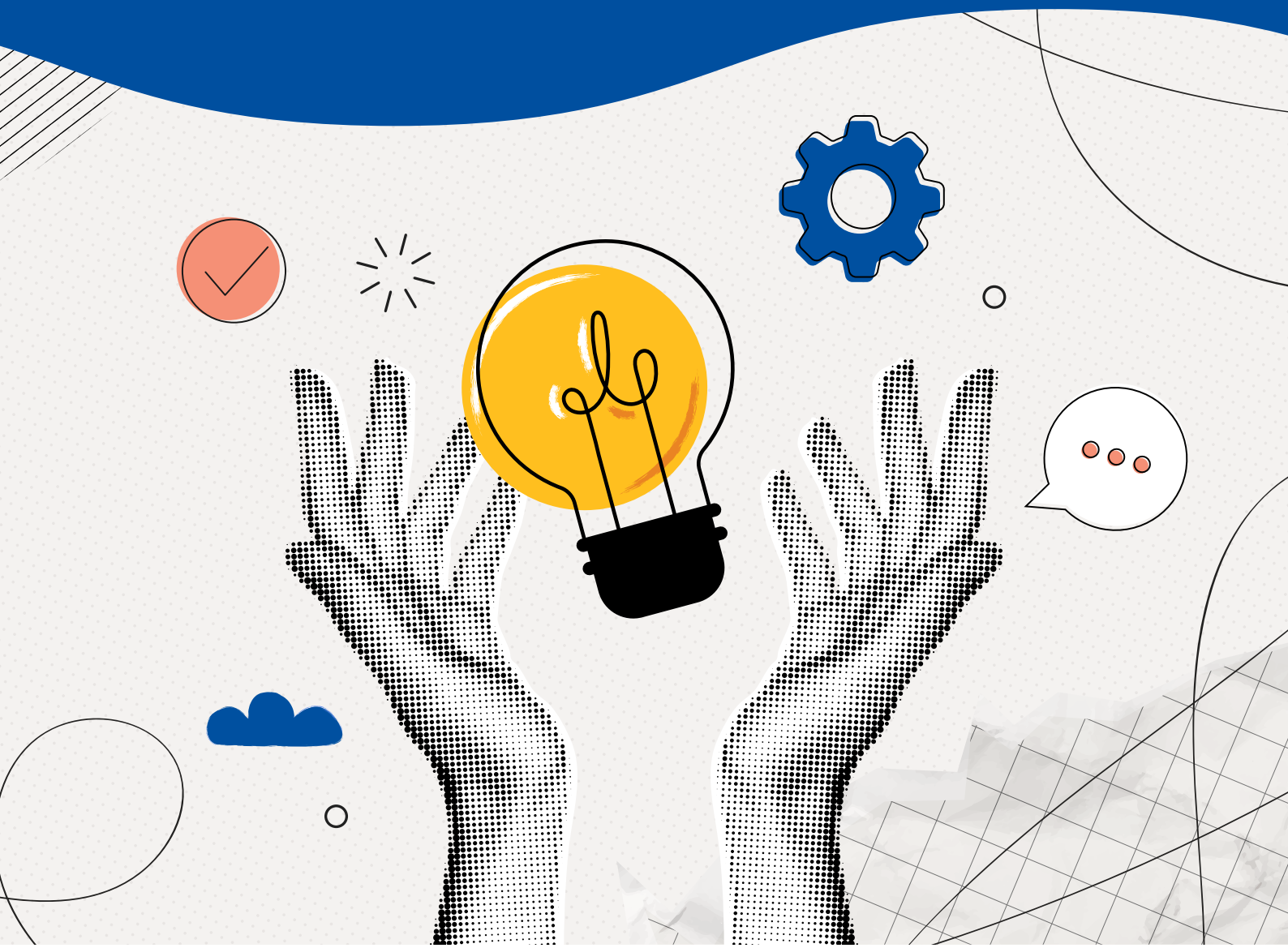
How is Västerbotten's Innovation Ecosystem Doing?



Interreg
Co-funded by the European Union
Northern Periphery and Arctic
RIO
region västerbotten

Content

How is Västerbotten's innovation ecosystem doing? 3

Executive Summary 4

1. Introduction 5

1.1 Background 5

METRIC and Regional Strategic Documents 6

Purpose 6

Key Actors and Preconditions in the Regional Innovation Ecosystem 7

2. Measurement of Västerbotten's Innovation Ecosystem 10

2.1.1 Technology 10

2.1.2 Research and Development 11

2.1.3 Human capital 16

2.1.4 Entrepreneurial capacity 19

2.1.5 Business support 21

2.1.6 Actors and connections in the innovation ecosystem 22

2.1.7 Financial capital 24

2.1.8 Infrastructure 25

2.1.9 Legal and regulatory environment 27

2.1.11 Markets 29

3. Analysis 31

Statistical covariation between indicators 33

Analysis of regional strengths and weaknesses 34

4. Conclusions and recommendations 37

Method and data sources 40

1. Overview 40

2. Measurement model 40

3. Measurement method 41

4. Analysis and interpretation 41

5. Follow up 42

6. The Business Survey, (NLE 2024) 42

7. References and data sources 42

How is Västerbotten's Innovation Ecosystem Doing?
Produced by: Regional Development Administration, Region Västerbotten and Umeå Municipality
Graphic Design: Krux

Foreword

How is Västerbotten's innovation ecosystem doing?

Västerbotten's ability and capacity for innovation must continuously increase in order to achieve regional, national, and global development goals. The capacity for faster green, inclusive, and digital transformation will be decisive for how the county's actors perform in competition, today and in the future.

Region Västerbotten has long worked to make Västerbotten more innovative. This work includes bringing together actors in the county, identifying regional needs and solutions, and implementing development initiatives to increase innovation, change, and renewal.

This report is an important step in Västerbotten's development of its innovation ecosystem. Over six years, Region Västerbotten, through the projects Regional Innovation Management Västerbotten, RIV, and Regional Innovation Management in Transition, RIO, has developed and tested the measurement method Measurement of Regional Innovation Capacity, METRIC, to assess the county's ability and capacity for innovation.

The purpose is to identify strengths, challenges, and opportunities, and to create strategic questions that can influence which areas should be prioritized at national, regional, and international levels. The report is part of an ongoing effort to strengthen Västerbotten's innovation ecosystem, and the methodology is available for download at innovationsekosystemet.se, together with recommendations for use.

Patrik Sällström, Regional Director of Development

Executive Summary

The regional measurement model METRIC (Measurement of Regional Innovation Capacity) has been developed to provide a snapshot of Västerbotten's ability and capacity for innovation. It combines statistical data and surveys, offering a stronger evidence base for understanding both strengths and challenges.

Measurements based on METRIC indicate that Västerbotten's innovation ecosystem rests on a strong knowledge base, including universities, research, education, and digital infrastructure. The region is also home to many strong and innovative companies, as well as a strong entrepreneurial spirit, which contributes to Västerbotten's already solid position. Positive trends include an increase in knowledge-intensive jobs, a growing student population, and rapid digital development. Despite these favourable conditions, they are only partially translated into new products, services, and markets, indicating untapped potential to further utilise ongoing research.

Human capital is one of the region's most evident strengths. Universities and higher education institutions in the county have reached their highest student enrolment levels to date, and the share of knowledge-intensive jobs continues to rise. The proportion of highly educated individuals and those with a STEM background (Science, Technology, Engineering, and Mathematics) has increased steadily, placing Västerbotten in a strong national position. At the same time, recruitment difficulties continue to limit innovation capacity, and graduate retention rates are low compared with other regions, highlighting the need for more qualified jobs and improved conditions for labour market entry.

Since 2021, the region's focus has increasingly shifted towards business development and digitalisation, with increased access to risk capital and strengthened technical infrastructure. The emphasis has moved from a primarily research- and knowledge-based logic towards a more market- and digitalisation-driven approach.

Several established indicators within research and development (R&D) show weaker performance and have developed more slowly than more market-oriented measures, reflecting a broader shift towards a more market- and digitalisation-driven logic.

Entrepreneurship and market-driven development show positive trends, but a lack of early-stage capital remains a challenge. The number of high-growth firms is relatively high, yet the sustainability of scaling declines faster than in comparable regions. Venture capital volumes have increased significantly, but year-to-year fluctuations are substantial, and access to seed capital remains limited and volatile. Only a small share of companies export innovation-based products and services, which constrains the commercialisation of new technologies.

Collaboration across the innovation value chain is unevenly developed. Only a limited share of companies collaborate with universities, research institutes, and innovation-support intermediaries, and few use innovation-friendly procurement as a method for developing and testing new solutions. This creates an implementation gap, where research results and technological enablers are translated into commercial or societal value only to a limited extent.

Overall, the measurements show that Västerbotten has strong underlying conditions, while the interaction between knowledge production, entrepreneurship, capital, and market introduction needs to be strengthened. To further develop innovation capacity, strategic initiatives are required to enhance the utilisation of research, improve access to early-stage capital, increase companies' awareness of support structures, and create faster pathways into the labour market for students and international talent.

1. Introduction

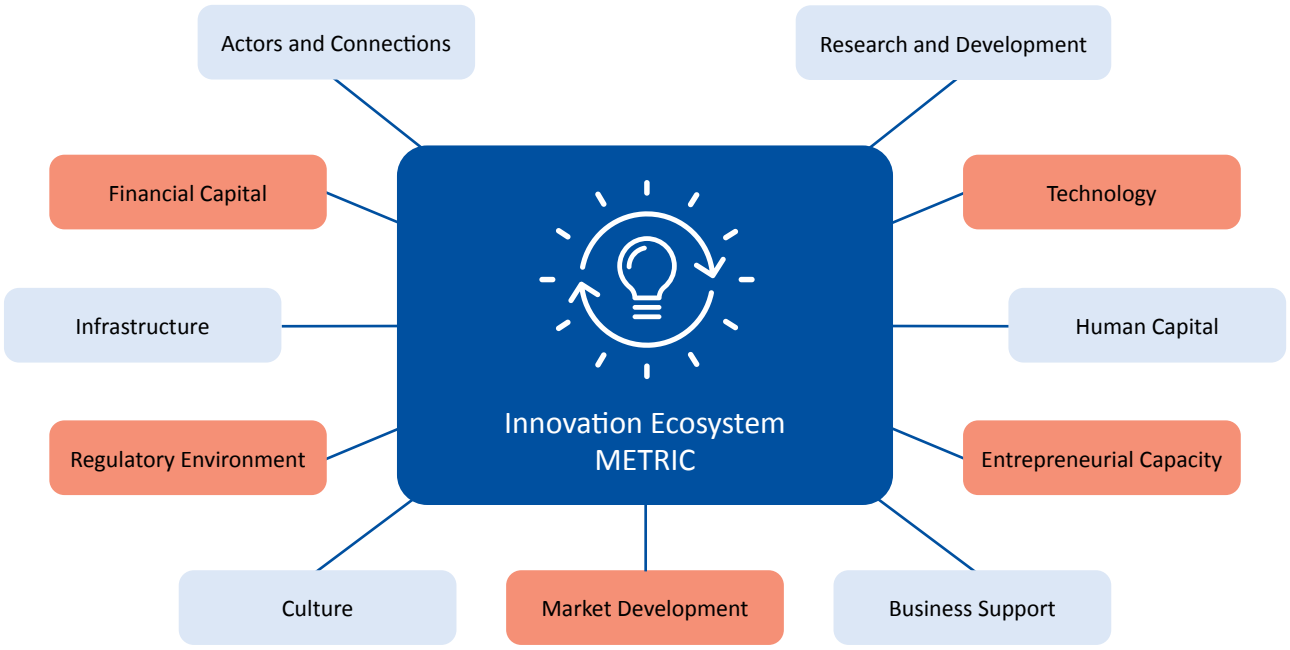
According to the EU's general definition, innovation is the use of new ideas, products, or methods where they have not been applied before. Today, innovation is seen as the result of collaboration, co-creation, and a diversity of actors, where companies, academia, the public sector, civil society, and citizens together drive development forward. A strong innovation ecosystem can enhance competitiveness, promote entrepreneurship, and generate societal value.

Regions need well-developed innovation ecosystems to remain competitive at both the national and international levels. By aligning resources, expertise, and stakeholders in a common direction, regions can develop innovation capacity, support companies and entrepreneurs, and create added value that increases quality of life and welfare. The innovation ecosystem is closely linked to the regional business environment and plays a central role in regional development.

1.1 Background

The concept of the innovation ecosystem emerged during the 2000s as an evolution of earlier linear innovation systems. While traditional systems often followed a straight chain—from research to development and commercialisation—today's concept of ecosystems is characterised by networks, openness, and dynamism. Ideas can arise at any time, anywhere, in unexpected contexts, and quickly take shape through interaction. This perspective highlights that innovation is not solely about technology, science, or investments, but also about social processes and organisational solutions. In practice, this means that companies, academia, the public sector, civil society, and citizens can all play active roles in creating innovations.

This report contains an analysis of Västerbotten's innovation ecosystem based on the measurement model Measurement of Regional Innovation Capacity (METRIC). The data and analysis presented in this report provide a comprehensive overview of Västerbotten's ability and capacity for innovation and assess the system at an overall level. Each indicator could, in principle, serve as the basis for a more detailed analysis. However, since METRIC aims to provide a holistic view of the system rather than focus on fine-grained detail, such a level of detail is not the focus here. METRIC covers eleven dimensions and over 60 indicators, which together provide an overarching picture of the region's innovation capacity and capabilities.



METRIC and Regional Strategic Documents

By collecting and analyzing data on regional innovation capacity, METRIC contributes to creating conditions to achieve the goals of Västerbotten's Regional Innovation Strategy 2022–2030 (RIS), regarding increased innovation capacity, sustainable transformation, and coordinated regional efforts. In this way, METRIC functions as a support tool for RIS. The model translates the strategy's vision of an innovative and smart region into actionable insights.

METRIC makes it possible to identify strengths, challenges, and development needs to achieve the strategy's vision of an innovative and smart region. It has the potential to strengthen the region's innovation capacity, thereby creating the conditions to meet the goals formulated in both the Regional Development Strategy for Västerbotten 2020–2030 (RUS) and Agenda 2030, as innovation capacity is often a prerequisite for tackling major societal challenges.

