, social economy and civil security, retail, textile and tourism

Source: European Commission: https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/european-industrial-strategy_en (last access 19.04.2023).