



# Skills for Smart Specialisation in Värmland Region

EXECUTIVE SUMMARY



Nordregio

Region Värmland is drawing up new strategies for regional development, skills and smart specialisation. In 2020 it commissioned Nordregio to review the skills supply and needs in the areas covered by its research and innovation strategy for smart specialisation 2015–2020. The aim of the review was to provide knowledge about the skills supply in the five areas designated in the strategy: Forest-based bioeconomy; Digitalisation of welfare services; Advanced manufacturing and complex systems; Nature, culture and place based digitalised experiences; and Systems solutions with photovoltaics. It also covers the horizontal specialisation value-creating services, as well as a process model for gender integration.

## SMART SPECIALISATION AND LABOUR MARKETS IN TRANSITION

The smart specialisation concept is based on relating strategies for regional development to specific local conditions and ensuring that they are based on existing areas of strength so that new ones develop. The concept builds on earlier theories of economic growth (Foray & Goenaga, 2013; McCann & Ortega-Argilés, 2015). The vital components of smart specialisation are often identified as universities and colleges, R&D, patents and links to industry. However, some would argue that in rural areas achieving critical mass is often more important (Hassink & Gong, 2019). The concept of “borrowed size” illustrates how smaller, more rural regions can be “scaled up” by working with other regions.

The clearest trend, and perhaps the most obvious pattern in the labour market – albeit before the COVID-19 outbreak, which may well have major impacts on the labour market in both the short and the long term – is the transition from manufacturing to services. This is the case all over Sweden and has created jobs, mainly in the cities and uni-

versity towns. The result of the transition is a high degree of integration between products and services, which in turn means that the distinction between a manufacturing company and a service company is now less clear (Andersson et al., 2018; Eriksson & Rodríguez-Pose, 2017; Eriksson & Henning, 2018),

## METHODS

The study was based on interviews with representatives of the five smart specialisation areas and the cross-sectoral gender integration in Region Värmland. The purpose was to identify the skills needed for the various specialisations to develop in line with the visions set out. What are the most important skills needed? How are these skills needs related to the development of current and future provision of education and training? A total of 20 semi-structured interviews were carried out during 2–25 March 2020. Due to the limited number of interviews per smart specialisation area, the results should be regarded not as definitive, but as a basis for discussion and further development with the participants in the various areas of specialisation.



*Picture: Sebastian Pocięcha / unsplash.org*

## What smart specialisation skills does Värmland need?

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The table below illustrates the results of the study, and lists the main skills required for Värmland region to be able to develop smart specialisation in line with the vision set out in the research and in-

novation strategy. The table shows skills with education and training from several levels are required for all smart specialisation areas.

**Table 1: Skills needs in areas of smart specialisation in Värmland region**

Area of specialisation	Value-creating services	Forest-based bioeconomy	Digitalisation of welfare services
Level of education			
<b>Postgraduate (PhD)</b>		New bio-based materials, bio-packaging, system effects, modelling, sustainability.	Digitalisation (data communications, software development and data security), service research, health science and gender science.
<b>Master's (MSc)</b>	Master's programme in servicification for students and professionals. Ongoing at Karlstad University.	Civil engineering programme focused on basic studies in mathematics, physics, chemistry, and specialisation in forestry-based bio-economy. New, bio-based materials, bio-packaging, system effects, modelling, sustainability.	Digitalisation, service research, health science and gender science. Digitalisation and e-health (including digital communication and interaction, data security and ethics) in all healthcare study programmes (for doctors, nurses and other care staff).
<b>Bachelor (BSc)</b>	Integration of servicification and productification in a range of study programmes. Change of perspective.	Sustainability.	Digitalisation, service research, health science and gender science. Digitalisation and e-health in all healthcare study programmes (see above).
<b>Higher education degree below Bachelor (BSc)</b>			Digitalisation and e-health in all healthcare study programmes (see above).
<b>Vocational training</b>			Digitalisation and e-health in all healthcare study programmes (see above).
<b>Secondary education</b>		Sustainability and forestry (early in school).	Digitalisation and e-health in all healthcare courses at secondary level.
<b>Continuing education and in-service training</b>	Training in servicification for private sector/ entrepreneurs.	Communication, project management, circular economy, legislation, digitalisation.	Systematic continuing education and training for healthcare personnel in digitalisation and e-health.