Purpose

The purpose of the report is to provide an overview of the capacity and capability of Västerbotten's innovation ecosystem. The expectation is that the METRIC model and its results will provide a valuable knowledge base, which can also lead to insights, ideas, and coordinated efforts on how Västerbotten's innovation ecosystem can be further strengthened and developed. Achieving this requires a common platform and dialogue about what the map of the ecosystem shows and needs.

Since METRIC's indicators cover a wide range of knowledge areas and responsibility for development can lie with many different actors, a coordinated effort is essential to further develop the system. In some cases, responsibility lies outside Västerbotten, and here METRIC can act as a tool to support advocacy efforts for increased innovation capability and innovation capacity at both regional and national levels. At the national level, this includes, for example, tax incentives, research funding, and legislation. At the local level, the business sector and civil society play significant roles, with many actors and private initiatives making their own decisions.

The need for a fact-based foundation built on regional data was the starting point for developing a regional measurement model. Systematically and continuously monitoring development over time was another important aspect, as was ensuring that the model is based on a sufficiently broad set of indicators to provide a comprehensive view of the system and to enable development efforts.

The purpose and utility of the report can be summarised as follows:

- Assess and monitor Västerbotten's innovation capacity over time.
- Creating a shared platform and overview is intended to support both strategic decision-making and practical development work within the regional innovation ecosystem. For example, it has the potential to underpin regional strategies. The material also has the potential to stimulate collaboration and discussion. By highlighting facts and shared challenges, the report can function as a platform for dialogue and co-creation.
- Knowledge-building resource for policymakers, users, and the public, showing strengths and weaknesses in different areas. The report provides a fact-based foundation for prioritisation, resource allocation, and strategic initiatives, as well as the opportunity to identify areas where interventions can have an impact and where collaboration needs to be strengthened.

Key Actors and Preconditions in the Regional Innovation Ecosystem

Västerbotten's innovation ecosystem consists of several types of actors and systemic conditions that together create the structures, flows, and processes necessary for innovation to be developed, tested, and disseminated. These actors and conditions can be broadly described in three layers: the public innovation ecosystem, the market-driven innovation ecosystem, and organisations' internal innovation management systems. The ecosystem as a whole is shaped by the interaction between these layers.

Public Innovation Ecosystem

This is the outer layer and includes the actors and structures that set the overarching conditions for innovation in the region. This layer encompasses Region Västerbotten, municipalities, national authorities, and universities and colleges, which both produce knowledge and act as public innovation nodes.

Key universities such as Umeå University, Swedish University of Agricultural Sciences (SLU), and Luleå University of Technology in Skellefteå are central actors in Västerbotten's innovation ecosystem through their broad research activities, educational capacity, and role in providing skilled labour.

Region Västerbotten has a regional development responsibility and creates governance through strategies for regional development, smart specialisation, skills provision, and digital transformation. Municipalities are important arenas where societal challenges are addressed directly, and new solutions need to be developed and implemented, for example through innovation procurement, digital services, and collaboration with academia and industry.

Policy tools, regulations, and funding systems also form part of this layer, influencing the conditions for innovation—from national legislation and intellectual property rights to innovation programs and public funding mechanisms.

The public innovation ecosystem is also responsible for large parts of the region's infrastructure, both physical and digital, as well as research environments and campus areas. These elements are fundamental for the county to attract talent, conduct advanced research, and provide scalable development environments.

Market-Driven Innovation Ecosystem

This layer encompasses the innovation processes of the business sector. Here, actors interact with incubators, accelerators, science parks, industry organisations, and other intermediaries that provide specialised innovation support.

University holding companies, innovation offices, incubators, and science park environments act as crucial linkages between academia, business, and the public sector in the region.

In Umeå, Umeå University and its innovation office play a pivotal role, together with academic incubators such as Uminova Innovation, Expression Umeå, and Umeå Biotech Incubator, currently being reorganised together with Umeå Science Park. Another actor is the incubator BIC Factory. Together, these organisations provide development environments for entrepreneurship.

Similarly, in the Skellefteå area, Luleå University of Technology operates a campus where Arctic Business Incubatorand Skellefteå Science City serve as key actors for business development, industrialisation, and innovation-driven transformation initiatives.

In addition, SLU contributes through research and innovation environments in areas such as Röbäcksdalen, Vindeln, and Sävar, with activities closely linked to application, test environments, and incubator-like support.

State research institutes such as RISE and IVL further strengthen the regional innovation ecosystem through their presence and staff in both Umeå and Skellefteå, acting as important bridges between research, industry, and societal challenges.

Private investors, venture capital firms, and technology- and knowledge-intensive companies are also part of the market-driven ecosystem. Together, these actors form a system where ideas are developed, tested, scaled, and commercialised. Market structures and customer needs are important drivers, as demand for solutions creates incentives for innovation.

The system is closely dependent on regional human capital—i.e., the skills and composition of the workforce—as well as cultural attitudes toward entrepreneurship, including risk-taking and collaboration.

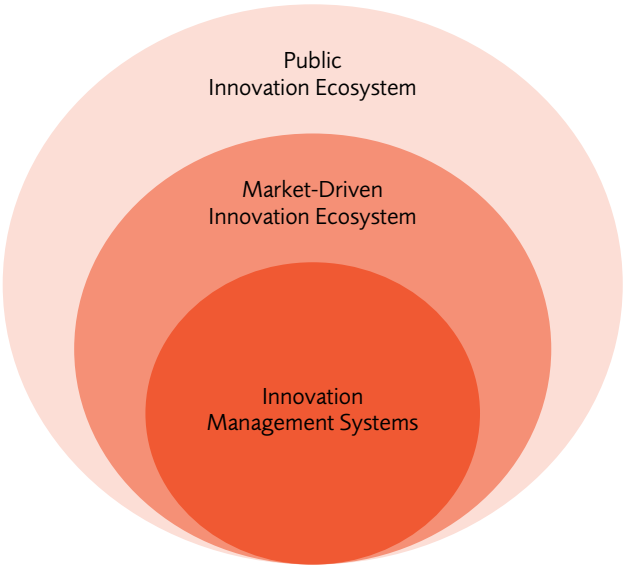
Innovation Management Systems

The innermost layer consists of individual companies' and organisations' own innovation management systems. This includes structures, processes, workflows, strategies, and resources that make it possible to identify needs, develop new solutions, and transform ideas into products, services, and improvements.

Innovation management systems form the foundation of an organisation's ability to leverage opportunities arising in the other layers. This encompasses leadership, innovation culture, competence, internal R&D capacity, financial resources, and strategic capability to integrate external inputs.

Companies, the public sector, and civil society are the practical arenas where ideas are tested, prototypes are developed, and market-oriented and socially beneficial innovations emerge. The connection between the internal capabilities of companies and organizations and the support available in other layers is therefore crucial for regional innovations to develop and achieve impact.

Picture 2. How innovation operates on three levels: organization, business, and public sector. Ozan, H., & Steiber, A. (2025). Aligning regional innovation ecosystems: The MEAM-3LAM model and CAM actor mapping.



For the three layers to reinforce each other, public governance must be designed so that companies and organisations can actually utilise the opportunities created. The business sector, in turn, needs dense networks and actors that actively connect companies, ideas, and resources. At the organisational level, companies and other actors must have sufficient internal capacity to absorb new knowledge, further develop it, and translate it into practical solutions.

Innovation refers to a new or improved product, service, or process that differs significantly from previous products, services, or processes and that has been made available to customers and users or implemented within operations. There are many types of innovations, including product and service innovations, process innovations, organisational innovations, and broad system innovations.
Innovations that contribute to addressing social challenges and improving people's quality of life, rather than generating economic value, are commonly referred to as social innovations. Innovations that fundamentally and radically transform entire sectors or systems are referred to as system innovations and often involve many actors. Regardless of the type of innovation, the core of the concept lies in being new, useful, and utilised—meaning that it must meet real needs and create value for individuals and society.

Innovation capacity refers to the ability to renew and change by turning something new, or potentially useful, into actual use.

An innovation ecosystem consists of a diverse set of actors whose activities influence the innovation capacity of the county. The ecosystem includes several innovation systems that may be linked to different industries or themes. It consists of companies and organizations that develop and implement new ideas, knowledge environments, and public sector actors that demand or provide expertise. In some cases, there is close interaction and collaboration between actors, while in other cases they operate independently. Regardless of this, all actors affect the ecosystem's ability and capacity for innovation.

An innovation support system can be described as actors, cultures, and environments that promote innovation. This can include both digital and physical meeting places for various actors, whose ways of working facilitate innovation within and between citizens, companies, and public organisations. A key factor in the strength of a support system is its ability to capture and further develop new ideas. An innovation-supporting system shares many similarities with business support or entrepreneurship promotion structures but can be said to focus more on stimulating and further developing new and more experimental ideas and development initiatives.

Delimitations

In this measurement, the causal relationships between indicators are not considered. Calculating how changes in one indicator affect others—that is, quantifying causal links—would require advanced causal methods, which has been deemed too complex for this current measurement. However, statistical correlations between indicators are examined using methods such as principal component analysis, creating a basis for identifying structural patterns. Comparisons with other regions are also conducted, though to a limited extent.

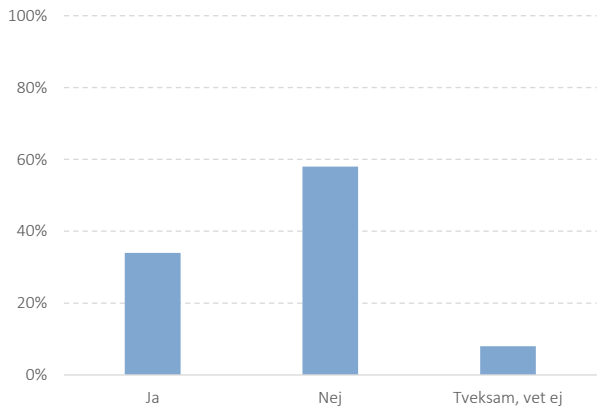
The analytical focus of this measurement does not specifically target social innovation and does not allow for separate quantification of its conditions. However, aspects of social innovation are indirectly addressed through other indicators.

2. Measurement of Västerbotten's Innovation Ecosystem

How many companies in Västerbotten report that they are working with innovations? Data from a business survey conducted in 2024, answered by 305 companies in the region (NLE 2024, Verian), show that 34 percent of all companies in the county (with at least one employee) are engaged in innovation activities. This corresponds to approximately 1,700 companies. Innovation is almost twice as common in the education, healthcare, and social care sectors compared to other industries and is somewhat more prevalent in companies with multiple employees.

A majority of companies (58 percent) report that they do not work with innovations, while 8 percent are uncertain.

Figure 1. Share of companies that work on developing innovations. Source: Own analysis of NLE 2024, Verian.



Does your company work in any way on developing innovations? That is, products or services that are new to the company's market, often supported by new technology, a new business model, or a completely new concept.

Among the companies that report engaging in innovation activities, the survey has also examined the extent to which they work systematically with innovation management. This refers to whether they follow an established structure or method to develop new products, services, or ways of working.

The results show that 36 percent do not work systematically at all, while an additional 22 percent do so to a limited extent. Nine percent state that they work with innovation management to a very high degree, and a further nine percent say they do so to a fairly high degree.

2.1.1 Technology

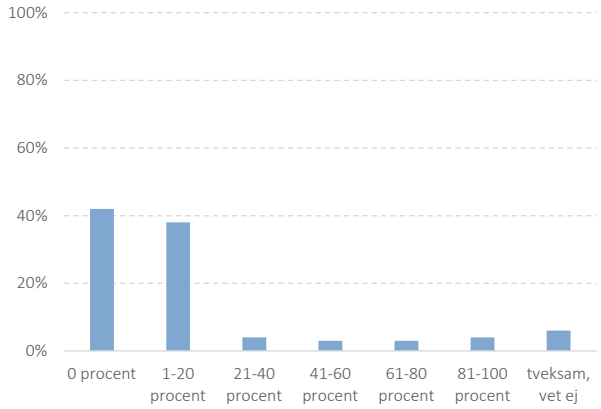
New technology is the foundation for most successful innovations, especially the more groundbreaking ones. Therefore, an innovation ecosystem needs to work systematically to both develop and gain access to new technology. Organisation, infrastructure, regulations, and policy play a significant role in facilitating successful innovation.

Use of high technology in companies

The business survey also shows that the use of high-tech and advanced digital tools among companies in the region is generally low. Just over 40 percent do not use these tools at all, and most of those who do use them only to a limited extent. Only a few companies report that the majority of their work is based on advanced technologies.

The survey further shows that frequent use of high technology tools is somewhat more common in health and social care, education, and agriculture. Companies with more research and innovation collaborations with universities tend to use a larger share of high technology products and advanced digital tools in their work, while companies with few or no collaborations mainly operate at lower levels of technology use.

Figure 2. Share of work in the company that is carried out using high technology products. Source: Own analysis of NLE 2024, Verian.



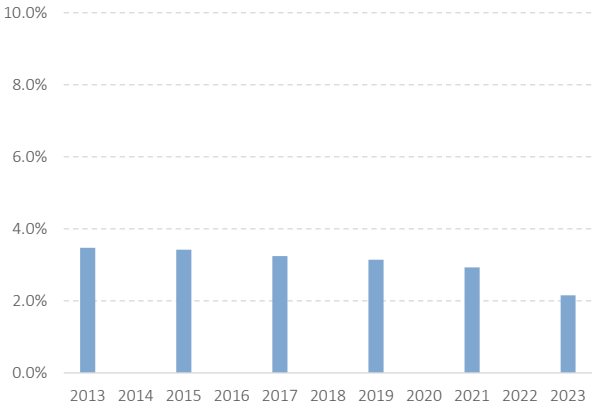
Of the work carried out at your company, approximately what share is performed with the support of high technology products and or advanced digital tools? For example, using 5G technology, genetic engineering, advanced sensors, nanotechnology, artificial intelligence, and similar technologies.

