Improving Innovation and research infrastructure, from fragmented to integrated and sustainable cooperation between actors in Middle Norrland

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Report from the Interreg Europe InnoHEIs project partner Mid Sweden University analysis of HEIs role and possible impact on the regional ecosystem and the economical growth in Middle Norrland region.

InnoHEIs
Interreg Europe

European Union
European Regional
Development Fund

Mittuniversitetet
MID SWEDEN UNIVERSITY

Content

Summary of InnoHEIs report on Middle Norrland in the period September 2019-October 2021

This InnoHEIs report is made to highlight the role of Higher Educational institutes and their research and innovation infrastructure in the regional ecosystem addressing the ERDF programming structure. All partners in InnoHEIs are providing an analysis of their region as an input to the peer review the partners will have while doing study visits at each partners office. Mid Sweden University is the Swedish partner in InnoHEIs and we will have visitors from all InnoHEIs countries, (NL, FR, ES, PL, FL, LT) on the 19-20th of January 2022. This report will be the basis for this peer review and we hope to get interesting feedback and constructive suggestions how to solve our identified gaps in order to go from fragmented to a more integrated ecosystem.

The report identifies some gaps in the regional ecosystem when addressing the ERDF operational programme under the investment for growth and jobs goal one - Strengthening research, technological development and innovation. They are:

- Geography and the dynamics in the region create a gap in itself. The existence of two regions one university, long distances and dense population. Different cultural background large industry in the county of Västernorrland, service-oriented industry in the county of Jämtland Härjedalen.
- The innovation system of the Middle Norrland region is atomized or filled with gaps. At least four different innovation support and policy making agencies are active. They are not necessarily coordinated.
- Many stand-alone actors who are by themselves creating value but they are not integrated into a common ecosystem with similar view of Middle Norrland, so they can build on each other's strengths

- The roles the researcher and the research institutes of MIUN may and can take when participating in developing and implementing smart specialisation strategies are unclear.
- The diversity of stake holder expectations, coordination of priorities, areas of interest, research calls and needs, to mention a few, have been a challenge for the university. Internal research policies, strategies and not least important, the individual interest of researchers, generated administrative strain, poorly perceived R&D impact, situations of mistrust and at times even disappointment on the local arena.
- An obstacle for researchers emerges from the fact that ERDF funding primarily addresses regional development by supporting the needs of small and medium-sized enterprises (SMEs) to acquire new knowledge, methods and processes, but does not consider the needs of the higher educational institutions. By considering the researcher's need for input from the companies instead of the companies' need for outputs from the researcher, this would allow companies to participate in shorter sprints, where the result will still be of relevance for them. Smaller companies may rather be the target group of a structure that can make knowledge available and collaboration possible
- Contacts and dialogue between higher education institutions and regional authorities is in several cases weak. Despite the fact that the ERDF aims at regional development, and despite that higher education institutions should be considered as key players in smart specialisation strategies.

The report indicate there is a potential for improvement in the Middle Norrland innovation ecosystem. Making the research and innovation infrastructure more integrated and connected to the regions smart specialisation strategies and prioritisations. The InnoHEIs project team suggest implementing a permanent dialogue between the university, region(s) and the Swedish agency for economical and regional growth. This in order to facilitate mutual understanding, priorities and help each other implementing the smart specialisation priorities. Maybe also develop new

programs and calls together. If the actors can find a way for co-working, jointly prioritise, it will be less complicated for the university and other Regional Innovation Institutes (RII) to organise their investments and research initiatives. It could even be in line with the regional ambitions. Researchers have to find substantial reasons to do academic research in line with alien strategies as the smart specialisation (S3). Why not start a joint research academy with focus on smart specialization? It could be beneficial for all stake holders.

InnoHEIs purpose and goals.

InnoHEIs started in august 2019 and ends in august 2023. (www.interregeurope/innoheis). InnoHEIs aims at enlarging the role of higher education institutions (HEIs) and their research and innovation infrastructure by:

Fostering entrepreneurship and creativity in regions

Fostering entrepreneurship and creativity brings many benefits to higher education institutions and regions. InnoHEIs addresses the challenge to enhance the role of higher education institutions and their research and innovation infrastructure.

Enabler of the entrepreneurship discovery process

This role can be filled in as an enabler of the entrepreneurship discovery process (EDP). The entrepreneurship discovery process is an inclusive and interactive bottom-up process. Participants from different environments, such as policy, business and academia are discovering a potential of new activities and opportunities that emerge through this interaction.

Integration of entrepreneurial knowledge

Higher education institutions and their research and innovation infrastructure can build partnerships thanks to their unique infrastructure and human capacities. Entrepreneurial knowledge is often fragmented and distributed over many organisations, companies, universities, clients and users. Higher education institution can support the integration of the entrepreneurial knowledge.

Remove barriers and enhance collaboration

Thus, InnoHEIs partners look at possibilities to mobilise higher education institutions and their research and innovation infrastructure for regional

innovation development. Their aim is to remove barriers among different types of higher education institutions and their research and innovation infrastructure. And enhance their cross-institutional and cross-sectoral collaboration

The Swedish partner in InnoHEIs is Mid Sweden University, which address the operational programme under the investment for growth and jobs goal one - Strengthening research, technological development and innovation. The Middle Norrland Region in Sweden is focusing on developing research and innovation ecosystems connecting industry, academia and the public sector around important areas, like “Forest as a resource”, “Industrial information technology and digital services”, “Tourism” and “Sports and Health”. Environmental, economic and social sustainability are important horizontal criteria in all areas. There are also important well recognised research in social science and humanities, genus, democracy and political science, sensor-based services, digital printing and digital information services. Currently there is a strong focus on scaling up the environmental research and the development of new methods to reduce CO2 emissions. Connected to the Goal 1B investment priorities and the innovation priorities, it is considered important to increase the investments in research and development which is low compared to other regions and to increase the commercialisation of research. The ERDF policy instrument for innovation and growth needs to be improved by adding the dimension of social science and humanities into technology driven innovation programs utilising the cross scientific approaches given by mixing technology driven development and research with social science and humanities, digital information services in a structural way.

Methodology and working process of InnoHEIs project team at Mid Sweden University.

This report tries to highlight the structure, including good examples, gaps and challenges of the regional ecosystem in Middle Norrland. We in the project team are all employed by the university and we therefore use our perspective when presenting our conclusions and recommendations for future action. We will use this report as a discussion document for the

planned peer review we will arrange in january2022 in Östersund, with the partners in InnoHEIs. In order to identify areas were the policy changes may make a difference when integrating HEIS, higher educational institutes, into the regional ecosystem, the InnoHEIs team made a gap analysis interviewing the leaders of the different research centers and innovation support actors in the region. Articles and public analytical reports have been analyzed. There are some reports that have been more influential, they are 1) an audit report[1] from the Swedish state audit office on ERDF effectiveness, 2) a report called policy in practice ordered by Tillväxtverket, (The Swedish Agency for Economic and Regional Growth)[2] 3) The smart specialisation strategies for Jämtland Härjedalen and for Västernorrland[3],[4].

The team have ongoing discussion with the responsible people of smart specialisation strategies in the two regions of Jämtland/ Härjedalen and Västernorrland. A dialogue with the managing authority of ERDF funds, TVV, the Swedish Agency for Economic and Regional Growth is ongoing. We have also invited representatives from other regions and universities as well as representatives from Vinnova, the Swedish innovation agency in Sweden and discussed with them how they view the integration of the universities R&D infrastructure into the regional ecosystem. This continuous process of dialogue has given us new perspective and deepen our understanding of the complexity in the process of interaction and how it may develop.

The InnoHEIs project is not the only activity going on in the region of Middle Norrland. There are many stand-alone organisations and each and every one is working according to their best effort supporting the innovative ecosystem. Most of these actors have good stability and financing, not in need of anyone else. The major identified gap is the

[1] An audit report from the Swedish state audit office RIR 2020:10 Regional Structural Fund Partnerships: do they provide the conditions for the efficient use of EU funds?
[2] Så kan akademin skapa nytta i europeiska regionala utvecklingsfonden 2021–2027, published January 2021. ISBN 978-91-88961-80-8 rapport 0346.
[3] Beslutad Smart specialisering- politiskt styrdokument.pdf (regionjh.se)
[4] vasternorrlands-innovationsstrategi-for-smart-specialisering.pdf (rvn.se)

fragmentation, the lack of coaction between the actors and a common understanding of what to do and how to act in order to create innovation and growth in the Middle Norrland. This report is trying to identify some of the gaps especially focusing on the role of HEIs and its research infrastructure. As such giving suggestions on activities and policy suggestion how to close these gaps. MIUN has for example since many years research agreements with many of the municipalities in the Middle Norrland, mainly Västernorrland, where they together address societal challenges and set up joint research projects. We have identified this cooperation as a good practice example.

The InnoHEIs project team believe it is a very good idea to address the issue of how to improve the utilization of HEIs in the regional ecosystem during a process of three years as the InnoHEIs perspective permits, not just a short analysis at a specific point of time. As time passes we have received lots of inputs from our partners in different countries, realising that all regions and universities have similar challenges. We have discussed with the management of the university and our stakeholders in the region ideas and good practices from other European countries, while participating in the digital partner meetings. We hope this process as well as this report will contribute to the development of a more integrated ecosystem in Middle Norrland.

Results from the Gap analysis and interviews with the RII actors in Middle Norrland

This survey consists of a questionnaire which is attached as an appendix to this report. The interview is a part of a learning process. During the interviews, the questionnaire was answered and the following analysis was performed by Karin Nygård Skalman, Nina Erkenstam and Karolina Rosdahl.