**Table 1: Skills needs in areas of smart specialisation in Värmland region - continued**

Area of specialisation Level of education	Advanced manufacturing and complex systems	Systems solutions with photovoltaics	Nature, culture and place based digitalised experiences
<b>Postgraduate (PhD)</b>	Further links between industry and university in project form.	Excellence, research and formal knowledge that spill over into degree projects and postgraduate studies. Importance of attracting excellence from elsewhere.	Importance of geomedia, i.e. the link between locality and digital sphere. Complementing traditional research areas with Deep Learning, AI and augmented reality.
<b>Master's (MSc)</b>	Importance of holistic and interdisciplinary perspective. Mechanical engineering in IT courses and IT in engineering courses. Integration of sustainability and servicification into these study programmes. More collaboration with industry.	Master's programme in solar energy (available at Dalarna University; needed at Karlstad University).	
<b>Bachelor (BSc)</b>	Importance of holistic perspective and interdisciplinarity, both within IT courses and to include IT into engineering courses. Integration of sustainability and servicification into courses. More collaboration with industry, e.g. on 3D printing.	Multi-disciplinary study programmes that develop synergies between data, electronics and electricity, including Internet of Things (IoT), innovation, design and entrepreneurship. Solar energy focus on electronics programmes. Importance of degree projects in the sector.	Media and communications science. Multi-disciplinary skills, web and design courses involving locality and participation. Web-based and digital development study programmes in games, AI, automation, robotics, and augmented reality. Pedagogy, including culture and music teaching.
<b>Higher education degree below Bachelor (BSc)</b>			
<b>Vocational training</b>		Vocational training courses in renewable energy, solar power, planning, solar technology and installation. Permanent installation and electrician training focusing on solar power.	Games development, video editing, VR video editing, scriptwriting, storytelling, guidance, etc. Flexible courses in close collaboration with the ICT sector, e.g. on digital learning platforms.
<b>Secondary education</b>		Great potential at the secondary level, including the electricity programme. Electricians and craftsmen are necessary for the development of the sector.	Secondary education and apprenticeship programmes are also relevant for certain skills areas listed above.
<b>Continuing education and in-service training</b>	Digitalisation programmes and courses.	Glava Energy Center's courses for installation engineers. Shorter courses for professionals.	In-service training on digital platforms and assistive devices in the tourism industry.

The table (p. 4-5) and the figure below show that the various areas of specialisation need a range of skills and that those skills differ between the various areas of specialisation. In some areas, the main need is to make existing education more interdisciplinary (e.g. in Forest-based bioeconomy and Advanced manufacturing and complex systems, but also in Nature, culture and place based digitalised experiences). In some, the need is mainly to develop customer and user skills (e.g.

in Value-creating services, Digitalisation of welfare services and Gender integration). In others, there is a specific need for more skilled working labour to develop the specialisation (e.g. Systems solutions with photovoltaics).

The table and the figure provide an indication of the skills needs in the various areas of smart specialisation and serve as a starting point for more in-depth analyses and discussion.