2.1.2 Research and Development

Research and development (R&D) is about building knowledge in the region and creating new solutions through experiments that can later be commercialised. Public investments aim to generate knowledge that can be widely used, while private investments focus more on developing innovations that strengthen company growth.

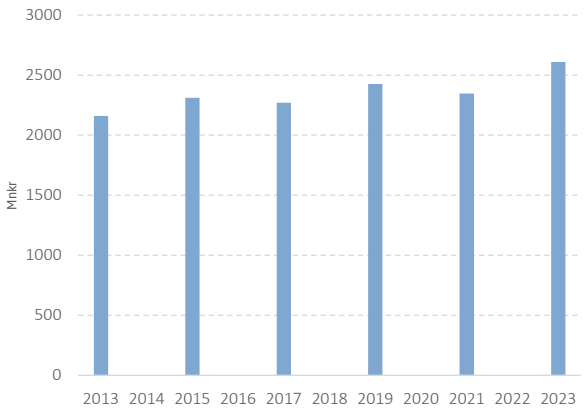
R&D expenditures as a percentage of gross regional product (GRP) have decreased from 3.48% in 2013 to 2.15% in 2023, indicating that resources allocated to R&D have not kept pace with GRP growth.

Figure 3. Percentage expenditure on in house R and D in the region as a share of gross regional product. Source: Statistics Sweden, own calculations.



It should be added that gross regional product has grown strongly during the period, from SEK 89,045 million in 2013 to SEK 148,729 million in 2023. So even though the share of R and D expenditure has decreased over the period, the funding has increased in absolute terms. However, relative to the increase in overall resources, the area is not prioritized in the same way as before. Investments are mainly directed toward universities and higher education institutions, although there have also been increases within the public sector, among others.

Figure 4. Total expenditure in SEK million on in house R and D at regional universities and higher education institutions. Source: Statistics Sweden, own calculations.



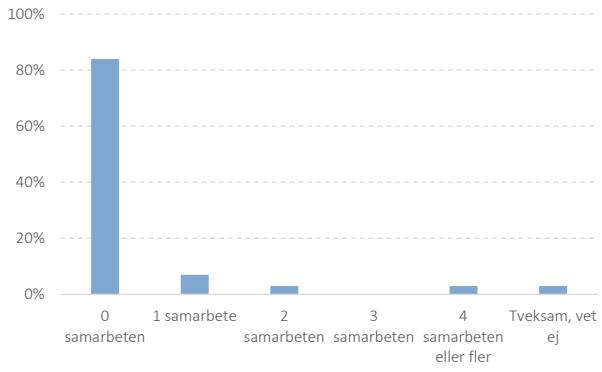
Collaborations Between Companies and Universities

Knowledge of new theories, models, methods, and technologies emerging in academia forms a critical foundation for innovation. For research results to be applied, however, meeting places and incentives are needed to translate knowledge into practical applications and commercial solutions, which primarily occurs in the business sector. Therefore, collaborations between academia and industry are essential.

Results from the business survey show that most companies in the region have not collaborated with universities, colleges, or research institutes in the past year. 84 percent of companies report no collaboration, while 3 percent report one or more collaborations, averaging 0.3 collaborations per company. Among companies engaged in innovation, nearly 10 percent collaborate extensively with universities, while 70 percent report no collaboration at all.

Despite limited formal collaborations, there are examples of joint projects in battery technology, electric vehicle charging, drone transport, and healthcare, including some international collaborations via EU projects.

Figure 5. Number of collaborations, or projects, that regional companies have with research institutions. Source: Own analysis of NLE 2024, Verian.



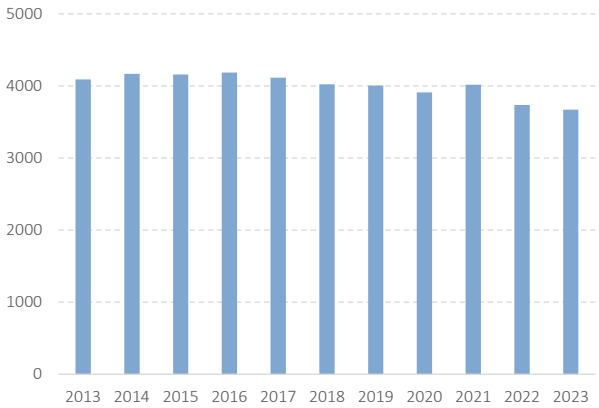
How many research and or innovation collaborations or projects has your company had with universities, higher education institutions, or research institutes over the past 12 months?

Scientific Publications

Articles accepted by reputable journals, magazines, and forums undergo peer review by other researchers and are published only if they are judged to meet high scientific standards. A high number of such publications therefore indicates the innovative capacity and expertise present among the region's researchers and companies. Within the research community, merit is assessed primarily based on the number of published articles, where different journals carry different weight or value, how frequently these articles are cited by other researchers, and the amount of research funding obtained. According to the Swedish Research Council, the number of highly cited publications also correlates strongly with the total number of publications, meaning that high publication activity often also implies greater scientific impact.

The number of research publications from regional universities has been around 4,000 annually but shows a negative trend from 2016 onwards, except for 2021. For example, 4,015 articles were published in 2021, while 3,671 were published in 2023. Highly cited publications at Umeå University have also declined according to data from the Swedish Research Council.

Figure 6. Number of qualified research publications by the region's universities. Source: UKÄ and own calculations.

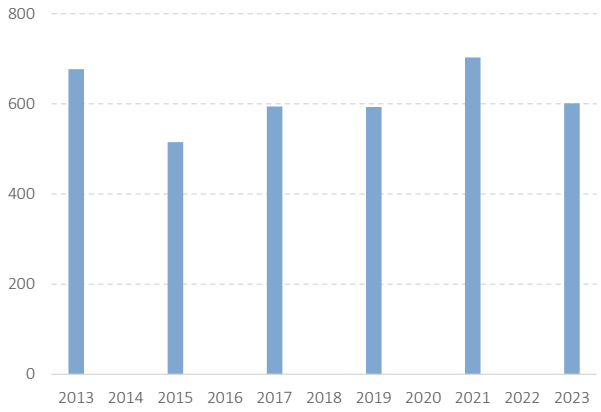


Professional researchers

Higher education and research are closely linked to innovation, because research creates new knowledge that can lead to new ideas, methods, and technologies. It is not limited to academic research, but also includes research and development, R and D, in a broader sense. According to the OECD, anyone who spends at least 10 percent of their working time on R and D is included in the statistics.

The measurements show that the number of person years, full time equivalents, in research and development, R and D, in the private sector in the county has decreased since 2013, from 677 years to 601 years in 2023. This means that there has been a certain reduction in resources and that the level of effort in R and D has declined during this period. Since the indicator converts work effort into full time equivalents rather than counting individual people, the results show an actual reduction in resources, but the year to year variation is relatively large and there is no clear trend.

Figure 7. The number of person years, full time equivalents, in research and development, R and D, in the private sector in the region. Source: Statistics Sweden, own calculations.

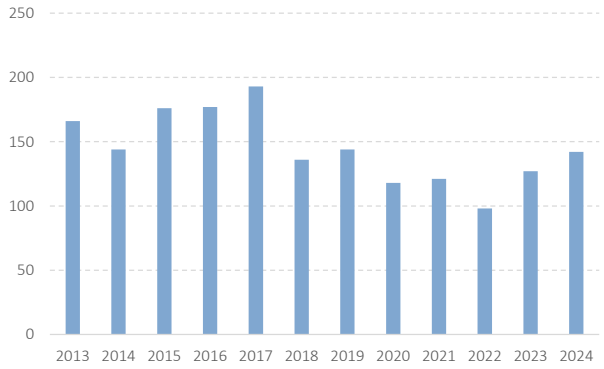


Number of doctoral degrees awarded

The number of newly graduated PhD holders at universities and higher education institutions in the region is a measure of the level of expertise created locally. New PhD graduates represent advanced knowledge that can contribute to development.

The number of doctoral degrees awarded in the region has varied over the past ten year period, but the overall trend has been negative. Between 2013 and 2017 the levels were high, with a peak in 2017 when 193 doctoral degrees were awarded. After that, the number gradually declined. In 2019, 144 people graduated, and in 2022 the number fell to 98, which is the lowest level during the entire period. In 2024, the number increased to 142, which is the highest level since 2020, but still mostly lower than during the 2013 to 2019 period. One partial explanation may be that it has become more expensive for higher education institutions to employ new doctoral students after the doctoral grant was abolished in 2017. Approximately the same number of men and women have graduated since 2013.

Figure 8. Number of doctoral degrees awarded at universities in the region. Source: UKÄ, own calculations.



University students

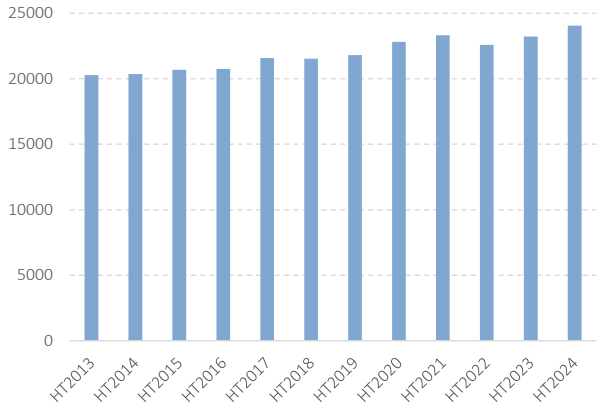
The number of students at universities and higher education institutions in the region is an important prerequisite for future innovation capacity. The institutions not only contribute to the development of new theories, methods, models, and technologies, but also serve as a source of advanced expertise across different fields. Through education programs, this knowledge is transferred to the labor market, which makes universities a key resource for building strong conditions for innovation in the county.

The chart below shows the development of the number of registered students at Umeå University in the region since 2013.

Umeå University has had a relatively stable student volume, with a small decline from 23,324 students in 2021 to 22,598 in 2022, followed by an increase to 23,227 in 2023 and a further rise to 24,309 in 2024. This means that the number of students is now at the highest level during the period and in fact the highest level ever for Umeå University.

SLU's student numbers have also increased over the same period, from 469 registered students in 2013 to a peak of 736 in 2022, before declining somewhat to 605 in 2023. In 2024, the number was 623, which is slightly higher than the previous year.

Figure 9. Number of registered students in the autumn semesters 2013 to 2024 at Umeå University. Source: UKÄ, own calculations.



It is important for the county to retain the students who come to study at universities and higher education institutions. At present, however, according to data from Statistics Sweden, only a small share of students who move to the county from elsewhere choose to remain in Västerbotten after completing their degree, compared with many other counties. This suggests that the county's labor market does not succeed in offering enough qualified jobs or reasonably priced housing.

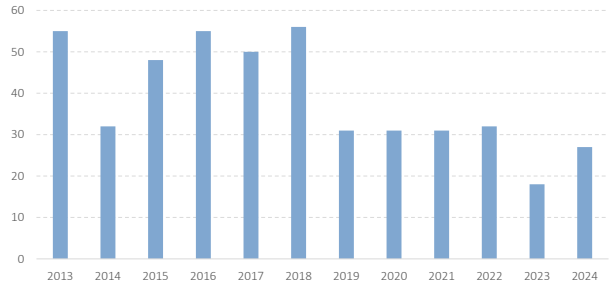
Women make up a larger share of registered students at Umeå University than men, and the share of women has increased since 2013, from 61 percent to 64 percent in 2024. This means that the gender distribution has become more uneven over time. If this trend continues, it could in the long term lead to consequences for the regional supply of skills.

Applications for national patents

Patents are a way to protect new inventions. Patent applications do not directly lead to innovation, but they indicate a high level of knowledge and create good conditions for innovations to be developed. A region with many patent applications therefore has better conditions both for driving new innovations and for generating licensing revenue.

Based on statistics from the Swedish Patent and Registration Office, PRV, on patent applications, Västerbotten accounts for a relatively small share of the country's total applications, and there is a negative trend in the number of patent applications. This is partly linked to population size and the fact that the region's business sector is significantly smaller than that of the metropolitan regions, where the majority of the country's patent applications are filed. It is also due to the fact that many large companies hold patent portfolios, and these are recorded only where the headquarters are located. The technology areas that dominate in Sweden are digital communication, transport, and computer technology.

Figure 10. Number of national patent applications submitted to the Swedish Patent and Registration Office by companies headquartered in the county or by residents of the county. Source: PRV, own calculations.

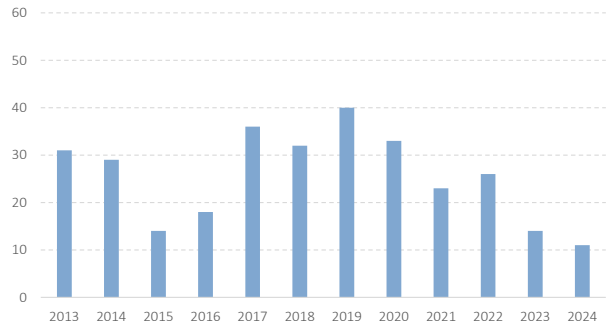


International patent applications

International patent applications mean that an innovation is protected in several countries at the same time. This gives companies better opportunities to grow in international markets and can in the long term contribute to regional growth. The chart below shows

that the number of these applications is quite low and that they also show a negative trend, although there is relatively large variation over the 2013 to 2024 period.

Figure 11. Number of international patent applications from municipalities in the region to WIPO. Source: WIPO, own calculations.

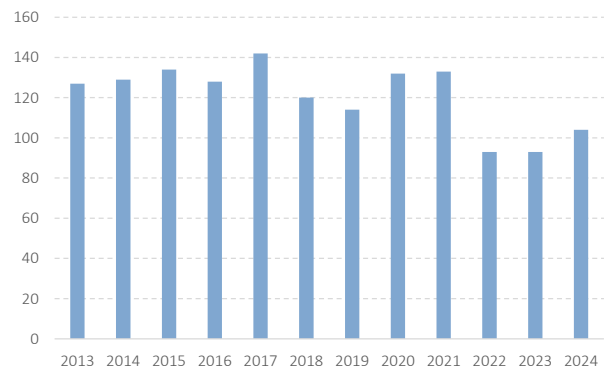


Trademark applications from companies in the region

Trademarks are an indicator of innovation. They show where an innovation originates and act as a quality signal to customers through the company's responsibility for its name. They also contribute to visibility in the market.