This survey will contribute to improving the utilization of research and innovation infrastructures (RIIs) through better involvement of its users

and customers. Three perspectives have been highlighted in the questions, to find answers to the current situation, opportunities for the future and obstacles.

I. Mapping of HEIs and their RII

II. Gap analysis of RII performance identifying gaps and finding out how to fill in these gaps identifying challenges and needs to improve RII performance.

III. Role of HEIs in the context of RIS3, HEIs capacities and involvement in RIS3 design and implementation.

The RII actors in Middle Norrland who were included in the interviews are:
CER – The Centre for Research on Economic Relations, RII at MIUN
ETOUR – The European Tourism Research Institute, RII at MIUN
FSCN – Fibre Science and Communication Network, RII at MIUN
NVC – The Swedish Winter Sports Research Centre, RII at MIUN
RCR – Risk and Crisis Research Centre, RII at MIUN
STC – Sensible Things that Communicate, RII at MIUN
Processum - Bio refinery development for a fossil free future, Research Institute RISE
Bron Innovation - IT cluster and digital innovation hub, own member organisation,
MIUN Innovation – Innovation Office at Mid Sweden University
Region of Jämtland Härjedalen the research center and RII on health.
SCA R&D Center , MNE, one of the largest companies in Sweden in the paper and pulp industry.

Results from the Gap analysis

Some results are presented here. In appendix 1 there is a copy of the questionnaire used when we interviewed the managers of the different RIIs. As the RII organisations interviewed have different roles in the ecosystem, we decided to analyse the Mid Sweden University's (MIUN) research centers, (RC) separate from the non-university RII, which consist

of independent cluster organisations, regions doing research in the health area, private companies and research institutes. The RIIs outside of the university are diversified and have different roles. All together they give a picture of the complexity of the RII in the Middle Norrland region. It also shows the dominance MIUN has on the Research and innovation infrastructure. We have made a separate analysis on the RIIs of MIUN. The table below shows how MIUN research centers have answered following specific questions:

8. Do you expect other external users to use your research and innovation infrastructure within 3-5 years?

11. Would you like to add extra requirements for using your research and innovation infrastructure within 3-5 years?

14. Would you like to establish/improve institutional connectivity with other research and innovation infrastructure within 3- 5 years?

18. Do you have sufficient research and innovation capacity (= human resources and qualifications) at your facility?

22. Is ERDF- structural funds for Middle Norrland relevant financial resource for your facility?

24. Do you want to change the financial organization of your facility within the next 3-5 years?

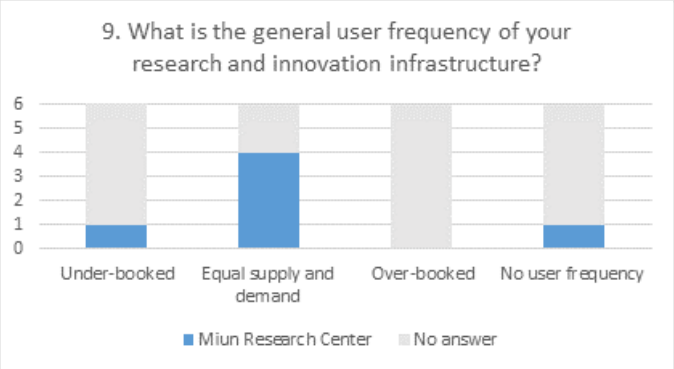
31. Would you like to extend your regional influence within the next 3-5 years?

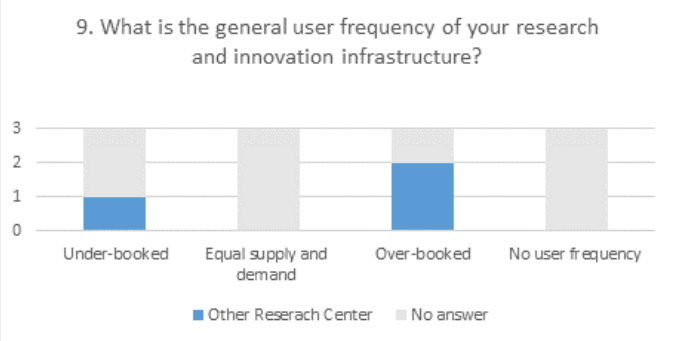
32. Do you depend on other organizations in your region?

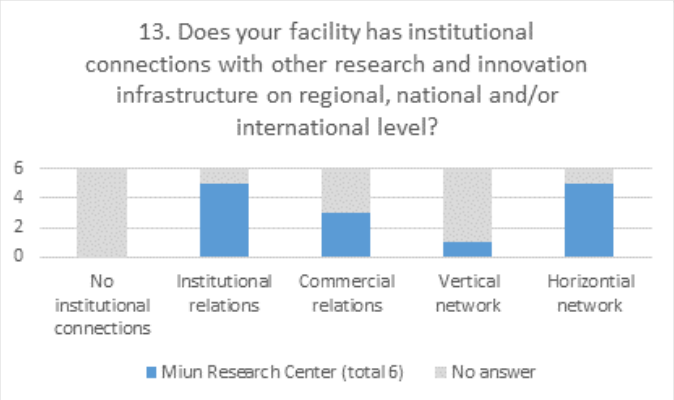
8	Yes (please describe)	Yes	Yes	yes	yes	No
11	Yes	no	No	no		No
14	If it is appropriate (fits our business) and practically possible.	Yes	Yes	yes	Yes	Yes
18	no	yes	No	No	Yes	No
22	Yes	Yes	Yes	Yes	Yes	Yes
24	Yes	no	Yes	Yes	Yes	Yes
31	Yes	yes	Yes	Yes	Yes	No
32	Yes	Yes	yes	Yes	Yes	Yes

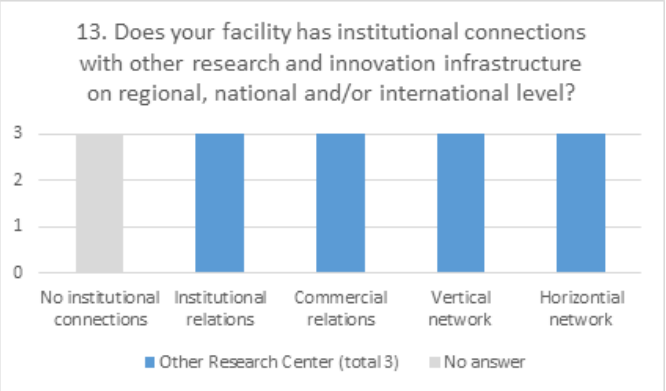
Tabell 1: Gap analysis and interviews with the Research centers at Mid Sweden University.

By comparing the results from MIUN RIIs with the RIIs outside of the university in question 9- What is the general use of you Research and Innovation infrastructure and question 13- Does your facility have institutional connections with other research and innovation infrastructure on regional, national and/or international level? We found that the MIUN RIIs are less booked than the ones outside the university. It also seems like the RIIs outside MIUN has stronger connections into different networks both academic and commercial connection, vertical and horisontal. It is hard to draw any specific conclusions around these findings as the material is so small. But we may say there is an opportunity and possibility to use the MIUN research infrastructure more in the future than today. Some of the RII said they did not have enough human resources to expand, not strong enough financial situation or not enough motivation, due to lack of academic meriting if they start to "sell" the research infrastructure.


9. What is the general user frequency of your research and innovation infrastructure?
6
5
4
3
2
1
0
Under-booked
Equal supply and demand
Over-booked
No user frequency
Miun Research Center
No answer


9. What is the general user frequency of your research and innovation infrastructure?
3
2
1
0
Under-booked
Equal supply and demand
Over-booked
No user frequency
Other Reserach Center
No answer


13. Does your facility has institutional connections with other research and innovation infrastructure on regional, national and/or international level?
6
4
2
0
No institutional connections
Institutional relations
Commercial relations
Vertical network
Horizontal network
Miun Research Center (total 6)
No answer


13. Does your facility has institutional connections with other research and innovation infrastructure on regional, national and/or international level?
3
2
1
0
No institutional connections
Institutional relations
Commercial relations
Vertical network
Horizontal network
Other Research Center (total 3)
No answer

Most of the interviewed RII would like to establish/improve institutional connectivity with other research and innovation infrastructures within 3- 5 years. They want to find new sources of funding the organization. The dependence of other actors in the ecosystem is important and funding from ERDF is most relevant and they are willing to expand their regional influence.

The collaboration between actors varies between different RII centers at MIUN. All have a large collaboration within the academic RII ecosystem on local, national, European and international level. The cooperation between RIIs and private companies and public organisations is high on local and national level, but rather low or non-existing on all other levels. The analysis shows that the RII's would like to implement new cooperation models with increased joint projects and guest professors/researchers. To be able to do a progress within 3-5 years the RII's needs better support structures for international staff and finding new partners.

As one of the aims of the InnoHEIs projects is to investigate how RIIs may be an enabler of the entrepreneurship discovery process in region Middle Norrland we found that many of the RIIs recommend in their answers to utilise capacity in existing research and innovation infrastructure and they see the need of more researchers in general and more researchers with innovation capacity.

Smart specialisation as a concept developed by the EU is an entrepreneurial discovery process (EDP). All RII's inside the university and outside prioritise research and innovation support measures towards the smart specialisation areas. The RIIs are doing their research in many different fields connected to smart specialisation, but not necessary the ones prioritised in Middle Norrland. It varies a lot between the different RIIs and maybe it is not always a perfect fit towards the selected area at each region.

There is a need for long-term strategic financing with room for early collaborations and available financing in the early experimental phase.

There is a wish from the RIIs to utilize its capacity fully in existing research and innovation infrastructure.