*Figure 1. Need for excellence and general skills in areas of specialisation.*

**Level of the need:**

- Mainly excellence
- Both excellence and general skills
- Mainly general skills

Level of the need	Area of specialisation	Skills needed
<ul style="list-style-type: none"> <li>○ Mainly excellence</li> </ul>	<p><b>Forest-based bioeconomy</b></p> <p><b>Forest-based bioeconomy</b></p> <ul style="list-style-type: none"> <li>○ E.g. bio-materials</li> </ul>	<ul style="list-style-type: none"> <li>○ Both excellence and general skills</li> </ul> <p><b>Forest-based bioeconomy</b></p> <ul style="list-style-type: none"> <li>○ E.g. basic studies in mathematics, physics, chemistry and specialisation in forestry-based bio-economy. Sustainability in forestry-based bio-economy.</li> </ul> <p><b>Systems solutions with photovoltaics</b></p> <ul style="list-style-type: none"> <li>○ Higher numbers of electricians, installation engineers and planning managers indicate a need for general skills. Inter-functional skills with a holistic perspective in innovation and solar power. Combination of electrical power, electrical engineering and data – a clear example of a shortage of excellence.</li> </ul> <p><b>Nature, culture and place based digitalised experiences</b></p> <ul style="list-style-type: none"> <li>○ E.g. the ICT sector: excellence in video editing, AI, VR, automation, robotics or games development, and augmented reality. Multi-disciplinary approach for ICT and tourism sectors, e.g. scriptwriters, storytellers, guides. Tourism: digital skills enhancement for practitioners based on need and locality.</li> </ul> <p><b>Gender integration</b></p> <ul style="list-style-type: none"> <li>○ E.g. enhancing skills within companies and organisations on gender integration and diversity issues, with support from research and process management.</li> </ul> <p><b>Advanced manufacturing and complex systems</b></p> <ul style="list-style-type: none"> <li>○ E.g. engineering and IT courses should be integrated. Both study programmes require a holistic perspective that looks at the production chain as a whole. Also broad continuing education in digitalisation.</li> </ul>
<ul style="list-style-type: none"> <li>○ Mainly general skills</li> </ul>	<p><b>Value-creating services</b></p> <ul style="list-style-type: none"> <li>○ E.g. study programmes and specialisations must integrate a service perspective. Master's course on which professionals develop a service perspective for their specific sector.</li> </ul> <p><b>Forest-based bioeconomy</b></p> <ul style="list-style-type: none"> <li>○ E.g. project management, communications, forestry.</li> </ul> <p><b>Digitalisation of welfare services</b></p> <ul style="list-style-type: none"> <li>○ E.g. user skills in digital welfare services in the healthcare and care sectors.</li> </ul>	

# Summary and conclusions

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## WHAT SKILLS ARE NEEDED?

This study shows that a range of skills is integral to the development of smart specialisation areas in Värmland. Developing them will require studies of – and reinforcement of – the dependency chains (or eco-systems) in the various areas of specialisation. This involves everyone in the respective smart specialisation areas, from spearhead researchers to multinational companies, service developers, professional craftspeople and storytellers. It is precisely from such multi-disciplinary meetings that cross-fertilisation, new approaches, progress and business development opportunities emerge. Development of smart specialisation areas requires a solid foundation comprising both broad, basic skills and more specialised skills. Many informants, not least in Forest-based bioeconomy, indicated that a key approach would involve basic mathematics, physics and chemistry, combined with a shorter final specialisation.

In order to identify the skills needed, it is necessary to look below the macro-level to the micro-level and identify the specific needs in individual areas of specialisation, industrial sectors and companies. It is even valuable to look at professions to see which skills need to be developed within them.

One example in recent years is civil engineering: today, civil engineering programmes must include both industrial and service competence. This is also reflected in the interviews conducted for this study, which indicate a growing demand for civil engineers capable of

working in multi-disciplinary teams – i.e. who have both good basic education and training, and a specialisation within a particular area. Another example is the demand for digital user skills both in the welfare sector and in the area of digitalised experience of nature, culture and place.

As one of the researchers interviewed pointed out, there are two different types of skills that are in demand in regard to digitalisation: facilitation skills and user skills. The former means that there is a demand for graduates who have system knowledge, i.e. locally based system developers capable of producing system solutions and facilitating system changes, for example, developers, data specialists, programmers or systems experts. More generic skills are also in demand, for example, in project management and marketing. However, also as regards system users skills enhancement is needed. Those may have a secondary education or vocational training, or may already be in a job but need short in-service training courses. Above all, they need to be curious, adaptable, and willing to experiment and try new things.

This rationale was confirmed in the interviews, which highlighted a need for skills enhancement for users (for example in regard to Digitalisation of welfare services and care and gender integration) and customer skills (for example, in Nature, culture and place based digitalised experiences and Value-creating services). However, it is often difficult for companies to be specific about the skills they need. What does a job advertise

supposed to describe the need for skills in business logic or servicification look like? Not to mention the fact that companies evolve all the time based on both their existing skills and new ones they bring on board.

### **WHO CAN PROVIDE THE REQUISITE SKILLS?**

The most important arguments in favour of education and training are that they promote individual development, contribute to the development and regeneration of companies, and that they boost economic growth in the longer term, as is well documented in the research literature (for an overview, see, e.g. Eriksson & Henning, 2018). In this context, higher education's most important function is to provide a scientific platform, and higher education institutions has been steadily expanding across the whole country.

As the interviews make clear, the big problem is the lack of continuous education and training and in-service training. Many people consider vocational training to be a good foundation upon which to build, but it has to be complemented to a greater degree with supplementary training, tertiary education and shorter courses. The low number of applications for vocational courses at secondary school level that do not provide access to higher education shows that students want a platform that offers personal development opportunities and a clear path to continue their educational journey.