The number of trademark applications from companies has varied quite a lot between 2013 and 2024. In 2013, 127 applications were filed, and in 2020 and 2021 the number rose to more than 130 per year. After that, there was a clear decline. Both 2022 and 2023 recorded 93 applications, but the number increased to 104 in 2024.

Figure 12. Number of national trademark applications from companies in the county to the Swedish Patent and Registration Office. Source: PRV, own calculations.

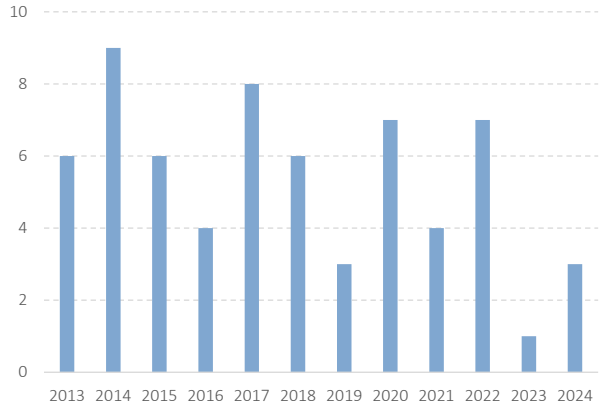


Design applications

A design protection grants exclusive rights to a specific design and can be sold or licensed. It strengthens investor confidence that an innovation's unique value is protected, and the application is filed by companies or residents in the region.

The number of design applications from companies and residents in the region has varied significantly over the 2013 to 2024 period, from peaks of nine applications in 2014 to low points of just one application in 2023.

Figure 13. Number of design applications from companies headquartered in the region. Source: PRV, own calculations.

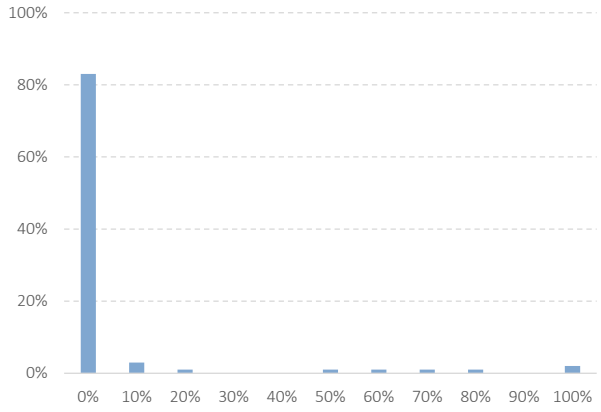


Licensing revenue

Innovative outcomes can generate revenue both through direct sales and through licensing of intellectual property rights such as patents, trademarks, copyright, or design. One question that can be asked is what share of company revenue comes from such licensing agreements.

The results from the business survey show that a very large majority of companies, 83 percent, have had no revenue at all from licensing agreements for intellectual property rights during the past year. Only a small number of companies report having income from this type of agreement, and then most often as a very small share of total turnover. Two percent state that all of their revenue comes from licensing.

Figure 14. Share of company revenue derived from licensing agreements for intellectual property rights. Source: Verian, own calculations.



What share of the company's revenue over the past year has come from licensing agreements for intellectual property rights?

Picture 3. Knowledge intensive jobs in Västerbotten. Source: Statistics Sweden, own calculations.

2.1.3 Human capital

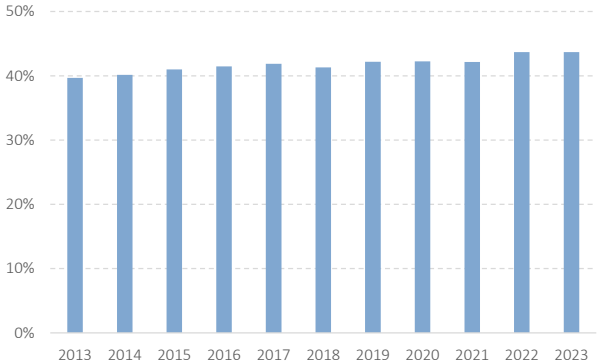
Human capital, that is people's skills, experience, and creativity, is an important prerequisite for innovation capacity. Counties with a well educated population and a strong skills base have greater capacity to develop new ideas, solve problems, and translate research into commercial solutions. The higher the quality and diversity of human capital, the better the conditions for new thinking and long term innovation capacity.

Knowledge intensive jobs

For a regional innovation ecosystem to function, access to skills is required. This involves both retaining existing talent and attracting new talent. The following indicator measures knowledge intensive jobs in the region. In this context, knowledge intensive jobs refer to occupations that generally contribute to innovation, namely managerial positions and occupations that require higher education or equivalent competence, SSYK groups 1 to 3. According to the business survey, NLE 2024, companies that report working on developing innovations find it somewhat more difficult to recruit key skills than companies that report not working on innovation development.

For the resident population, that is people registered as living in the county, the number of people in knowledge intensive jobs increased from around 51,600 in 2020 to just under 59,700 in 2023. At the same time, the share of knowledge intensive occupations among the employed population rose from 42.2 percent to 44.0 percent. A similar development can be seen for the day population, that is people who work in the county but are not necessarily registered as living there, where the number increased from around 51,200 to almost 58,900, and the share rose from 42.2 percent to 43.7 percent. This means both more people in absolute terms and a larger share of the regional workforce are employed in knowledge intensive occupations.

Figure 15. Share of knowledge intensive workers in Västerbotten, day population. Source: Statistics Sweden, own calculations.

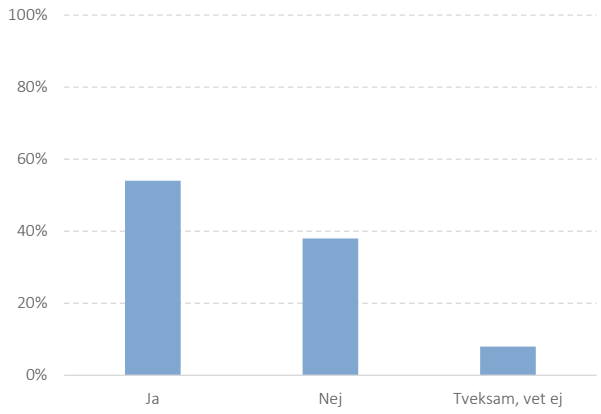


Companies that offer skills development

In today's society, it is rarely sufficient to obtain an education once and then rely on it entirely. Skills development is needed to maintain relevance and attractiveness in the labor market. Skills development is also a prerequisite for driving innovation forward. In many workplaces, employees are expected to take responsibility for their own development, but companies that actively offer learning and further education opportunities lay the foundation for stronger growth. When companies invest in advanced skills development, they strengthen employees' ability to work with new technology and innovation. Over time, this can increase competitiveness across the regional business sector.

In the business survey, 54 percent of companies stated that they offer technical or advanced skills development for their employees, while 38 percent answered no and 8 percent were unsure. The results show that about half of the companies in the region invest in developing more advanced skills among their staff, but also that a large share do not.

Figure 16. Share of companies that offer technical or advanced skills development for employees. Source: Own analysis of NLE 2024, Verian.



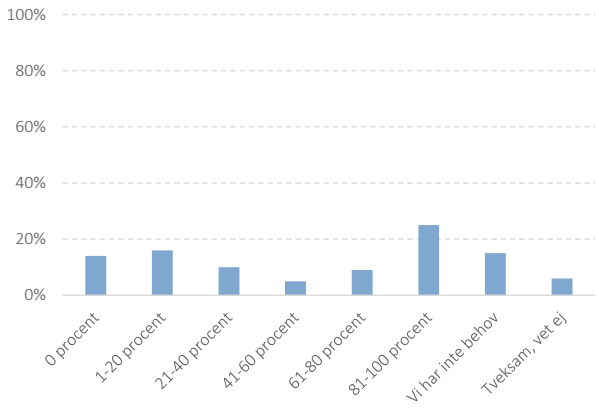
Does your company work systematically with technical or advanced skills development for your employees?

Occupational certifications in companies

Occupational certifications aim to provide employees with proof that they are formally quality assured in their professional roles. This means that they have a strong skills foundation to build on and can therefore find new creative ways to generate innovations.

One quarter of companies state that almost all of their employees are certified, while 15 percent of companies say that they have no need for certifications at all.

Figure 17. Share of employees in regional companies who hold one or more qualified occupational certifications. Source: Own analysis of NLE 2024, Verian.



What share of your company's employees hold occupational certifications that you consider qualified?

Post secondary education in the county

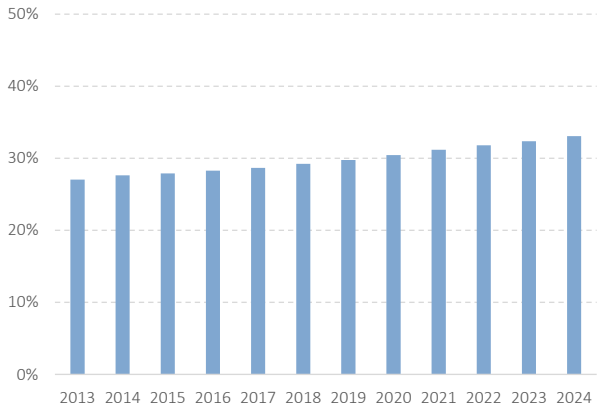
A higher level of knowledge creates better opportunities for innovation. When the average level of education in society increases, the conditions are further strengthened.

The chart below shows the development of the education level among the county's population aged 25 to 64. In 2013, 27 percent of this group had post secondary education. The share has increased steadily each year and reached 32.8 percent in 2023. This means that almost one in three working age adults in the region now has higher education. Around 42 percent of women and 25 percent of men in this age group have higher education, and the trend is that the differences are increasing over time.

This development reflects both a general trend in Sweden toward higher levels of education and the role

played by universities in the region. An increased level of education strengthens the region's human capital.

Figure 18. Share of the region's residents aged 25 to 64 who have post secondary education from a university, higher education institution, or vocational higher education of three years or more. Source: Statistics Sweden, own calculations.



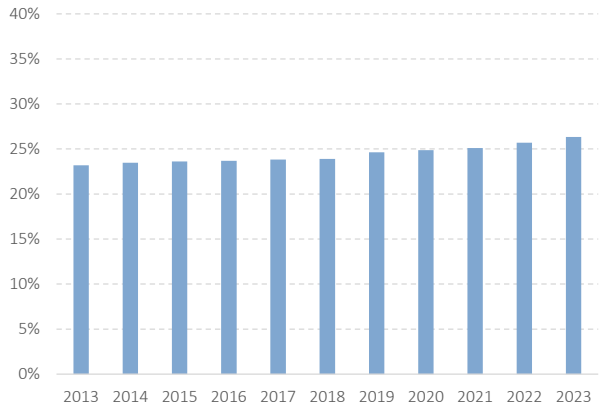
STEM education

STEM skills, that is skills within science, technology, engineering, and mathematics, are very important for creating inventions and patents. For this reason, it is beneficial if many people with higher degrees have education within scientific fields.

In 2013, around 55,000 people aged 25 to 64 in the county had post secondary education. By 2023, this number had risen to just over 65,000. During the same period, the number with a STEM orientation increased from around 12,700 to almost 17,300. This means that growth applies both to higher education in general and to those with technical, scientific, or engineering degrees.

The share of post secondary educated individuals with a STEM background has also increased slightly, from 23.2 percent in 2013 to 26.3 percent in 2023. This means that more people in Västerbotten with higher education are choosing technical and scientific fields. The increase applies to both men and women. In particular, a much larger share of women than before are choosing this orientation, even though men still account for a significantly larger share overall. Forty four percent of men and nearly 13 percent of women among those with post secondary education have a STEM orientation. This corresponds to around 12,500 men and 4,800 women.

Figure 19. Share of the county's residents aged 25 to 64 who have post secondary STEM education among those with post secondary education, from a university, higher education institution, or vocational higher education of two years or more. Source: Statistics Sweden, own calculations.



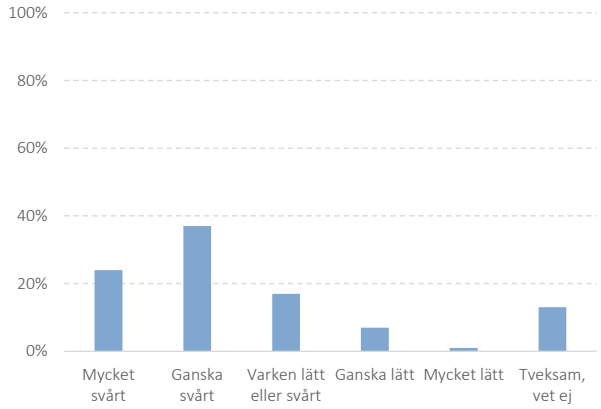
Recruitment of key skills

If it takes too long to find and establish key skills, innovation work slows down. This means that organizations risk losing important competitive advantages. In turn, this negatively affects the regional innovation ecosystem. Therefore, it is important that access to key skills is smooth.

A clear majority of companies find it difficult to recruit key skills for their operations. Sixty one percent state that it is "very difficult" or "fairly difficult," while only 8 percent consider it "fairly easy" or "very easy." A smaller share, 17 percent, experience the situation as neutral, and 13 percent are unsure or have no opinion.

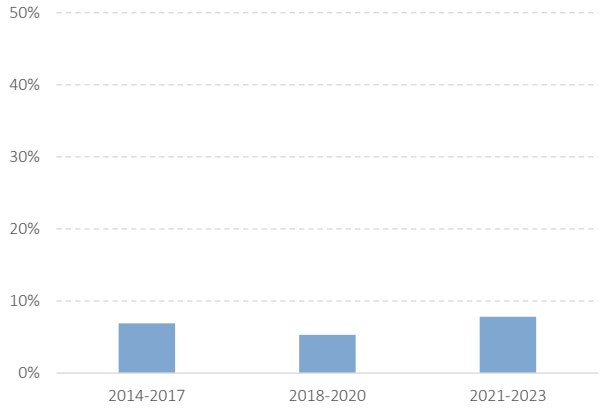
The results clearly show that recruitment of key skills is a significant challenge for many companies in the region.