In order to Strengthen Middle Norrland human capacity for research and innovation we asked if the RIIs joined partnerships with other RIIs, such as universities and research institutes and private companies that have capacity to do research. The answers from all RII's were that they need - administrative support for international exchanges of researchers and students. They state that multidisciplinary research is very important for impact and that they would like to see a strengthen support structure for researchers to do research. *The InnoHEIs project suggest to strengthen Middle Norrland with a vertical and horisontal network strategy to integrate the RIIs into the regional innovation ecosystem in order to remove barrier and enhance their cross- institutional and cross-sectorial cooperation. This networks strategy needs to focus on prioritise the "Tug of war" over budget for long-term as R&D activities versus operational daily activities. The Political leadership which operate in 4-year cycles, counteracts long-term solutions. The politician's and other actors who work with innovation and long-term strategies need to be given time in their assignment to get to know and understand the roles of RIIs in the regional ecosystem. We will get results faster with partners as one of the RIIs said*

Highlights from the smart specialisation priorities in the region of Jämtland Härjedalen and Västernorrland.

Region of Jämtland Härjedalen[5]

The geography — a blessing and a curse

The smart specialisation 2021-2027 in the region of Jämtland is focused on four prioritized areas, they are, 1) Earth, Forest and Water, 2) Sustainable energy,3) Experiences and 4) Digital solutions. Many of the county's sectoral specialisations are based on nature and sparse geography as a resource, such as tourism forestry, but the healthcare sector also constitutes a large part of employment in the region. Geography is also what has de facto driven much of the innovation efforts in e.g. e-health in the region. The county has an important strength in service innovation, or non-technological product innovation — both relative to technological innovation, but also relative to other counties. The innovation system in the region also faces structural difficulties. This is reflected, for example, in the low number of patents applications, but also in partly weak connections between knowledge-producing environments (mainly Mid Sweden University), innovation-promoting actors and business specialisations. Behind several of the above-mentioned factors are the county's sparse structures. It is important to consider that a sparser region does not have the same conditions to build complete innovation systems as a more densely populated region has, and thus collaboration opportunities and grassroots innovation become important areas to prioritize, together with focused leadership from public actors. However, both the tourism industry as well as the healthcare sector have the characteristics of being part of stronger regional innovation systems, given that they are also surrounded by knowledge-producing and innovation-enhancing actors.

[5] Analys- och kunskapsunderlag till en smart specialiseringsstrategi för Jämtland Härjedalen, Oxford Research

The County of Västernorrland[6],[7]

Major structural transformation

Västernorrland County areas of strength in smart specialisation are 1) Forest bioeconomy,2) Advanced specialized manufacturing in metal, machine and automotive manufacturing, 3) GovTech, 4) Renewable energy — power, solar, wind, water and bioenergy and 5) Development and management of complex production and operating systems. There are areas of development identified such as Autonomous mobility, FoodTech, Crisis and Rescue and Smart Caring — care, safety and security. The county is undergoing a major structural transformation of its entire business community, where the importance of traditional industrial communities are giving way to the development of private, knowledge-intensive service industries. This transformation also has clear effects on demographics, as the stagnant and growing industries are in many cases not located to the same municipalities. This leads to an increasingly ageing population in the former industrial communities, whereas the emerging societies display a positive net migration, often with people from other parts of the world.

The two most influential industries in Västernorrland are the Forestry, Wood and Paper industries as well as Information and Communication technologies (ICT). The specialisation of the business sector can also be measured by the fact that Västernorrland has a higher number of trademark applications in these areas compared to the rest of the country.

As for the innovation support system in the county, it is relatively decentralised. However, there is interregional collaboration between innovation support actors such as Almi and Business Sweden in Västernorrland, Jämtland and Härjedalen. Large companies, especially in the forest industry, seem to collaborate to a greater extent with nationally leading universities such as Umeå University, the Royal Institute of Technology and Chalmers, than with regional research institutions.

[6] Kartläggning och analys av styrkeområden i Västernorrland, Oxford Research

[7] Strukturbilder Västernorrland. Till en ny regional utvecklingsstrategi, WSP

Collaboration between the regional business community and Mid Sweden University takes place primarily with small and medium-sized companies.

Higher Educational Institutes in regional development[8]

Incentives and obstacles with ERDF funding

In this part, we summarize the incentives and obstacles that may exist for academic institutions to contribute to regional development by participating in projects through ERDF funding.

The main reason for regional collaboration is that it provides an influx of new ideas, which strengthens both the research and educational environment. This makes universities and other academic institutions more attractive to external funding and students, which in turn provides an opportunity to further strengthen research areas with funding from national and international agencies. A first obstacle emerges from the fact that ERDF funding primarily addresses regional development by supporting the needs of small and medium-sized enterprises (SMEs) to acquire new knowledge, methods and processes, but does not consider the needs of the higher educational institutions. In addition, many SMEs lack the skills, capacity or financial means to participate under the conditions imposed on ERDF projects. Instead, by considering the researcher's need for input from the companies instead of the companies' need for outputs from the researcher, this would allow companies to participate in shorter sprints, where the result will still be of relevance for them. Smaller companies may rather be the target group of a structure that can make knowledge available and collaboration possible. It may also be more relevant to follow up on the participation of smaller companies at portfolio level rather than in individual projects.

An extremely strong incentive for research environments to contribute to regional development is, of course, the financial component offered by ERDF funding — "money talks". This financial, political instrument, is

[8] Så kan akademin skapa nytta i Europeiska regionala utvecklingsfonden 2021-2027, Policy in Practice

naturally heavily used also in the new Horizon Europe programme structure with the Clusters of Global Challenges presented in pillar two, as well as the Missions. The downside of ERDF funding is that recently a flat-rate calculation (of 20 %) has been applied for overhead costs, instead of the actual costs of 40 % or even more that many universities face in reality. As a result, many universities no longer see the ERDF and regional development as attractive funding, which in turn reduces the skills and innovative profile of projects. The combination of not recovering the actual costs and the increase in the co-financing rate from 50 % to 60 % in the next programming period, is of great concern for many higher education institutions.

Despite the fact that the ERDF aims at regional development, and despite the fact that higher education institutions should be considered as key players in smart specialisation strategies, contact and dialogue between higher education institutions and regional authorities is in several cases weak. *One possible action for the project InnoHEIs could therefore be to propose the creation of a continuously active dialogue group where the Swedish Agency for Economic and Regional Growth, the regions and the university can plan for future calls for proposals and building research environments in collaboration with other relevant regional actors. Maybe in similar manner as InnoHEIs project is running its process but more regular.*

Nevertheless, one of the main obstacles in contributing to regional development is that public outreach does not provide any scientific merit. To overcome this obstacle, relevant actors need to propose and implement relevant indicators for collaboration as evaluation criteria of funders and in the qualifications systems of universities. *In this context, as another suggested action from the InnoHEIs project, ERDF Middle Norrland, together with the regions and university, should sit down and look at relevant indicators for the next programming period, which also consider the needs of scientific merit for the researchers. As a good start one of the professors at MIUN have developed a follow up system for researcher so they easy can keep track of the indicators asked for by ERDF.*

Highlights from the international quality evaluation of Mid Sweden University research in 2021.

There are observations from the evaluators that have been identified in almost all feedback reports given to the research centras (RC)Research Innovation Infrastructure (RII) at other places in the report. They are listed here in no specific order.

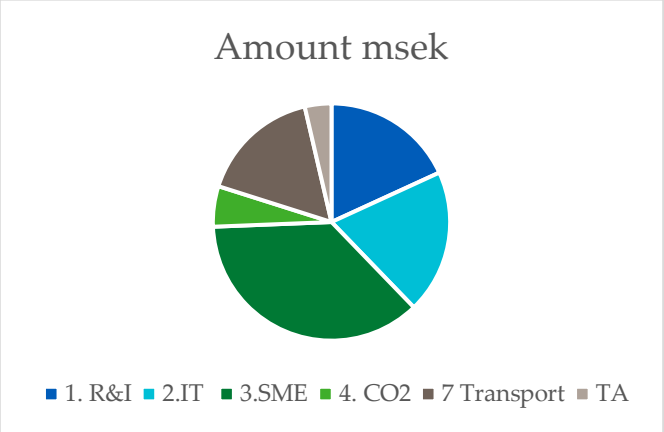
- The RC should explore new funding opportunities, both at national and international level, to reduce vulnerability. The RC are relying on few sources of funding today, they should diversify in order to secure the continuity of research activities and enhance visibility.
- Additional administrative support at faculty or university level is required to sustain and further develop internationalization: hosting arrangements, offload tasks from researchers, provide a welcoming and inclusive environment, assist with research applications.
- The RC should enlarge international networks to ease international positioning. Increase funding for guest professors and use them strategically, in order to increase funding, build networks and find potential PhD students.
- Its challenging for research groups to act locally with industry and at the same time increase globalization, which is a main goal for the whole university.
- Give PhD students, from different departments, opportunities to interact more often in order to create synergies, allowing large-scale cooperation projects and enhance use of infrastructure.
- Good equipment of the laboratories gives large potential in offering services for other companies, associations and institutions. Not done to such an extent.
- Expand the support and training of entrepreneurs, enable them to take knowledge and IP to build early-stage and spin-off companies/SMEs. Spin-off companies facilitate employment opportunities for graduated researchers.

- An active alumni engagement is necessary, acting as ambassadors for the university. National and global promotion.

How has ERDF been used in Middle Norrland during 2014-2020?