***“Why not think about the renewal of human capital in the same way? After all, research says human capital is the most important basis for renewal and innovation.”*** -Interviewee

At present, there are few supplementary courses for people already in work, partly because the state has been reluctant to fund purely internal company training. On the other hand, the state supports innovation and renewal projects with funding.

In other words, the current education and skills-enhancement system is quite inflexible. There is a lack of a clearly thought-out system or model for how lifelong learning should be organised and financed. There are several different systems, such as education exchanges, education accounts, education cheques and YouTube courses, that could serve as inspiration. Aside from questions about how to organise such a system and who should pay for it, one challenge is how to encourage companies to prioritise skills enhancement during different economic cycles, both when the economy and companies are thriving and when the economy is going down and the companies lack resources for education and training.

***“It is surprising that in spite of everything, it works as well as it does. How this is would make a good research topic.”***

-Interviewee

It must also be remembered that, based purely on growth and productivity which are the primary measures of business performance – it appears as if in general the supply of adequate skills is working.

In the wake of the COVID-19 crisis, one important issue will be identifying which activities state and other public-sector bodies will launch in order to help companies recover. Skills enhancement will undeniably play an important role in that process.

## SKILLS - A QUESTION OF ATTRACTIVENESS

In order to develop areas of smart specialisation in Värmland, it is vital to attract highly skilled labour to the region from Sweden and beyond – and to retain them. Karlstad University plays a key role in this. While the university faces fierce competition from other universities, such as the Royal Institute of Technology in Stockholm and Chalmers University of Technology in Gothenburg, competition is just as fierce for many of the Värmland companies in the international market. It is therefore vitally important to be able to offer attractive, welcoming workplaces that make good use of all of their employees' skills. In terms of gender and diversity integration, a great deal can be done in order to live up to the promises and make more of an impact.

A sustainable region that is an attractive place to live and work – in terms of residential areas, schools, public services, culture and the natural environment – is also important. In addition to being responsible for the skills enhancement of its own staff, particularly in terms of healthcare, the most important tasks facing Region Värmland are to regularly follow up on and analyse issues relating to skills supply; safeguard the attractiveness of the region, and ensure that the region's stakeholders work together on both short-term initiatives and longer-term strategies.

The COVID-19 pandemic will have major consequences for business and the Swedish labour market. As yet, however, it is too early to predict exactly which changes will be the most significant in the longer term. The current economic crisis will have important consequences for the labour market and affect which skills are in demand. Tracking these trends will, therefore, be an important research task.

### **Further reading:**

Andersson, Lars-Fredrik, Rikard H. Eriksson & Emelie Hane-Weijman (2018) *Växande regionala obalanser*, Ekonomisk debatt, <https://www.nationalekonomi.se/sites/default/files/NEFfiler/46-8-lfarheehw.pdf>

Foray, Dominique & Xabier Goenaga (2013), *The goals of smart specialisation*, JRC Scientific and Policy Reports, S3 Policy Brief Series No. 01/2013, [https://s3platform.jrc.ec.europa.eu/documents/20182/115084/JRC82213\\_The\\_Goals\\_of\\_Smart\\_Specialisation.pdf/f5908687-6a34-42d7-bfd1-735e882e3681](https://s3platform.jrc.ec.europa.eu/documents/20182/115084/JRC82213_The_Goals_of_Smart_Specialisation.pdf/f5908687-6a34-42d7-bfd1-735e882e3681)

Hassink, Robert & Huiwen Gong (2019) *Six critical questions about smart specialization*, *European Planning Studies*, 27:10, 2049-2065, DOI: 10.1080/09654313.2019.1650898

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The working paper was part of the special focus on skills within the framework of the Nordic cooperation programme and the thematic group of Innovative and Resilient Regions. The full report can be retrieved from:

<https://nordregio.org/publications/kompetensbehov-for-smart-specialisering-i-varmland/>

**Research contacts:**

Anna Lundgren  
Senior Research Fellow  
[anna.lundgren@nordregio.org](mailto:anna.lundgren@nordregio.org)

Anders Olsson  
Strategist at Region Värmland  
[anders.olsson@regionvarmland.se](mailto:anders.olsson@regionvarmland.se)

**Cover photos:** Øyvind Lund