Figure 20. Perceived level of difficulty for regional companies in recruiting key skills for their operations. Source: Own analysis of NLE 2024, Verian.



How easy or difficult is it to recruit key skills for your company?

Figure 21. Percentage share of residents aged 18 to 64 in the region who are entrepreneurs or who own and lead a new business. Source: Entrepreneurship Forum, own calculations.



2.1.4 Entrepreneurial capacity

Early entrepreneurial activity

For people to dare to leave the security of regular employment and routine tasks, the conditions for entrepreneurship need to be perceived as attractive. This should be reflected in a significant share of the population actually choosing to start their own businesses.

The statistics show that the share of residents aged 18 to 64 in the county who are entrepreneurs or who lead a new business has varied somewhat over time. During the 2014 to 2017 period, the level was 6.9 percent. It declined to 5.3 percent in 2018 to 2020 and has since increased to 7.8 percent in 2021 to 2023. Despite this increase, the county still remains slightly below the national average of 8.4 percent. This means that a somewhat smaller share of the county's population chooses to start and run new businesses compared with the country as a whole, even though the difference is relatively small.

Newly started companies

The likelihood of establishing a business increases if it is easy to start one, if the culture encourages entrepreneurship, and if becoming an innovative entrepreneur feels both interesting and promising. When this is combined with access to knowledge, ideas, and start up capital, good conditions are created for more new companies to emerge.

The number of new business registrations in the county has varied somewhat in recent years. In 2021, the level was at its highest with 1,591 new companies, followed by a small decline in 2022 to 1,534. In 2023, the number dropped clearly to 1,299, but in 2024 it increased again to 1,528 new registrations. The development is partly related to the economic cycle and partly to the business climate. The peak year of 2021 can partly be explained by many people choosing to start businesses in the wake of the pandemic, while the outcome in 2023 is likely linked to higher interest rates and increased economic uncertainty.

Figure 22. Number of new business registrations headquartered in the county. Source: Growth Analysis, own calculations.

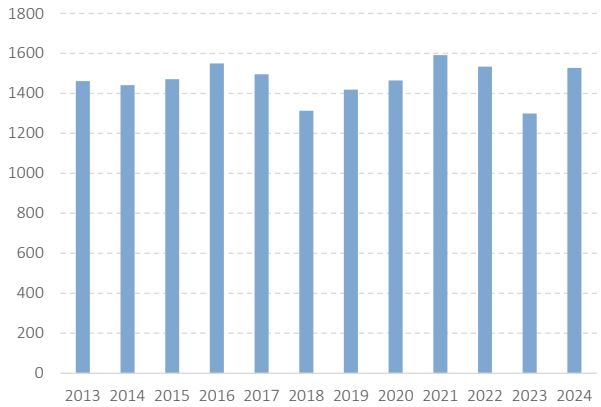
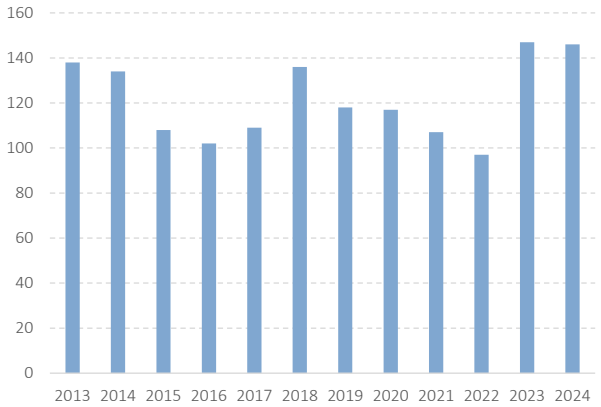


Figure 23. Number of registered bankruptcies of companies in the region. Source: Growth Analysis, own calculations.



Bankruptcies

Not all companies succeed, and many are therefore forced to close their operations. The reasons are often other than a lack of innovation capacity, but closures still represent a loss for the county's growth. However, risk taking is an inseparable part of new creation and innovation work. Without it, renewal rarely occurs.

The number of bankruptcies in the county has increased sharply in the past year. In 2024, 146 bankruptcies were registered, which is a clear increase compared with 97 bankruptcies in 2022. Compared with 2020 and 2021, when the numbers were 117 and 107 bankruptcies respectively, the levels in 2023 and 2024 are also significantly higher.

The number of employees affected by the rising number of bankruptcies has also increased over the period.

This development reflects, among other things, the tougher economic conditions that many companies faced in 2023 and 2024, with high inflation and, in connection with this, rising interest rates and increased energy costs.

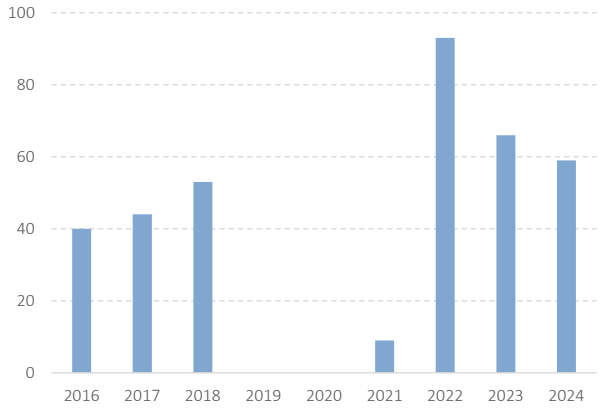
Companies in the region with strong employee growth

A central goal of company growth in a county is to create more jobs for residents. Growth companies that have managed to pass the so called valley of death, that is the most critical part of the innovation journey, the gap between research results or ideas and a market ready product, have very strong potential to contribute to increased employment. For this reason, this is an indicator that is important to monitor and to actively work to strengthen.

In Västerbotten, 1,613 companies increased their workforce by at least 20 percent between 2020 and 2021. The following year, 338 of those 1,613 companies again increased their workforce by at least 20 percent. After another year, 66 of the original 1,613 companies once again showed workforce growth of at least 20 percent.

The chart below shows the development of this indicator and illustrates that the number of companies that increase their workforce by 20 percent for three consecutive years varies greatly between years.

Figure 24. Number of companies in the region that have increased their workforce by at least 20 percent for three consecutive years. Source: Statistics Sweden, own calculations.



Turnover growth

In Västerbotten, 592 companies increased their turnover by at least 20 percent for three consecutive years during the 2020 to 2023 period. This corresponds to 1.47 percent of all companies in the county. The development shows that the county has a broad base of fast growing companies, especially during the first year. However, the persistence of growth declines gradually over time. Compared with Region Skåne, Östergötland, and Örebro, Västerbotten shows somewhat weaker development. The results are instead more in line with Värmland.

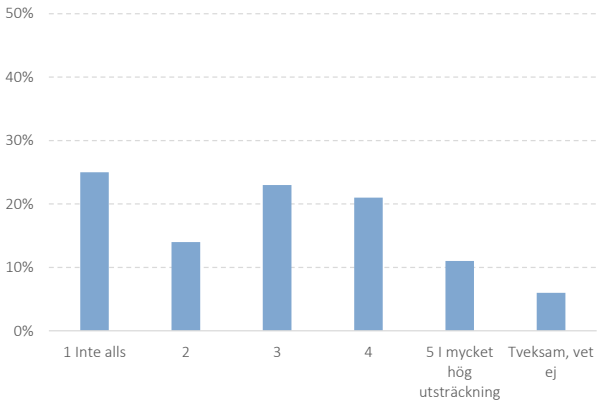
User driven innovation

The traditional model of closed innovation, where development takes place internally and in isolation, has to a large extent played out its role, except within specific research environments.

It has instead proven valuable to involve users and target groups early in the development process, as this acts as a form of quality assurance that captures actual needs and conditions in the market. A user and customer oriented approach can therefore be seen as an important success factor that increases the likelihood that new innovations are relevant and gain traction.

The results from the business survey show that companies' involvement of users or customers in development work varies widely. One quarter, 25 percent, state that they do not involve users or customers at all, while an additional 14 percent report a low degree of involvement. This means that almost four out of ten companies, 39 percent, have limited or no user involvement in their development process. User oriented innovation has therefore not fully taken hold in the county's business sector or development thinking. Although around one third of companies actively involve customers in their development work, there are still many that do so only to a limited extent or not at all.

Figure 25. Degree to which companies in the county involve users or customers in their development work. Source: NLE 2024, Verian.



To what extent do you involve users or customers in your company's development work?

2.1.5 Business support

Companies in the county receiving support through incubators or accelerators

In a question posed to the county's active incubators in 2024, Uminova Expression, Uminova Innovation, BIC Factory, Go Business, and Umeå Biotech Incubator, it emerged that approximately 87 companies, according to their estimates, participated in programs during 2023 that offer structured business support in the form of advisory services, networks, financing, and skills development. The incubators therefore constitute an important part of the innovation ecosystem and play a particularly important role for new and growing companies that need support to develop their business models and establish themselves in the market.

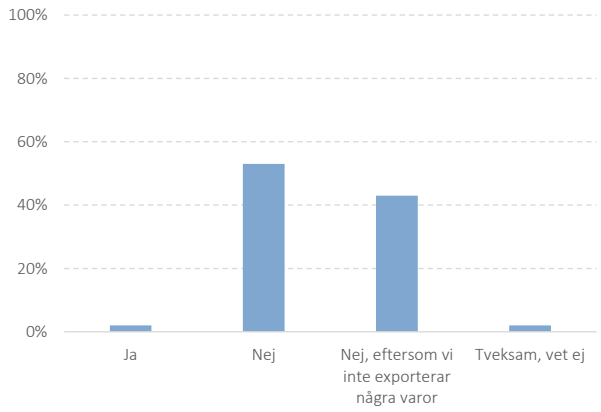
Profitability of companies through incubator or accelerator programs

The indicator on profitability shows how many companies that have gone through incubator or accelerator programs in the county over the past five years are currently profitable. As above, the data are based on questions to the county's incubators, and the results are quite varied. Some report very low levels, while others estimate that 60 to 80 companies, corresponding to around 60 to 80 percent, are now profitable. The responses show both that it is difficult to obtain an exact picture, since many venture capital funded companies prioritize growth over short term profit, and that many reach profitability within a few years.

Export support

Only around 2 percent of companies in the county use support for exports from specialized public actors. Just over half of the companies answered no to the question about participation, and 43 percent stated that they do not export at all.

Figure 26. Share of companies participating in different export collaboration projects. Source: Own analysis and NLE 2024, Verian.



Does your company participate in one or more export collaboration projects, for example with Almi, Business Sweden, Swedish Export Credit, EEN, or similar organizations?

Among the few companies that have participated in export collaboration, perceptions of usefulness are mixed, but half state that the benefit is high, and a small share experience little or no benefit at all.

This suggests that the support largely works for those who use it, but that only a small number of companies are currently reached.

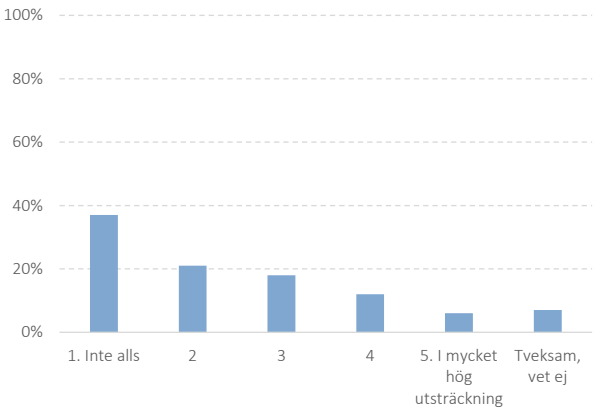
2.1.6 Actors and connections in the innovation ecosystem

Company collaboration with intermediaries

Among companies that work with innovation, a majority of companies in the county do not collaborate to any great extent with innovation intermediaries. Intermediaries refer to functions, physical or digital, that bring together companies and organizations across different industries or technological areas. These are environments that play a central role in promoting collaboration, knowledge exchange, and joint development. Thirty seven percent state that they do not collaborate with intermediaries at all, and an additional 21 percent report a low degree of collaboration. Around 6 percent of companies state that they collaborate to a very high degree.

This shows that contact with innovation promoting actors and different networks is mainly used by a smaller group of companies. Companies mention actors such as Uminova Innovation, ABI, Peak Innovation, RISE, Vinnova, Almi, Sting, and universities, which confirms that the support system is used, but to a limited extent.

Figure 27. Extent to which companies collaborate with intermediaries to create better conditions for innovation. Source: Own analysis of NLE 2024, Verian.

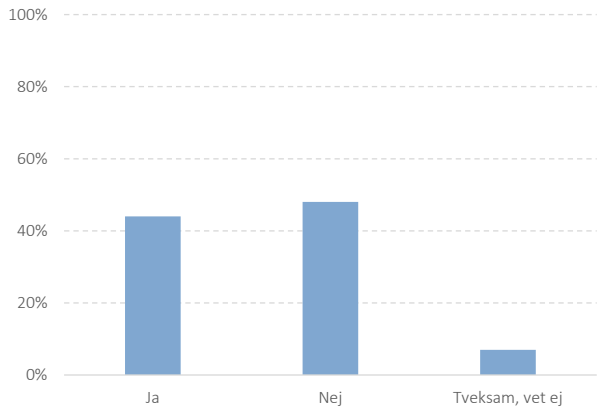


To what extent does your company collaborate with intermediaries to create better conditions for innovation?

Membership in industry and network organizations

Membership in industry and network organizations is relatively evenly distributed among companies in the region. Forty four percent are members of such a network, while 48 percent are not and 7 percent are unsure. The majority of companies perceive that the membership provides benefits. The share that responds at the upper end of the scale, meaning they perceive high benefit, is around 45 to 50 percent in total, while around 20 percent state that they experience little or no benefit.

Figure 28. Share of companies that are members of regional, national, or international industry and or network organizations. Source: Own analysis of NLE 2024, Verian.