The amount of funding in ERDF between the different prioritised areas in Middle Norrland between 2014 – 2020 were:

Area 1 Research & Innovation	26,0 m euro.
Area 2 IT infrastructure and services	28,1 m euro
Area 3 support to SME	52,4 m euro
Area 4 reduction of CO2	7 m euro
Area 7 transportations	23,6 m euro
Technical assistance, admin	5,2 m euro.



By looking at how the ERDF funds in area one research and innovation have been used during 2014 -2020, it is seen that Mid Sweden University is getting a large portion of the funding. It is seen that out of the 26,0 million Euros used in area 1, the university have run 20 projects and the total

funding have been 19,2 m Euro. The conclusions from these data are that the university is dependent of ERDF. When looking into the different projects it is seen that a large portion of the ERDF is used to build the research infrastructure in the region. Is this good or bad? It is very good to build a research infrastructure in the region, not so many other financial R&D sources have the possibility to support building laboratories and testbeds. Our view is that t*he ERDF funding will be an important source to build capacity in the region also for the period 2021-2027. It is up to the researchers and other partners to use the infrastructure well and position themselves and their organisations nationally, in EU and internationally.*

SWOT of MIUN impact on the ecosystem in Middle Norrland

The InnoHEIs team at Mid Sweden University have used the SWOT tool to identify strengths, weakness, opportunities, and threats asking the question what impact do MIUN provide to the regional innovation system? How do the university contribute to increased competence and capacity and economic growth? We also asked ourselves if the university contributed to attract talents and capital. The results are shown in the SWOT analysis. The strength of the Mid Sweden University, MIUN is the existence of the eight research and innovation centras and the networking culture of the university on which the university is built. This is shown in their established digital distance education research, and working habits. The weakness which effects the possible impact from the universities research are the unclear coordination between the two regions, the Swedish Agency for Economic and Regional Growth (TVV) and the university. The main opportunity is the possibility of getting remote working implemented (AI) and the biggest threat is that Mid Sweden University is not identified as a key contributor in the regional development and the smart specialisation strategies.

The innovation system of the Middle Norrland region is atomized or filled with gaps. At least four different innovation support and policy making agencies are active. They are not necessarily coordinated.

The diversity of stake holder expectations, coordination of priorities, areas of interest, research calls and needs, to mention a few, have been a challenge for the university. Internal research policies, strategies and not least important, the individual interest of researchers, generated administrative strain, poorly perceived R&D impact, situations of mistrust and at times even disappointment on the local arena.

MIUN can consider creating a platform that can work as a regional catalyst or dynamo. This platform should as a minimum include one or two of the 8 RII centras and be coordinated on a regional level. The region should be aware of this, act and support it´s 'best fit'. The process could bring spin-off effects as a joint ability to solve problems and a readiness to interact in processes of localization (new companies).

This kind of (regionally) coordinated ambition are now hampered by the relative low knowledge of MIUN capacities and resources. Thus, the identification of MIUN as a resource is not obvious or at least difficult to obtain or promote.

Training and acceptance of differences in missions and capacities among the regional stakeholders is key. The ability to recognize and fill the gaps in the current structure is a challenge. The university is not advocating the introduction of a new project organization or office, rather an inhouse coordinating capacity with one single mission: Smoothening the interaction between operative but divergent structures. Less competition, agendas and more trust.

Improving Innovation and research infrastructure, from fragmented to integrated and sustainable cooperation between actors in Middle Norrland

Strength (in MIUN)	**Weakness (in MIUN)**
• **8 RII centras in MIUN** • Grant and innovation office • Student housing guarantee • Academic excellence? • Strong academic network, national, EU and international level • Strong business networks and interoperability • Well-functioning research communication on: multiple channels, width and depth • Impressive infrastructure despite such a small university (ARC21) • BSc and MSc students are actively involved in research activities • MIUN attracts students and researchers in the areas where they are strong, tourism, winter sport and forestry. • MIUN is built on, since the 80ths the culture of networking with students, researcher and surrounding companies.	• Unclear for applicant how the coordination between Regions & The Swedish Agency for Economics and Regional Growth, is done regarding ERDF. • MIUN R&D too dependent on ERDF • MIUN not identified as key stakeholder in S3 strategy RJH • Few networks between academia and intraregional industry (some not all areas), • Silo mentality in many RII centers • Researchers do not take advantage of existing incentives • Lack of support for reallocation of researcher and staff. • Culture of being content, not so much career possibilities. • Quality of RII is not clear • Too few PhD students • Too little rotation and new influences: many PhD students tend to stay at the university after graduation • Cannot always fulfill the demands on RII from regional stakeholder • MIUN do not have enough research capacity to support entrepreneurial SME
Opportunities (external) • Digitalisation and AI • Remote working • Transformation to a CO2 neutral society • New green deal EU • EU Horizont • Processum, Rise attract companies and researcher in the bioeconomic field • Strong global companies SCA, Permobil, BAE, Valmet etc... • Strong broadband infrastructure • Many national agencies have their offices in the region • DIGG, (national agency for digitalisation) have their head office in the region • Dynamic between cities and the countryside • ERDF second biggest fund in Sweden,1,6 M Euro.	• **Threats (external)** • Many SME in RJH that do not have time to participate in RII. • Not so many researchers have started companies • Fragmented innovation support. • Not enough actors that supports SME in clusters – to get access to ERDF and co work with SME. • Demography large and sparcly populated. • Politicians do not always identify MIUN as a key stakeholder and knowledge carrier for regional innovation development. • The regional leadership has different priorities depending on what region they belong to. • Politician are elected for four years at the time. • Lack of understanding of academic research and what they can contribute with. • Preconceived opinions and general strategies towards new universities

Discussion and some conclusions based on the different analysis

The InnoHEIs team are developing this discussion from the Mid Sweden university perspective, meaning that we are trying to understand other actors in the region, but we cannot speak for them. The major gap we have identified so far when analysing the impact Higher education institutes, mainly the research centers of MIUN have on the Middle Norrland ecosystem and on ERDF operational programme under the investment for growth and jobs goal one - Strengthening research, technological development and innovation.:

- Geography and the dynamics in the region create a gap in itself. The existence of two regions one university, long distances and dense population. Different cultural background large industry in the county of Västernorrland, service-oriented industry in the county of Jämtland Härjedalen.
- The innovation system of the Middle Norrland region is atomized or filled with gaps. At least four different innovation support and policy making agencies are active. They are not necessarily coordinated.
- Many stand-alone actors who are by themselves creating value but they are not integrated into a common ecosystem with similar view of Middle Norrland, so they can build on each other's strengths
- The roles the researcher and the research institutes of MIUN may and can take in the local/ regional context, participating in developing smart specialisation for example is unclear.
- The diversity of stake holder expectations, coordination of priorities, areas of interest, research calls and needs, to mention a few, have been a challenge for the university. Internal research policies, strategies and not least important, the individual interest of researchers, generated administrative strain, poorly perceived R&D impact, situations of mistrust and at times even disappointment on the local arena.

- An obstacle for researchers emerges from the fact that ERDF funding primarily addresses regional development by supporting the needs of small and medium-sized enterprises (SMEs) to acquire new knowledge, methods and processes, but does not consider the needs of the higher educational institutions. By considering the researcher's need for input from the companies instead of the companies' need for outputs from the researcher, this would allow companies to participate in shorter sprints, where the result will still be of relevance for them. Smaller companies may rather be the target group of a structure that can make knowledge available and collaboration possible
- Contacts and dialogues between higher education institutions and regional authorities are in several cases weak. Despite the fact that the ERDF aims at regional development, and despite that higher education institutions should be considered as key players in smart specialisation strategies.

Many of the gaps identified are built into the structure itself. The actors have different roles and maybe not always have a clear picture of the roles of others. Despite all the challenges we have identify, there is a willingness of the RIIs to develop its research and become stronger both in quality and in quantity independent if they belong to the university or not. They have all expressed a willingness to participate in the regional smart specialisation. The Research Innovation Infrastructures management ask for support and incentives to merit their academic careers while contributing to the development of the regional growth and development of the regional ecosystem. The RIIs at MIUN is very dependent on ERDF as a financing source which could be problematic in the next ERDF period, when the co-financing needs to be higher than in the previous period.
It is only the actors themselves that can fill the gaps. It is important to build the relations and capacity of each organisation to work closer together so the key actors in the region jointly can prioritise what is important. It is not always so that the RIIs at the university or in the region can support the different expectations. There might not be any research in the field or lack of capacity at that time. Then it is important that the university or other RIIs as well as clusters and science parks act as capacity brokers and have a

mindset of supporting companies and other actors with their networks. As the famous example of Silicon Valley ecosystem, which is built around the sentence, pay it forward and fail fast.

Background to the Middle Norrland Region History- Dynamics in the region Two regions with very different industrial structures[9]

Middle Norrland includes two regions; Region Jämtland/Härjedalen and Region Västernorrland. Jämtland/Härjedalen covers about 12 % of Sweden's surface area, but has only 1.5 % of the population (approximately 132 000). Västernorrland has about 5.3 % of Sweden's area with 2.3 % (approximately 245 000) of the population. The two regions have a relatively different history. In 1905, when Sweden's union with Norway ended, Jämtland and Härjedalen were separated from a long time very close association with Norway, and became the only fully landlocked region in Sweden. By the beginning of the 20th century, just over 40 % of all land in Jämtland had been purchased by the forest companies that supplied their sawmills along the northern coast with timber from the forests of Åland. Very little was invested in Jämtland. In 1906, the Government, (Riksdag) prohibited such acquisitions by the Norwegian Prohibition Act. At this time when almost all of Sweden began to industrialise, no mills were established and few industries in Jämtland. One reason was also that the strong people's movement that had grown up in Jämtland, did not at all want to see the country industrialised and Jämtland became a raw material producer.10 In retrospect, it can be said that Jämtland went directly from an agricultural community to a service community. In today's statistics on

[9] From the Shrec regional report on Middle Norrland, http://www.interregeurope.eu/shrec/library/#folder=3176
[10] http://sv.wikipedia.org/jamtlands_samtidshistoria

entrepreneurship and start-ups, Jämtland has the second highest figures for entrepreneurship (small enterprises) and third highest for start-ups11.