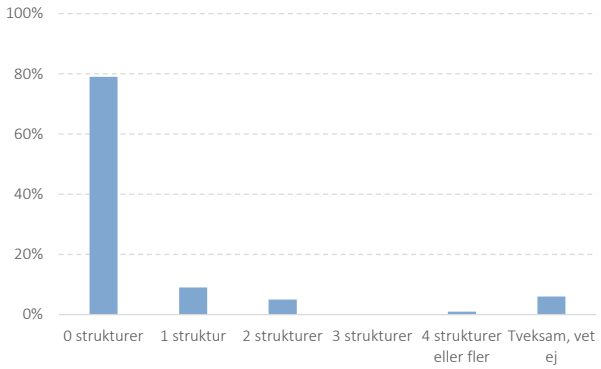


Is your company a member of any regional, national, or international industry and or network organizations?

Joint ownership structures

Statistics show that joint ownership structures, so called joint ventures, are uncommon among companies in the region. Seventy nine percent state that they do not participate in any such structure, while 9 percent are involved in one such structure and 5 percent in two. Only a few companies participate in more than that. As a result, the average value is very low, at 0.2 structures per company.

Figure 29. Total number of joint ownership structures, joint ventures, that regional companies participate in or co finance. Source: Own analysis of NLE 2024, Verian.



How many joint ownership structures, joint ventures, is your company a member of and or co financier in?

Joint ventures have significant potential for the innovation ecosystem in Västerbotten because they enable companies to share risks and costs in larger initiatives, for example in new technology or infrastructure. Their rarity in the county likely means that some innovation opportunities are not fully utilized.

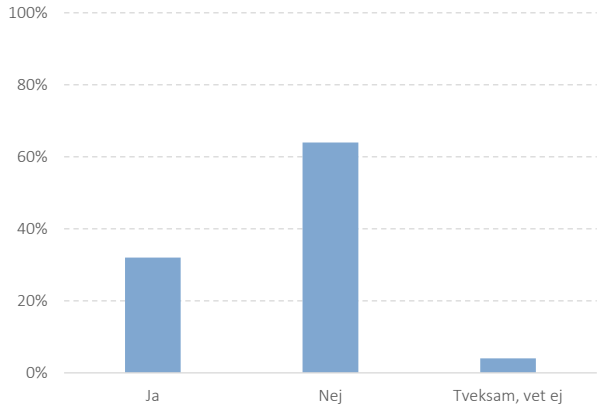
Contact points for innovation

In Västerbotten, a large number of events are organized each year with the aim of strengthening innovation, networking, and collaboration among actors in the region. These include recurring network meetings, innovation forums, and larger conferences with an industry focus.

The business survey shows that a majority of companies do not participate in networking events aimed at creating contact points for innovation. Thirty two percent answer yes, while 64 percent say no and 4 percent are unsure. Among companies that work with innovation, the share that participates in such events is somewhat higher, with 42 percent answering yes.

Among the companies that do participate in events, perceptions of their usefulness are positive. Nearly half state that the benefit is moderate, 27 percent that it is high, and 12 percent that it is very high. Only a few report no benefit at all.

Figure 30. Share of companies that report having participated in networking events aimed at creating contact points for innovation. Source: Own analysis of NLE 2024, Verian.



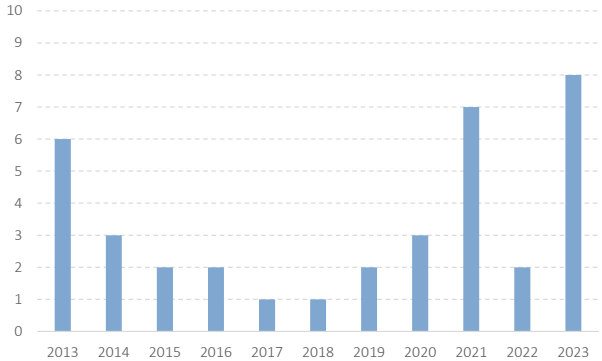
Has your company participated in any networking events aimed at creating contact points for innovation during the past year?

2.1.7 Financial capital

Active venture capital firms

The number of venture capital firms actively investing in the region varies greatly from year to year. From 2017 onward, a clear downturn can be seen, when the number was sometimes only one or two. In recent years, however, there are signs of recovery. In 2021, seven venture capital firms were active, while 2022 saw a sharp drop to two, followed by an increase to eight in 2023. The number of actors is small compared with metropolitan regions, which makes access to capital more sensitive to fluctuations between individual years.

Figure 31. Total number of venture capital firms that have actively invested venture capital. Source: SVCA.

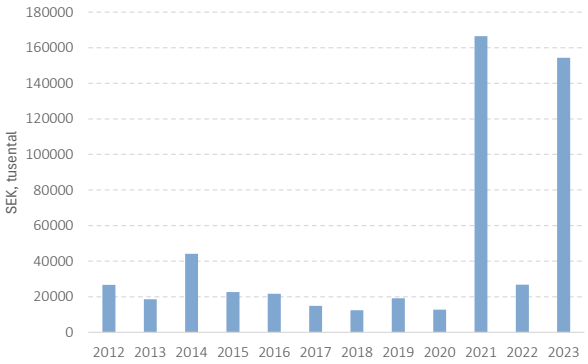


Venture capital investments in regional companies

Total venture capital invested in regional companies varies greatly from year to year. For a long time, investments remained at relatively low levels, often between 10 and 30 million euros, with some peaks, such as in 2014 when the amount reached just over 44 million euros, when Umeå was the European Capital of Culture.

The most recent years stand out, however. In 2021 and 2023, investments were very high, at 166.5 million and 154 million euros respectively, far above historical levels. In contrast, 2022 was significantly weaker, with investments of 26.8 million euros.

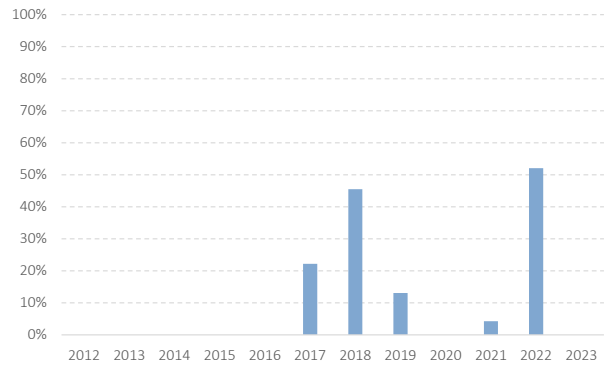
Figure 32. Total amount of venture capital investments in regional companies by venture capitalists. Source: SVCA.



Seed financing

The indicator measures the share of venture capital that has gone to seed financing in the region, that is, capital invested in companies in the start up phase. The share varies greatly between years. In some years, such as 2016, 2014, and earlier, the level was zero, while 2018 and 2022 stand out with very high levels of 46 and 52 percent respectively. In 2023, which is the most recent measurement year, the share again shows a zero level.

Figure 33. Percentage share of seed financing of total venture capital investments by venture capitalists in the region. Source: SVCA.

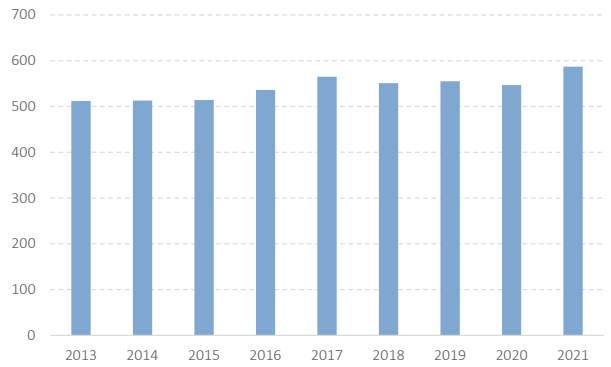


Number of establishments in the region owned by foreign corporate groups

The number of establishments in Västerbotten owned by foreign corporate groups increased by around 21 percent between 2013 and 2021. In 2021, the number was 587, and in 2022 it rose to 762.

The number of employees in these companies has also increased over time, and this increase has been slightly higher, at 25 percent. Employment rose from around 9,700 people in 2015 to more than 11,500 people in 2021. The results show that foreign investments play a role in employment in Västerbotten.

Figure 34. Number of establishments in the region owned by foreign corporate groups. Source: Growth Analysis, own calculations.



Loans to small businesses

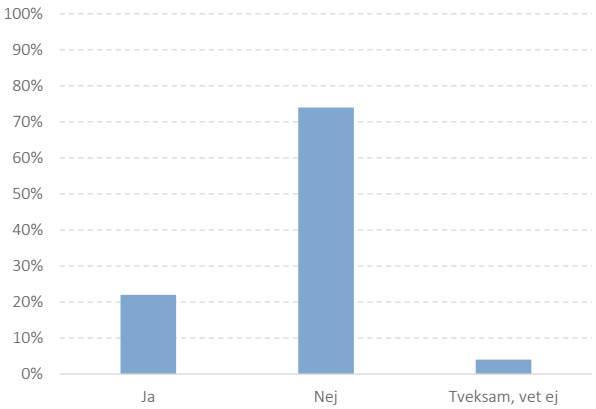
In 2023, the total loan amount to small businesses in Västerbotten amounted to just over SEK 11 million. Source: Almi. Of this, innovation loans from Almi accounted for approximately SEK 2.5 million, and growth loans from Almi for about SEK 8.7 million. The larger share of the loans therefore consists of growth loans.

Grants for innovation activities

Statistics show that a smaller share of companies in the region, 22 percent, have made use of grants or services for innovation activities from municipalities, the region, or the state during the past year. This means that most companies do not use these opportunities.

Among the companies that have received support, perceptions of the process are mixed. About half consider the application and reporting process to have been easy, while the other half experience it as fairly difficult or very difficult.

Figure 35. Companies that report having received grants or used services for innovation activities from municipalities, the region, or the state. Source: Own analysis of NLE 2024, Verian.



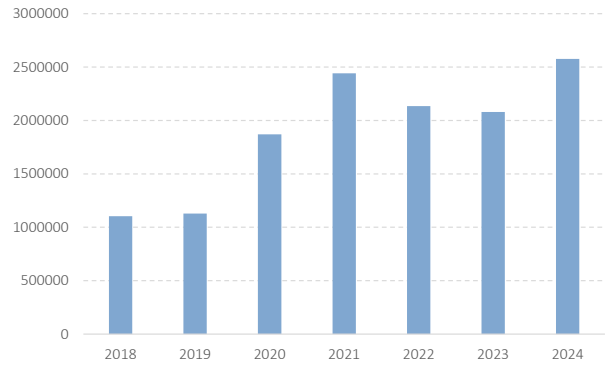
2.1.8 Infrastructure

Access to premises

In 2024, there were 2.5 million square meters of available office and commercial premises in the county. Over time, availability has increased.

There are several explanations for this development. For office space, subleasing has increased, mainly because more companies apply hybrid work models and therefore do not use their entire premises. Many therefore choose to sublet parts of their space. For retail premises, the growth of e commerce has negatively affected city center retail, which has led to more vacant shops. The economic cycle has also played a role. When the economic downturn hit in 2022, supply increased.

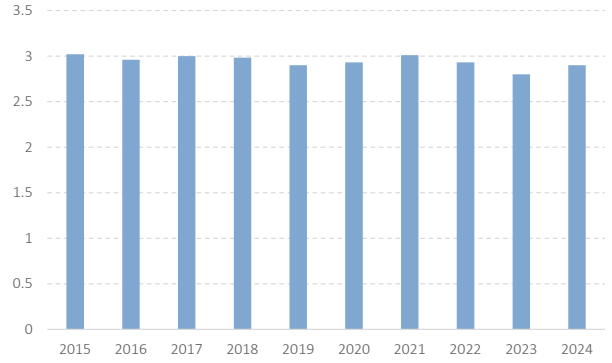
Figure 36. Number of available square meters of office and commercial premises in the region. Source: Objektvision.



Access to air travel, rail, and roads

The analysis shows that companies' perceived quality of transport infrastructure in the region averages 2.9 in 2024, which is in line with recent years, 2.8 to 3.0. This means that companies generally assess the infrastructure as insufficient, on a scale from 1 to 6. In Umeå municipality, access is rated higher, at 3.7, than the regional average.

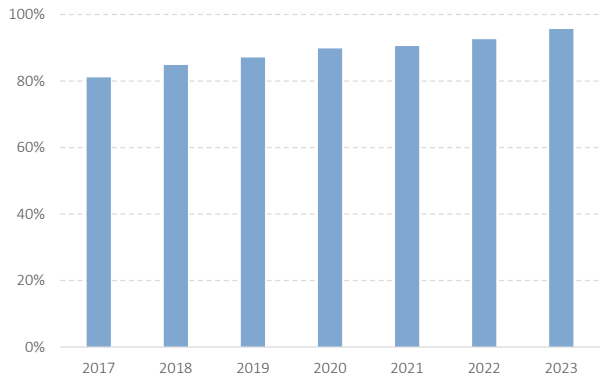
Figure 37. Regional companies' perceived satisfaction with road networks, rail, and air connections in the region. Source: www.foretagsklimat.se.



Access to high speed broadband

The share of establishments in the region with access to high speed broadband has increased sharply, from just over 80 percent in 2017 to more than 95 percent in 2023. This development means that almost all companies now have the conditions to participate in the digital economy, which strengthens competitiveness, innovation capacity, and the ability to operate even in more sparsely populated parts of the region. There are some variations within the region, but the development has been positive for all municipalities.

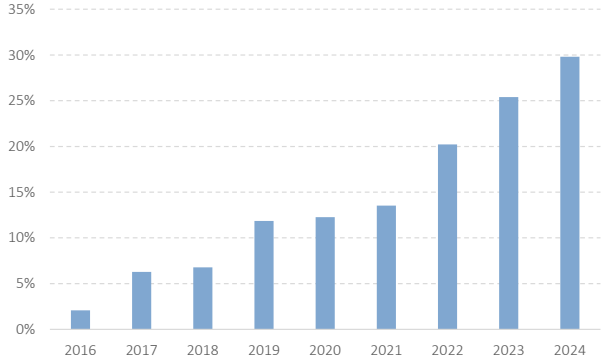
Figure 38. Share of establishments in the region with access to fixed broadband of at least 1 Gbit per second or fiber. Source: PTS.