Region Västernorrland has a long history of industrial activities, mainly through the forest industry with many sawmills. Sweden's first major industrial area arose when hundreds of steam saws were built along the coast of Middle Norrland, the first of which started in Tunadal in 184912. In the latter part of the 19th century, the sawmill epoch meant that Västernorrland had a faster population development than the rest of the country. The industries which currently have a high level of specialisation and at the same time employ a large number of employed workers are insurance, telecommunications, the manufacture of paper and paper products, the manufacture of chemicals, the manufacture of other means of transport and forestry. Forests and digitalisation are two areas of strength for Västernorrland, which were also discussed within the framework of the National Innovation Council autumn 202013. Today's statistics show that Västernorrland has few enterprises and small business start-ups, while the median wages are high14.

Forest as a resource – over time – hundreds of units rationalised to scale

At the beginning of the 20th century, the forest was the dominant source of energy in Sweden's energy supply. Most of the wood went to households, to fuel and operation of steam engines and to charcoal for the ironworks.

Rationalisation in forestry and in the forest, industry has progressed fast, in 1970 there were 899 sawmills, all of which produced more than 1,000 cubic meters of sawn product. In 2019, this figure was 151.15 Over the same period, production has increased by 35 %. In 1951-1989, the number of paper and pulp mills decreased from 135 to 70, while the number of enterprises fell from just over 80 to 20 through closures and mergers. Most

11 Economic facts 2020
12 M.Nylinder, H.Fryk, Timmer, Swedish University of Agricultural Sciences, Uppsala 2011
13 Government Offices, Article from the City Council Committee, 8 October 2020
14 Ekonomifakta.se
15 M. Nylinder, H. Fryk, Timmer, Swedish University of Agricultural Sciences, SLU 2011

pulp mills that are now in operation have a long history and to survive they have grown into very large units.16 The number of employees in forestry and the forest industry has also fallen drastically and many heavy, harsh and damaged jobs have disappeared.

Just under 50 % of the forest land area is owned by individual private forest owners in Middle Norrland. The forests of limited companies are mostly owned by forest industry companies. During the 19th century, a large number of forest companies were formed, which mainly bought peasant-owned forest land in Northern Sweden. By mergers during the 20th century, the number of forest companies has been gradually reduced to only a few, but large companies17. The same development can be seen in the case of forest owners' organisations. In the 1960s and 1970s, many small local associations merged into regional associations. Today there are few forest owners' associations in Sweden.

16 M.Nylinder, H.Fryk, Massaved, Swedish University of Agricultural Sciences, SLU 2015

17 Agriculture and forestry in Sweden since 1900, Sweden's National Atlas 2011

Geography /Demography

The Middle Norrland region is situated in the north of Sweden, SE32 in EU language. Moving from the east coast to the mountains and the boarder to Norway. The map of the region SE32 and its place in the Swedish geography is seen in the figure. There is one university Mid Sweden University in the region located at two campuses Sundsvall and Östersund. The region is densely populated, except close the coastal areas and in Östersund / Åre. The environment is harsh. There are long distances between the cities and the countryside.

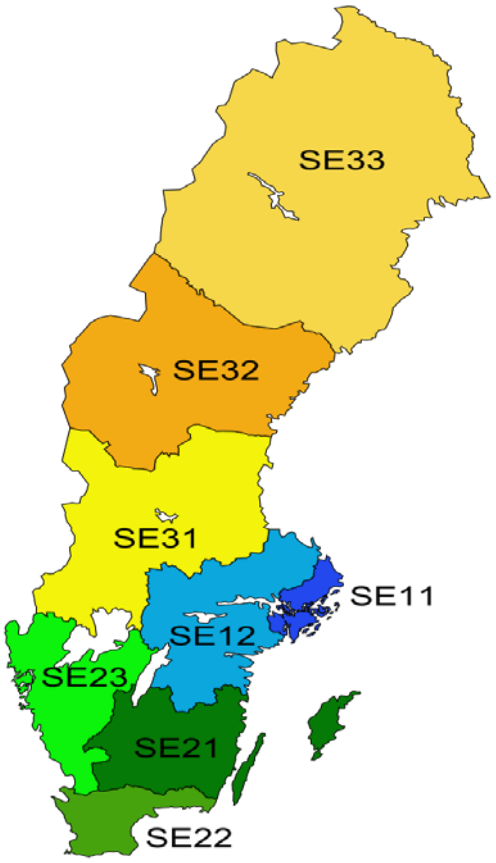


Figure shows the 8 NUTS regions responsible for their own ERDF fund

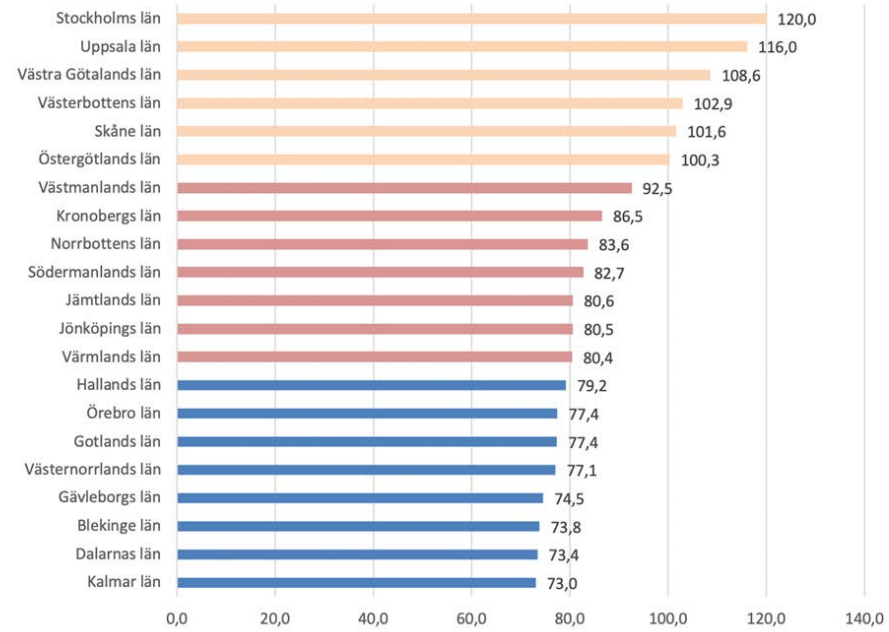
There are other research actors in the SE32 region, except MIUN, they are the Swedish research institute RISE and Umeå University situated in area SE33 and some private larger companies. The average income in the region is 20% below average in Sweden. The population is growing older and people are moving from the countryside to the cities. During the pandemic the demand for houses outside the cities have increased. The western area close to the mountains are attracting young people who want a different lifestyle. The amount of unemployment is 8% in Västernorrland and 7% in the region of Jämtland. The people between 25-64 years old with more than three years of education after high school were in 2020 about 28%.

The export value is the 4th highest in Sweden from the region of Västernorrland and the second lowest in the region of Jämtland. Regarding export of services, the region of Jämtland has a higher ranking than the region of Västernorrland but both regions are slightly below Swedish average.

Innovation Index

The global innovation scoreboard published in September 2021 indicated that Sweden is the second highly ranked country in the world after Switzerland.[18] The region of Västernorrland and Jämtland Härjedalen is shown in the figure 3. Innovation index for the Swedish regions 2019. Jämtland has an index of 80,6 and Västernorrland county has an index of 77,1[19] .

Figur 6. Samlat indexvärde för regioner år 2019



[18] https://www.wipo.int/global_innovation_index/en/2021/

[19] https://public.tableau.com/profile/kontigo.ab#!/vizhome/INNOINDEX_2019/1_Indexperregionochr

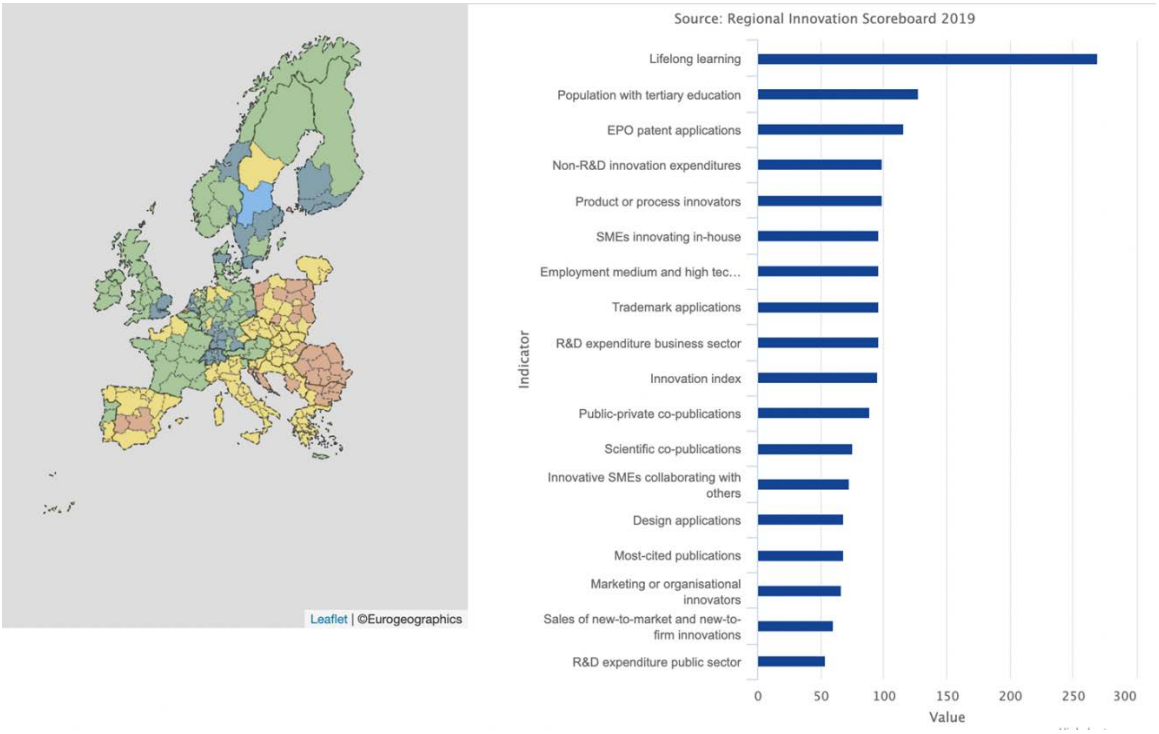


Figure 2. From the EU Regional innovation scoreboard 2019

The innovation index of SE32 Middle Norrland shows that the region is a moderate innovator compared to other regions in Sweden which are considered as strong innovators. This means that the Middle Norrland region is rather low in the national ranking. Even if Sweden is a high-performing country it poses challenges when it comes to competition for talents and capital for the region of Middle Norrland.

Actors in the Middle Norrland ecosystem for regional growth

A strong integrated innovation infrastructure is a crucial success factor for the work with both traditional commercialization and a broader utilization of research and education. Middle Norrland offers knowledge-intensive environments and clusters. Each organization are strong and focus on their own assignment. The region Middle Norrland needs to develop a process to go from a fragmented support system to a more integrated supports

system to enhance research and innovation. One way of doing that is to increase efficiency in the Swedish innovation support system through a new and deepened collaboration between employees in innovation offices – holding companies– incubators – science parks – clusters. The key actors from our, InnoHEIs project perspective are Mid Sweden University the smart specialisation owners meaning the regions of Jämtland Härjedalen and the region of Västernorrland and the managing authority of ERDF, The Swedish Agency for Economic and Regional Growth, Tillväxtverket (TVV) and the different municipalities in the regions.

Facts about Mid Sweden University

Mid Sweden University has two campuses, in Sundsvall and in Östersund. Campus Östersund is centrally situated in the city of Östersund and has cutting edge research and test environments in sports and outdoor activities, which offer fantastic opportunities for big brands and successful elite athletes.

In Västernorrland, which is heavily dependent on the forest industry, the research on finding new ways of using cellulose is of major importance for the development of the region.

A third of all new students from the counties of Jämtland and Västernorrland choose Mid Sweden University, and around half of all students stay in the region after their graduation, contributing to population growth.

Key information of Mid Sweden University, MIUN:

Mid Sweden University is one of the leading universities in Sweden in terms of distance education and conducts research in several cutting-edge areas. Close collaboration with working life and extensive external relations makes the university to stay dedicated and innovative.

Facts about the university (2020):

- 480 courses

- 60 bachelor-level education programmes
- 37 Master's programmes
- Approximately 24,500 students (of which about 6,000 on campus courses with equal distribution between Östersund and Sundsvall, the rest studying distance education)
- 170 postgraduate students
- 105 professors
- 1200 employees (700 in Sundsvall and 500 in Östersund)
- More than SEK 1 billion in turnover.

Regional impact:

- Mid Sweden University accounts for half of the addition of newly educated academics in Jämtland and Västernorrland County
- Of those who have studied at the university, 49 per cent remain in the counties two years after graduation
- A population supplement of around 39,000 people in the last 30 years
- Students and employees start about 1.5 companies per month with the help of the university's innovation support

The university has two faculties: Faculty of Human Sciences and Faculty of Science, Technology and Media. The research conducted at Mid Sweden University includes traditional subject research and thematic research and is organized under special units: centers and forums. The research centers are the centers for high quality research in the profile areas, and they also serve as a platform for collaboration with financiers and other interested parties. Research is also conducted in subject areas. This leads to a broad range of research projects and qualified researchers.

A center shall be a profile-bearing environment with a strong position within and outside the university, where the environment engages in a cohesive activity with a joint vision and plan that constitute the focus of the center's activities.

Since most researchers also teach, first-and second-cycle students get a natural insight into and a connection to the research conducted at Mid Sweden University in a certain subject.

Profiled Research Centres (Research Innovation Infrastructures (RIIs)).

There are eight research centers at Mid Sweden University:

CER – The Centre for Research on Economic Relations conduct industry-oriented research on economic relations of individuals and companies in the banking, insurance, pension, audit and real estate industries.

DEMICOM – conducts research on democracy and communication in the digital community.

ETOUR – The European Tourism Research Institute develops and communicates scientific knowledge about tourism and the travel sector as well as destination development.

FSCN – Fibre Science and Communication Network is a multi-disciplinary research centre. FSCN carries out research that supports the development of forest-based industries and new opportunities for forest-based biomaterials.

NVC – The Swedish Winter Sports Research Centre has a strong research focus on sports, performance and health, with specific excellence in winter sports.

RCR – Risk and Crisis Research Centre develops and communicates knowledge about risk, crisis and security.

STRC - Sports Tech Research Centre research in sports technology and products for outdoor and sports activities, as well as products meeting the demands of people with disabilities.

STC – Sensible Things that Communicate develops sensor-based systems and services for use within Internet of Things and AI. The research is conducted in the areas of electronics and computer science with a focus on Industrial IoT, next-generation measurement systems and functional surfaces.

Centre for Research on Economic Relations	DEMICOM	European Tourism Research Institute	Fibre Science and Communication Network
Conduct industry-oriented research on economic relations of individuals and companies in the banking, insurance, pension, audit and real estate industries.	Conducts research on democracy and communication in the digital community..	Develops and communicates scientific knowledge about tourism and the travel sector as well as destination development.	Carries out research that supports the development of forest-based industries and new opportunities for forest-based biomaterials.

Swedish Winter Sports Research Centre	Risk and Crisis Research Centre	Sensible Things that Communicate	Sports Tech Research Centre
Strong research focus on sports, performance and health, with specific excellence in winter sports.	Develops and communicates knowledge about risk, crisis and security.	Develops sensor-based systems and services for use within Internet of Things and AI.	Research in sports technology and products for outdoor and sports activities, as well as products meeting the demands of people with disabilities

Quality assurance process ERDF and Knowledge Foundation applications science, technology and media faculty, NMT

All project proposals to ERDF and the Knowledge Foundation must follow the faculty´s quality process. The purpose is to ensure a high scientific quality of the scientific part of the projects as well as to contribute to achieving set objectives for the calls.

ERDF

Project manager submits abstract, main research question, overall budget, preliminary partners, participating research groups, justification of long-term importance for the higher education institution - both scientific and economic, connection to the region's growth objectives and proposals for external reviewers of scientific quality.

Internal dialogue takes place, hearing with the faculty management.

The faculty board decides on which projects involving more than SEK 5 million are allowed to proceed in the process.

External scientific review and review of the achievement of programme objectives and benefit to the region. Dialogue with the dean after external reviews. Submission of complete application if external reviewers and faculty management approves.

The Knowledge Foundation

Project manager submits project proposal and abstract: list of participating companies, description of scientific challenge, the central research question and its relation to other scientific related work. For education development actions, a description of the competence needs and pedagogical challenges. For recruitments, a description of how they lead to a long-term valuable resource for the university.

External scientific and co-production review of the project proposal. Submission of complete application if external

reviewers approve of the application and if the application is approved by the faculty. Internal read-through to ensure that the proposals fulfil the formality requirements of the programs.

The quality assurance process for Human Science faculty.

The faculty for Human Science has a slightly different process to guarantee the quality of the application to the ERDF funds. It is described as follows The Screening process — Applications for EU Structural Funds 2014-2020. The hood faculty has decided to carry out a two-step pre-examination process for those who intend to apply for funding from the European Regional Development Fund via the Agency for Economic and Regional Growth for the period 2014-2020. The aim is to ensure that the research applications that are finally submitted are in line with the university's research strategies and that they strengthen the faculty's research environments. To the extent requested by the Agency for Economic and Regional Growth, the process will also form the basis for priorities for applications.

Step 1 — Abstract, financial framework, benefits for businesses (date)

A larger abstract should be presented here. The applicant shall also report the expected benefits for the region and grants for the implementation of the university's research strategies as well as a more detailed plan for funding. Proposals for scientific reviewers shall also be submitted. The documents are sent to the Registry for information on who intends to apply for funds, the dean is informed but only for information.

Step 2 — Full Project Plan (date)

Full project plan and presentation of external partners, to demonstrate the benefit to the region of the project. The project plans will be sent to external reviewers for review of scientific quality and co-production. Feedback is provided by external reviewers of scientific quality.

The faculty board decides to approve/refuse the submission of the application. The decision shall be based on the comments of the external

auditors (scientific quality and co-production). The Board has also assessed whether the application is in line with the university's research strategy. Depending on the date of submission of the application, the Board has at some point decided per capsulam and at some point, delegated to the dean the decision to approve/refuse the application.