Mobile data coverage above 30 Mbit per second

Access to fast mobile data in the region has improved significantly in recent years, from only 2 percent of the area in 2016 to nearly 30 percent in 2024. This shows a clear development and expansion of mobile networks.

Figure 39. Geographic area coverage in the county for mobile data speeds above 30 Mbit per second, as a percentage of the county's total area. Source: PTS.

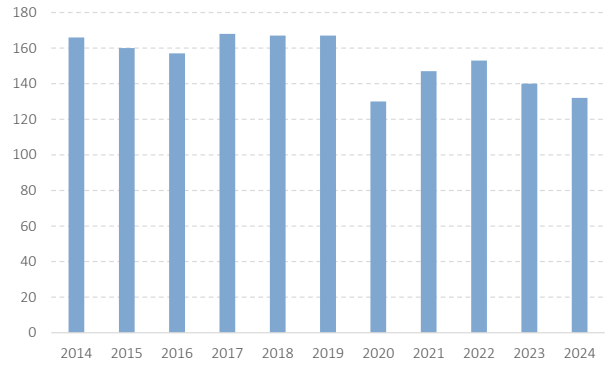


2.1.9 Legal and regulatory environment

Tax incentives for research and innovation

Over the past ten years, the total amount of granted tax incentives for research, development, and new business formation in the region has remained relatively stable, at between SEK 130 and 170 million per year. In 2024, the amount totaled SEK 132 million, which is slightly lower than in the previous two years, SEK 140 to 153 million, but still at a level that shows the support is used on an ongoing basis.

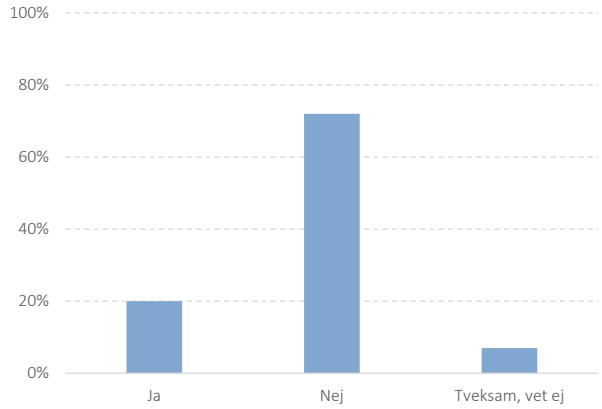
Figure 40. Total amount granted in SEK million in tax incentives to companies in the region for research and development and new business formation. Source: Swedish Tax Agency.



Regional companies' satisfaction with support for innovation

Only a small share of companies have actually participated in regional innovation programs or support schemes, 20 percent. Even more are not aware that the programs exist. Almost half of companies state that they are not aware of them at all, and only a small minority say they know them well. Among the companies that have used the support, satisfaction is high. A majority of users state that they are fairly or very satisfied, while dissatisfaction is marginal. Among those that have not participated in or used regional programs, the main reason given is that the programs are not adapted to the companies' operations, cited by 43 percent. Twenty one percent state that participation takes too much time.

Figure 41. Share of companies that have participated in or made use of a regional program or support for the development of innovation. Source: NLE 2024, Verian.



Has your company participated in or made use of any regional program or support for the development of innovation?

Innovation friendly procurement

Public actors can stimulate innovation in several ways through how they design their procurement processes. One example is innovation or functional procurement, where the focus is on desired functions or outcomes rather than on a predefined solution. Suppliers are then given the opportunity to propose their own creative ways to achieve the goals. This type of procurement provides greater room for new thinking within the public sector and can help drive innovation in the regional business community.

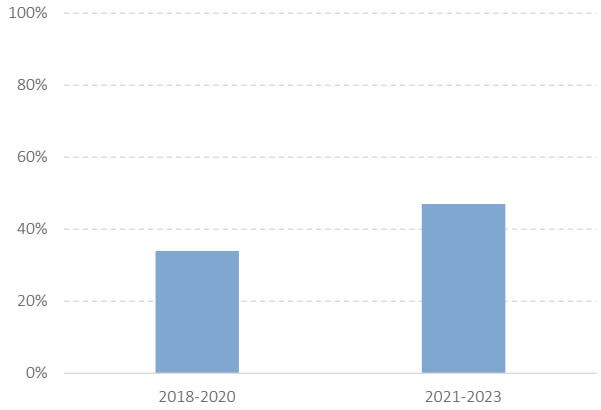
According to the Swedish National Agency for Public Procurement's statistics database, no innovation friendly procurements were registered in the county during the 2021 to 2023 period. Source: Swedish National Agency for Public Procurement, 2024. This means that no public actors in the county have yet used this opportunity to stimulate innovation through their procurement processes. Regions that have carried out innovation friendly procurements include Region Skåne, Region Jönköping, Region Halland, Region Kalmar, and Region Västernorrland. Luleå municipality appears 43 times, while Umeå municipality appears zero times.

2.1.10 Culture

Barriers to entrepreneurship

The share of the population in the region who state that fear of failure prevents them from starting a business has increased markedly. During the 2018 to 2020 period, the share was 34 percent, but between 2021 and 2023 it rose to 47 percent. This is a substantial increase. It may be linked to increased economic uncertainty, which makes fewer people willing to take the step into entrepreneurship.

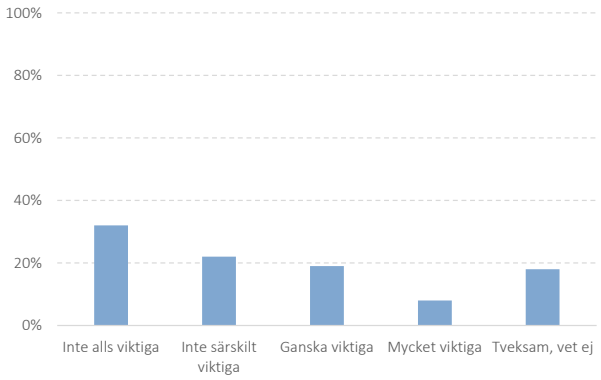
Figure 42. Share of the population aged 18 to 64 in the county who state that fear of failure prevents them from starting a business. Source: Entrepreneurship Forum.



Cross functional collaborations

Statistics show that attitudes toward cross functional collaborations in the county are mixed. Only a small share of companies, 27 percent, consider these collaborations to be fairly important or very important for innovation, while just over half, 54 percent, do not see them as particularly important or not important at all. Sixty percent of companies state that they have no such collaborations at all, and the average is only 0.6 collaborations per company.

Figure 43. How important companies consider cross functional collaborations related to innovation to be. Source: NLE 2024, Verian, and own calculations.

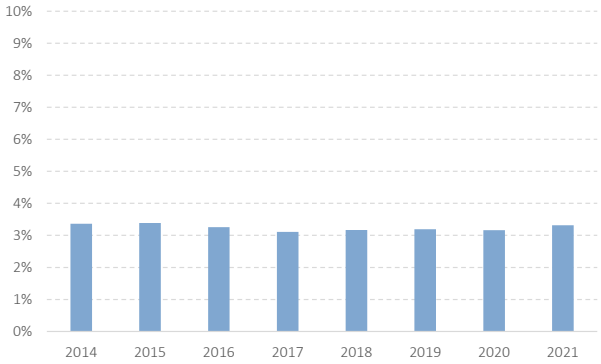


How important are cross functional collaborations with companies and industries that are completely different from your own, that is, where your company collaborates to increase the potential for innovation?

Knowledge intensive labor migrants

The share of knowledge intensive labor migrants in the region has remained stable at around 3 to 3.3 percent between 2016 and 2021. In 2021, this corresponded to 1,943 people out of a total of approximately 58,600 knowledge intensive employed individuals in the region.

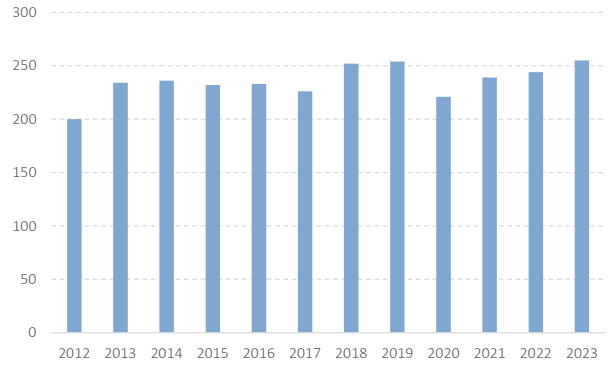
Figure 44. Percentage share of knowledge intensive labor migrants in companies in the region relative to the total number of knowledge intensive workers in the region. Source: UKÄ.



Number of internationally recruited researchers

The number of internationally recruited researchers in the region has remained relatively stable over the past decade, with some variation between years. In 2023, the number amounted to 255 people, which is slightly higher than in the preceding years and in line with the peak levels in 2018 and 2019, with 254 and 252 researchers respectively.

Figure 45. Number of internationally recruited researchers, both doctoral candidates and senior researchers, conducting research at universities and higher education institutions in the region. Source: UKÄ.

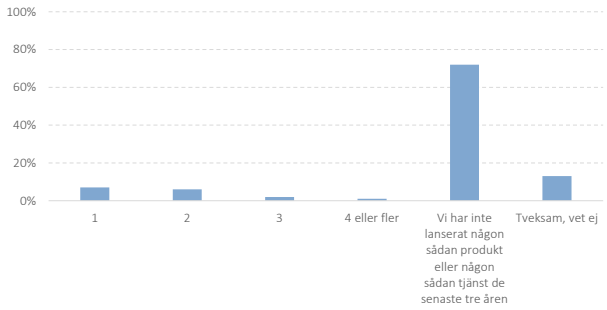


2.1.11 Markets

Launch of products based on new technology

The results from the business survey show that a majority of companies in the region have not launched product innovations based on new technology during the past three years. Of the 305 companies surveyed, 72 percent state that they have not introduced any such products or services. Around one in six companies have launched products based on new technology.

Figure 46. Share of companies in the county that have launched product innovations based on new technology to the market. Source: Own analysis of NLE 2024, Verian.

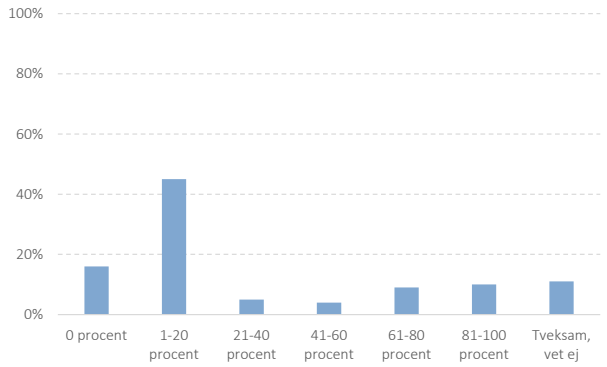


How many products or services containing new technology has your company launched during the past three years?

Contribution of innovations to companies' turnover in Sweden

In the business survey, 16 percent of companies in the region state that none of their turnover comes from innovations. The largest group, 45 percent, report that 1 to 20 percent of their turnover comes from innovations, while smaller groups report higher shares. Only around 10 percent state that 81 to 100 percent of their turnover comes from innovations.

Figure 47. Share of company turnover derived from innovations. Source: NLE 2024, Verian.

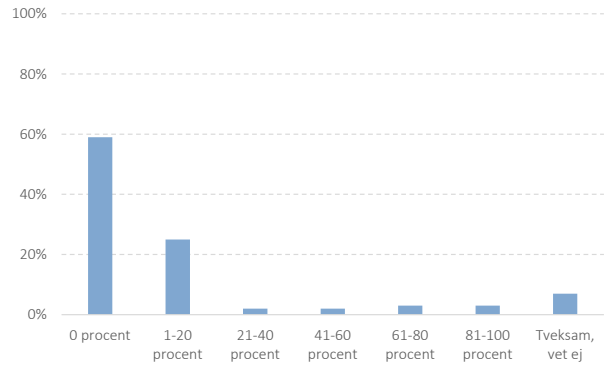


What share of your turnover consists of sales of innovations, products and services, to customers in Sweden?

Contribution of innovations to companies' turnover, international markets

The results from the business survey show that exports of innovations still have a fairly limited importance for companies in the county. A majority of companies state that none of their turnover comes from sales of innovations to customers in other countries, while one quarter report that exports account for a small share of turnover, between 1 and 20 percent. Only a small number of companies have a larger share of their turnover linked to exports of innovations.

Figure 48. Turnover from sales of innovations to customers in other countries. Source: NLE 2024, Verian.