Other R&I institutions in Middle Norrland

A strong integrated innovation infrastructure is a crucial success factor for the work with both traditional commercialization and a broader utilization of research and education. Middle Norrland offers knowledge-intensive environments and clusters. Each organization are strong

RISE – Research institute of Sweden

RISE is Sweden's independent, state-owned research institute and one innovation partner. Through international collaboration programs with industry, academia and the public sector, they ensure the competitiveness of the Swedish business community on an international level and contribute to a sustainable society. They offer unique expertise with 2 800 employees and over 100 testbeds and demonstration environments for future-proof technologies, products and services. In Middle Norrland they are represented by Processum, MoRe Research and Propell.

Processum – biorefinery development for at fossil free future

Processum is an industry-oriented and flexible research and innovation partner in biorefinery. Processum is also the hub of an innovation platform that spans both borders and industries, nationally and internationally. The are also running a national strategical development on bio economy. Through their large network of contacts, they can bring together entrepreneurs with established business, social actors and academia.

MoRe Research – Bioeconomics and Health

MoRe is a leader in research, analysis and industry-related process and product development in the paper, pulp and biorefinery industry. RISE has

had a long and close collaboration with MoRe, where premises, pilots and equipment have been shared and co-owned. MoRe Research AB will now be a partly owned subsidiary of RISE in the Bioeconomics division. From the turn of the year 2021-2022, MoRe Research AB will be part of the new division Bioeconomics and Health, Department of Biorefinery and Energy. The current owners
of MoRe (Eurocon, Kempestiftelserna, Metsä Board Sverige and Domsjö Fa briker) remain the owners with a total of 40 percent of the shares and see the deal with RISE as strategically important for strengthening the Swedish forest industry.

Propell[20]

Propell is a cluster and innovation hub offer research in the area
of sustainability and digitalization. Their strong national and international network and senior competence plays an important role to established companies and public organizations drive in investments in sustainable and digital transition. Propell is a collaboration between the municipality of Hudiksvall, Region Gävleborg and the research institute RISE. They have representation in Sundsvall as this organization also is a link for cooperation between two NUTs regions.

Private companies with significant R&D

Middle Norrland has strong private enterprise with close collaborations with institutes and universities. Examples of the largest companies are: SCA R&D Center, Permobil AB, BAE Systems AB, Akzo Nobel
AB, Domsjö fabriker, Mondi Dynäs, Bosch Rexroth AB, Valmet AB etc.

Innovation support organisations

A strong innovation ecosystem is also a crucial success factor for the work with both traditional commercialization and a broader utilization of research and education. Middle Norrland offers a wide range of innovation support organizations which complement each other and have a supporting role for both the individual idea owner and contributing to an

[20] https://propell.se/

integrated supportive innovation system. Middle Norrland has a long tradition in industrial innovation and therefor a leading position in Sweden in pattern application per capita. There are clusters within the regions, that support the companies and work with transition of the society into a more digitalized and sustainable work environment.

Bron Innovation[21]

Bron Innovation is Västernorrland´ s IT cluster and digital innovation hub that brings together over 90 private and public actors. The collaboration is well established in a triple helix model supporting innovation.

IUC Z-group R&D Centre [22]

IUC Sweden is owned by 11 independent IUC companies and has eight partners across Sweden. The organization is a link in the SMEs development chain and one important mediator of new knowledge and research institutes, industry organizations, authorities to Sweden's industrial companies. In Middle Norrland IUC Sweden is represented by IUC Z-Group R&D Centre.

Science Parks, incubators and accelerators in Middle Norrland

Science parks are stimulating and developing environments that offer knowledge-intensive growth companies' infrastructure, networks and business development. A science park can be described as a meeting place between people, ideas, knowledge and creativity. Science parks are often closely linked to a nearby university and in Middle Norrland Mid Sweden University is the geographically closest university. The region Middle Norland has two Science parks represented by **BizMaker AB**[23] and **PEAK Innovation AB**[24]. Each Science park hosts an incubator program, namely BizMaker Incubator and Peak Incubator. An incubator offers a dynamic process for the development of people, business and companies. The incubator assists entrepreneurs with support in active and customized

[21] https://www.broninnovation.se/
[22] https://iuczgroup.se/verksamhet/
[23] https://bizmaker.se/
[24] https://peakinnovation.se/

management support, business models, technical and commercial networks, creative and environment with associated office services. They host four accelerator programs with different themes that are open for national entry:

1.Forest Business Accelerator – for a greener future
(BizMaker Incubator)
2. Future Industry Accelerator – tomorrows industry
(BizMaker Incubator)
3. Youth Wellness Accelerator – to contract mental illness
(BizMaker Incubator)
4. PEAK Accelerator – active lifestyle
(PEAK Incubator)

Other innovation stimulating environments

-House Be – co-working area[25]
-Godmorgon Östersund[26] – co-working community
-Food tech – Region Västernorrland[27] is both active promoting local food currently creating a food tech hub to facilitate the transformation of the food industry to sustainable production with new production technologies.

-Food of Jämtland[28] is working with development of locally produced food

Almi Business Partner AB[29]

Almi Business Partner is a national actor that offers business development and loans to companies with growth potential. This applies to companies that are in the startup phase as well as existing companies.

[25] https://www.housebe.com/
[26] https://www.gomorronostersund.se/
[27] https://www.rvn.se/sv/Utveckling/naringsliv_innovation_digitalisering/smart-specialisering/utvecklingsomraden/foodtech/
[28] http://www.foodofjamtland.se/matakademien/
[29] https://www.almi.se/vasternorrland (jämtland)

Through the subsidiary Almi Invest, they invest venture capital in companies in the early stages with great growth potential and a scalable business concept.

Almi Företagspartner AB is 100 percent owned by the Swedish state. In addition to the parent company Almi Företagspartner, the Group consists of 16 regional subsidiaries, including four wholly owned subsidiaries. Almi Business partner Mitt AB is one of Sweden's regional subsidiaries are 51 percent owned by the parent company and 49 percent by regional owners (region Jämtland/Härjedalen and Region Västernorrland).

SNITTS – Swedish network for Innovation och Technology Transfer Support

SNITTS is a non-profit member-driven organisations and a knowledge arena for actors in the academic innovation support system. By providing a meeting place for exchange of experience, collaborations in the national innovation support system and competence development of individuals, we strengthen the bridge between academic research and the benefits created in society.

Coompanion

Coompanion promotes cooperative entrepreneurship - entrepreneurship that takes place on equal terms, where ownership and governance take place democratically and where sustainability from a social, economic and environmental perspective is safeguarded. There work results in companies that take social responsibility and create positive social effects, local and regional development and contribute to diversity of ownership models in the Swedish business community.

Leader

Leader is an EU initiative to develop rural areas within the EU. It is financed through the European Regional Development Fund. The leadership work takes place in a tripartite partnership where the public

sector, the non-profit sector and the private sector together decide on and implement projects. In middle Norrland four organizations are represented by Leader - MittLand, Leader-Sjö, Skog&Fjäll, Leader–HighCoast and Leader-3sam2.0.

Enterprise Europe Network, EEN

The Enterprise Europe Network helps supports innovation and growth on an international scale. It is the world´s largest support network for small and medium-size enterprises (SMEs) with international ambitions. The network is active worldwide and brings together 3000 experts from more than 600-member organizations. Member organizations include:
-technology poles, - innovation support organizations, -universities and research institutes, -regional development organisations, -chamber of commerce and industry.

Swedish Agency for Economical and Regional Growth is the Swedish member organization and in the region of
Middle Norrland, Almi Företagspartner Mitt AB is the local organization.

Swedish inventor's association

Middle Norrland has a long traditional in industrial innovation and has a leading position in Sweden in patent application per capita. Fore early phase idea and innovation development there is a national network that is well represented in Middle Norrland. The Swedish Inventors' Association promotes a strong innovation climate and in particular the individual's opportunity to contribute ideas for a sustainable future.

ERDF Funding -How does the Swedish system work?

The Swedish system of Structural Fund Partnerships[30]

In Sweden, the EU's requirements for partnership and multi-level governance have been implemented, among other things, through the creation of the Structural Funds partnerships. The partnerships prioritise funding between project applications that have been approved in a first step by the Swedish Agency for Economic and Regional Growth or the Swedish ESF Council. The partnerships are made up of both politicians and other members, and have secretariats in eight of the country's regions.

Partnerships are a way of realising the partnership principle

The aim of the partnerships is to contribute to the implementation of the Structural Funds programmes and to ensure coordination with other programmes. They do this by deciding which projects are to be prioritised for funding from the programmes. This is done at specific priority meetings.

The implementation of the programmes in Sweden follows a regional division into eight cross-country partnership areas. For each area, the government has established a partnership. The partnerships themselves are not public authorities, but their task of prioritising funds is the exercise of public authority. The partnerships were introduced for the 2007-2013 programming period, replacing in part a system of so-called Structural Funds delegations. The role of partnerships is set out in the Act (2007:459) on Structural Fund

[30] An audit report from the Swedish state audit office RIR 2020:10 Regional Structural Fund Partnerships: do they provide the conditions for the efficient use of EU funds?

Partnerships and is specified in the Ordinance (2014:1383) on the management of the EU Structural Funds. The Government has also set out certain guidelines in its decisions to appoint the chairperson of the partnerships. On the other hand, there are relatively few rules and agreed principles on the formation and functioning of partnerships. The Government also states that partnerships should be free to decide for themselves what considerations they wish to make in their priorities. On the other hand, there are more rules on how the authorities and partnerships will carry out their tasks in practice.

The Government has also given the Structural Fund Partnerships a task in connection with calls for proposals. It consists of the fact that the Swedish Agency for Economic and Regional Growth shall reconcile the criteria in the calls with the partnerships prior to their publication. Below is a picture showing the application process in brief

Application process is described in the figure below

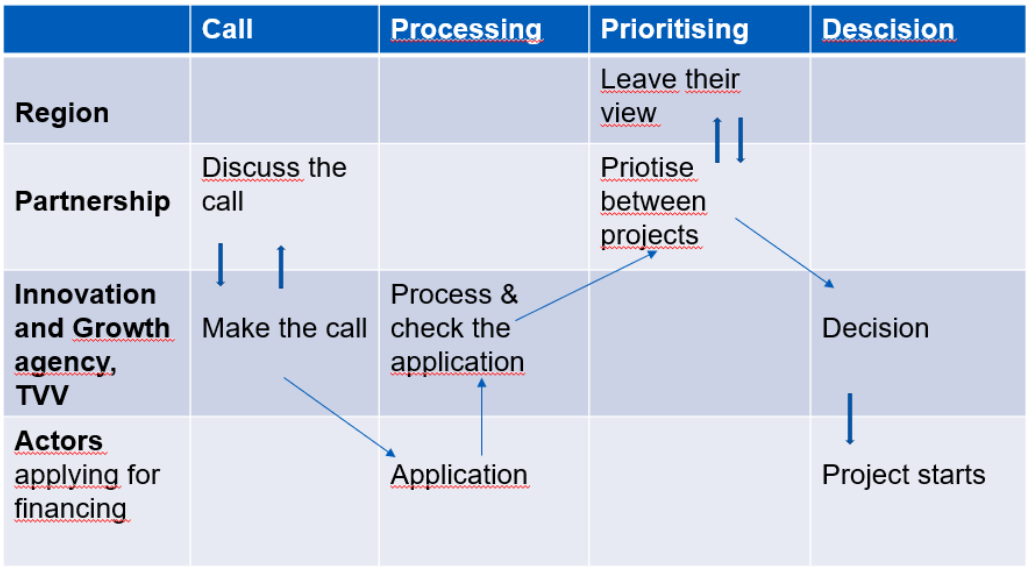


Figure. Application process to ERDF

The Swedish Agency for Economic and Regional Growth carry out an initial examination of applications.

ERDF and funds are channeled through calls for proposals, in which actors have the opportunity to apply for funding. The Swedish Agency for Economic and Regional Growth take the initiative and implement the calls for proposals. The authorities then examine the applications received.

The Swedish Agency for Economic and Regional Growth assessment of applications shall be carried out on the basis of what the Government calls an examination from a legality perspective. The regions may in many cases co-finance the projects and are also giving advice on what to prioritise. It is the partnership that prioritize the projects. Based on these inputs the decisions are made and an agreement can be signed between the applicant and the Swedish Agency for Economic and Regional Growth.

There are always different ways of implement the rules meaning there are difference between the regions.

Summary from the Swedish government audit of the governance of the ERDF funds in Sweden 2021 (RIR 2020:10)

The Swedish National Audit Office has examined whether the Structural Funds partnership system provides the conditions for effective implementation of structural funds programmes in Sweden. In total, this concerns the distribution of EU funds of more than SEK 12 billion in the period 2014-2020.

The audit shows that there are several problems with the Structural Funds partnership system. Taken together, the conditions for the effective implementation of the programmes are shortcomings.

The system of Structural Fund partnerships is complex and involves many actors. There are several ambiguities as to the responsibilities between them, and in practice many decisions are taken before project applications reach the partnerships. The conditions for efficiency are adversely affected

by increasing the time from application to decision, by the lack of learning in the system and by the fact that other than the projects' own qualifications are governing. There is also a lack of transparency in the system, which has a negative impact on legal certainty.

The role of partnerships has been limited

The partnerships have not played a significant part in the initial work of mobilising applicants and implementing calls for proposals. They have also lacked formal responsibility and financial resources for such tasks. Their importance for the regional anchoring in the use of EU funds is therefore limited. On the other hand, regions already play a key role in the implementation of EU funds, in that they are responsible for regional growth. They also co-finance operations under the European Regional Development Fund (ERDF) to a significant extent. As a consequence, other actors in the counties have limited opportunities to influence by participating in the partnerships.

Unclear priorities and absence of strategies

There are several problems linked to the role of partnerships in deciding which projects to receive EU funds, which together entail a lack of conditions for effective management of funds. For example, it is difficult for outsiders to get an idea of why partnerships prioritise as they do. Few partnerships have guidelines or strategies for selecting beneficiaries. Moreover, most partnerships do not set out clear reasons in their opinions, in some cases none at all, for which projects they prioritise or not.

Difficulties for partnerships to play an independent role

Many members of the partnerships are closely linked to the projects and actors seeking the funds they prioritise. There are several shortcomings in how partnerships deal with conflict-of-interest issues. It's both about who's fucked up and how partnerships deal with fucked members. Given the large number of members linked to the projects, it is difficult for the partnerships to carry out their task while complying with the current rules on conflict of interest.

Dialogue between partnerships and authorities can be improved

The Swedish Agency for Economic and Regional Growth have generally provided good support for the Structural Funds partnerships. Good cooperation between the authorities and the partnerships is essential for the proper functioning of the system, as they are responsible for each step in the assessment of project applications. The Agency for Economic and Regional Growth on the other hand, can become clearer and more consistent with the partnerships as regards the rules and procedures they apply in their management of projects.

Government needs to steer partnerships more clearly

An unclear division of responsibilities between the partnerships, the regions and the Swedish Agency for Economic and Regional Growth and the Swedish ESF Council is in several cases a contributing factor to problems highlighted in the audit. The partnerships are not authorities, but they have a task of public authority and work on behalf of the government. We note that the government has only to a limited extent steered the work of the partnerships, and that in several respects the government needs to be made clearer in its governance.

Recommendations from the Swedish audit suggest that the Government should:

Take the initiative to explore alternatives to the system of regional structural fund partnerships. This should include examining the responsibility for the processing and selection of applications for structural funds. In future, it shall be divided between authorities and other actors.

- Clarify the responsibilities of Structural Fund Partnerships vis-à-vis the regions.
- Require Structural Fund Partnerships to define the basis for prioritisation and to update them where necessary.
- Require clarification of the justifications given by the Structural Funds partnerships to their opinions.

- Ensure that Structural Fund Partnerships apply the rules in force on conflicts of interest in their handling.
- Review the grounds for appointing the members of the Structural Funds Partnerships. This is in order to achieve a composition where fewer members are closely linked to the actors who themselves run projects seeking the funds on which the partnerships express their views.

Appendix 1 Survey - the questionnaire for the GAP Analysis.

The questionnaire consisted of the following questions to the management of the different Research Innovation Infrastructures in Middle Norrland. We got 14 answers and the results are described in tables in this appendix, a summary of the report is included in the regional report from InnoHEIs.

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1. What is the name of your organization? :
2. Where is your organization located at in Middle Norrland? :
Other (please specify) :
3. What is the legal status of your organization? :
Other :
4. What is the main nature of your research and innovation infrastructure? Please choose one of the following answers: :
Other (please specify) :
5. Which Smart Specialisation Strategy (S3) priorities of Middle Norrland, Jämtland Härjedalen and/or Västernorrland does your facility focus on? Please choose one or more of the following options. If you choose 'Other', please define:
Other (please specify) :

6. Which research and innovation services does your facility provide? Please select one or more of the following options:
Other (please specify) :
7. Which type of external users can use your research and innovation infrastructure? Please select one or more of the following options. :
Other (please specify) :
8. Do you expect other external users to use your research and innovation infrastructure within 3-5 years?
9. What is the general user frequency of your research and innovation infrastructure?
10. What are the requirements for using your research and innovation infrastructure?
Other (please specify) :
11. Would you like to add extra requirements for using your research and innovation infrastructure within 3-5 years?
Policy restrictions:
Policy incentives :
13. Does your facility have institutional connections with other research and innovation infrastructure on regional, national and/or international level? Please choose one or more of the following options.
Other (please specify) :
14. Would you like to establish/improve institutional connectivity with other research and innovation infrastructure within 3- 5 years?
Please specify :
Local, Middle Norrland :
National level :
EU level :
International level :
16. Which cooperation models would you like to apply/implement within 3-5 years? Whom do you want to cooperate with and why?
Policy restrictions:

Policy incentives:

18. Do you have sufficient research and innovation capacity (= human resources and qualifications) at your facility?

Please describe :

19. How do you envisage your research and innovation capacity within 5 years? E.g. 5 more innovation managers with specific training by 2023.

Policy restrictions :

Policy incentives :

21. Where do your financial resources come from? Multiple answers are possible.

Other (please specify):

22. Is ERDF- structural funds for Middle Norrland relevant financial resource for your facility?

23. Who funds your research and innovation infrastructure?

24. Do you want to change the financial organization of your facility within the next 3-5 years?

Please describe :

25. Which financial resources do you target at within the next 3-5 years? E.g. specific regional, national, EU or international resources. Please describe these resources.

Policy restrictions :

Policy incentives :

27. Does your facility focus on regional challenges?

28. Would you like to focus on (other) RIS3-challenges within 3-5 years?

Please describe :

Policy restrictions :

Policy incentives :

30. Which organization(s) is (are) strongly dependent on you in your region?

31. Would you like to extend your regional influence within the next 3-5 years?

Please describe :

32. Do you depend on other organizations in your region? :
Please describe :
33. How do you envisage your dependence on others within the next 3-5 years? Will you be more or less dependent? :
Policy restrictions :
Policy incentives :
Positive features :
Negative features :
36. If you could change two regional features that influence your research and innovation infrastructure, which would it be? (Local, Midddle Norrland, national, EU, international) :
Example 1 :
Example 2 :