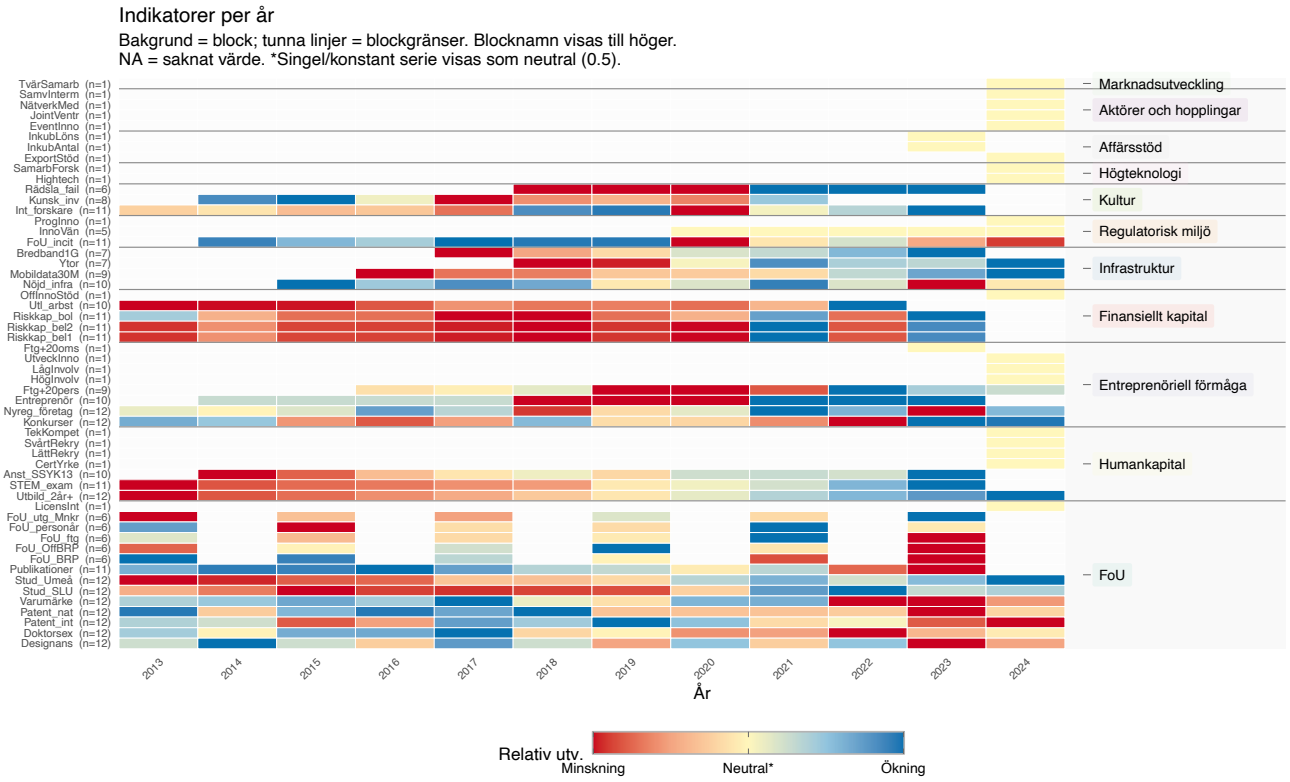


3. Analysis

The analysis highlights how Västerbotten's innovation capacity and capability have developed over time and which factors strengthen or limit the region's long term innovation potential. The point of departure is the Measurement of Regional Innovation Capacity, METRIC, which includes financial capital, research and development, human capital, digital infrastructure, entrepreneurship, and the institutional and regulatory conditions that shape the innovation ecosystem. By comparing developments across these areas, a picture emerges in which some parts, especially financial and human capital, show positive development, while the research and knowledge base display weaker tendencies.

The development in Västerbotten presents a complex and overall somewhat uneven picture of the county's ability and capacity for innovation. Financial capital has strengthened, mainly through a clear increase in venture capital volumes, although year to year variation is large.

According to the measurement model, this development improves the conditions for innovation and business development. However, the area of research and development shows a weaker trend, with a reduced share of R and D in relation to gross regional product, fewer awarded doctoral degrees, and a declining number of publications. This suggests that the knowledge producing base has weakened somewhat, even though the decline in doctoral graduates follows a national trend. The share of scientific and highly cited publications has also decreased at Umeå University. Human capital, on the other hand, shows a generally positive development. The share of highly educated individuals and people in knowledge intensive



Picture 4. Relative development for each indicator. Blue colors at the end of the time series indicate a positive development, while red colors indicate a negative development. Yellow colors consist of only one measurement value and indicate a neutral development. Note, however, that bankruptcies have increased and are shown in blue, and the same applies to fear of failure.

occupations is increasing, as is the share with STEM education, science, technology, engineering, and mathematics, among the highly educated, with a particular increase among women over the past decade. Compared with the national level, Västerbotten has a high share of highly educated residents and a large proportion employed in knowledge intensive occupations, which provides a strong knowledge base. The positive development in STEM aligns with the national STEM strategy and strengthens the region's innovation potential, especially within the technology sector. At the same time, challenges remain in terms of recruiting and retaining skills, creating more qualified jobs, and offering better opportunities for skills development in the business sector. Retention rates among graduates are low compared with other counties, which underscores the need for attractive job opportunities and affordable housing. Umeå University has seen a strong inflow of students and a record number were registered in 2024, but the increase places the university roughly in the middle range compared with other institutions of similar size.

The digital infrastructure has developed rapidly and largely positively, especially after the 2020 pandemic. Increased digitalization is also evident in the education sector, where the share of distance learning students at Umeå University has increased by 10 to 15 percentage points over the past decade.

Perceptions of physical infrastructure vary across the county. Residents in Umeå are generally more satisfied than those in several inland municipalities, particularly with regard to road networks, rail connections, and air traffic. Long geographic distances and sparse settlement patterns constitute a clear challenge.

When it comes to entrepreneurial capacity, Västerbotten is slightly below the national average in terms of both new business formation and the share of residents who run or lead new companies. Despite this, the indicators are moving in a positive direction. Nearly 600 companies increased their turnover by at least 20 percent for three consecutive years during the 2020 to 2023 period. This shows a broad base of fast growing companies, even though growth persistence declines somewhat faster than in several other counties. Compared with Region Skåne, Östergötland, and Örebro, the development is slightly weaker, while it is on par with Region Värmland. This suggests that Västerbotten has a broad business base but a weaker capacity to support long term scaling, although this may also be influenced by the business structure in Västerbotten. This constitutes an indication of challenges in the commercialization or "utilization" phase according to the METRIC model.

Economic policy instruments have developed weakly. Tax incentives for research, development, and new business formation have declined from around SEK 160 million to SEK 130 million over the past decade. This signals somewhat lower economic stimulation for R and D activities. The regulatory environment, such as policy frameworks and public instruments, does maintain basic support, but contributes to a limited extent to strengthening innovation driven momentum over time.

The results from the business survey, NLE 2024, which forms part of METRIC, show that only 20 percent of companies have participated in any innovation program or support scheme, and almost half are not aware that such support exists. Among the companies that have actually used the support, satisfaction is high, which suggests that the instruments work well for those who are reached. This points to a reach problem rather than an effectiveness problem, meaning that the support is effective but reaches only a limited share of the target group.

With regard to innovation friendly procurement, data from the Swedish National Agency for Public Procurement show that no such procurements were registered in the county during the 2021 to 2023 period. This means that public actors in Västerbotten have not yet used innovation friendly procurement as a tool to stimulate innovation. Compared with several other regions, for example Skåne, Halland, and Västernorrland, the county therefore lags behind in the application of this instrument.

In Västerbotten, negotiated procedures and framework agreements are used relatively often when the contracting authority seeks increased flexibility. These procedures are, however, generally regarded as less innovation promoting within the framework of the Public

Procurement Act, since they are usually applied when needs are already clearly defined or when competition is limited. This can reduce the scope for stimulating innovation and new thinking.

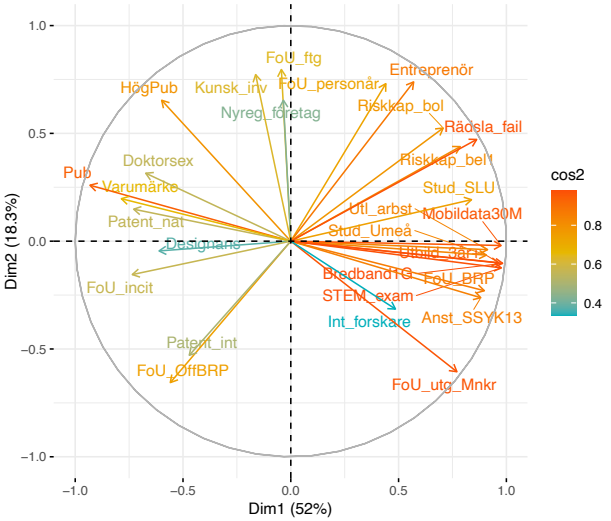
Statistical covariation between indicators

To analyze how the indicators covary and to identify overall patterns in Västerbotten's innovation ecosystem, a principal component analysis, PCA, was carried out based on indicators with good representation in the components, cos squared of at least 0.3. The purpose was not to establish causal relationships between areas and indicators, but to highlight structural and statistical relationships between indicators within and across the METRIC dimensions. This can provide clues about how the system as a whole functions.

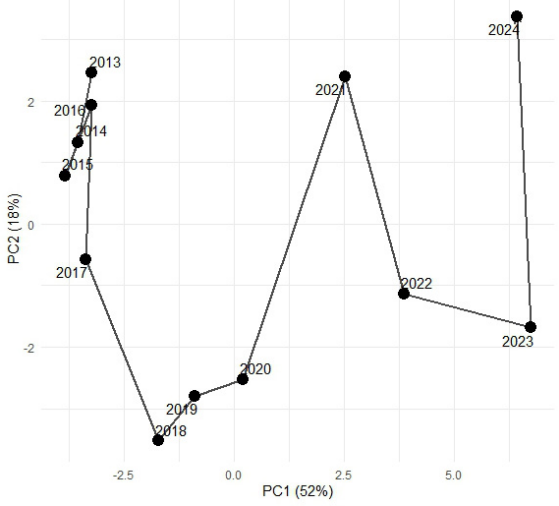
The first and most significant component separates indicators that describe a research and knowledge based innovation environment, including publications, patent applications, and doctoral degrees, from indicators that reflect a more market and digitalization driven innovation ecosystem, such as venture capital, entrepreneurship, and digital infrastructure. This dimension explains over 50 percent of the variation and therefore constitutes the main axis of the regional innovation structure, ranging from a research driven logic to a more application and business oriented logic.

In the figure, we can see that over time a pattern emerges in how the innovation ecosystem in Västerbotten has changed. During the 2013 to 2017 period, the points are tightly clustered on the left side of the figure. This suggests an innovation profile dominated more by knowledge producing factors. From 2018 to 2020, a shift begins to take place. From 2021 onward, there is a further movement toward the business and digitalization driven side of the model. There is also increasing distance between the years in the later period.

It is interesting to note that the two different development logics, the research and knowledge based logic and the market driven logic, shift in strength over time. When the market oriented logic is strengthened,



Picture 5. PCA. Visualization of indicators in Västerbotten's innovation ecosystem. The arrows show the direction and strength of the indicators in relation to the first two components. The color scale indicates how well the indicators are represented by the model, cos squared. Component 1 describes the transition from research and knowledge based indicators, on the left, to market and digitalization driven indicators, on the right.



Picture 6. The figure shows how the region's innovation ecosystem has shifted over time across two dimensions. During the 2013 to 2017 period, an academically oriented R and D logic dominates. This is followed by a decline in entrepreneurial dynamism in 2018 to 2020. Thereafter, a trend break occurs, with the system moving toward a more business driven and entrepreneurial profile in 2021 to 2024.

the research based logic tends to weaken. This may indicate a certain imbalance between knowledge production and a focus on commercial application.

The negative correlations between the two clusters, r of approximately minus 0.38, which indicate this development logic, should not be interpreted as a conflict between research driven and market driven innovation. Rather, they should be seen as an expression of shifting focus between two complementary development profiles. When market and digitalization related indicators are strengthened, research related indicators tend to have less impact, and vice versa. This can be described as a pendulum movement between knowledge building and commercialization. Since both of these logics are important for regional innovation capacity, strategic efforts need to support both the long term flow of ideas and the mechanisms that translate ideas into scalable businesses. In practice, this means strengthening the links between knowledge production and commercialization, so that the system develops more in tandem rather than alternately.

Analysis of regional strengths and weaknesses

Strengths in Västerbotten

Strong in migration flows and increasing skills
Large inflows of people create opportunities to retain individuals with in demand skills, such as students, researchers, specialists, and entrepreneurs, in the region and within organizations after studies, assignments, or first jobs. The strong in migration therefore contributes to a substantial inflow of skills to Umeå University and Norrland University Hospital, as well as to growing companies and the public sector. Since the 2000s, the county as a whole has shown a positive and increasing net migration trend, which is an indicator of the region's overall attractiveness.

University environments are a clear driving force. Umeå University, together with the Swedish University of Agricultural Sciences, SLU, has a very large student base, with Umeå University reaching its highest level ever in 2024. The level of education in the population is rising, and the share of STEM educated individuals is increasing, with a particularly positive development among women, which broadens the region's skills base. Luleå University of Technology also contributes to the region's skills supply through its campus in Skellefteå, especially within technology and future oriented industries. Taken together, this means that the county is continuously supplied with new human capital and thus better conditions for research, technical competence, and innovation. The connection to Norrland University Hospital further strengthens the clinical and life science related parts of the ecosystem.

Improved digital infrastructure
Digital infrastructure is another key foundation. More than 95 percent of establishments have access to high speed broadband, and coverage for mobile data above 30 Mbit per second has improved significantly in recent years. The pandemic accelerated digitalization, with positive spillover effects on societal development and the creation of new opportunities. This provides good conditions for data driven ways of working, remote and collaborative work, test beds, and fast connectivity between higher education institutions, companies, and the public sector. With this combination of strong universities, growing human capital, and digital infrastructure, there is a solid foundation for scaling up utilization and enabling more research results and ideas to become real products, services, and ways of working.

Challenges in Västerbotten

Implementation gap
Despite high levels of knowledge production at higher education institutions, research results and technological enablers reach companies only to a limited extent, which indicates an implementation gap. The fact that 84 percent of companies lack collaboration with universities may be a sign of low implementation capacity, that is, weak ability to identify, absorb, and apply external knowledge. In a region that is as knowledge intensive as this, there should be potential for more collaboration, even if not all companies have such needs. The consequence is that the region's strong knowledge base is not fully translated into competitiveness, growth, and societal benefit. To bridge the gap between academia and industry, the intermediary links need

to be strengthened. Above all, this would require that utilization of research results is given academic merit, see further under Utilization and governance below. Other measures could include standardized forms of collaboration between companies and higher education institutions, such as co creation, test beds, and adjunct industrial doctoral candidates, small and fast adoption support schemes, and early customer validation through procurement or first customer contracts.

Challenges related to early stage capital

Capital flows are uneven, and early stage risk willing capital is scarce. The number of active venture capital firms varies greatly, even though it has increased in recent years. For example, there were seven active firms in 2021, two in 2022, and eight in 2023, and total investment volumes show similar volatility, with peaks in 2021 and 2023. Particularly concerning is that the share of seed financing is highly volatile and in some years zero. Growth loans dominate over innovation loans, at approximately SEK 8.7 million versus SEK 2.5 million in 2023, which indicates that financing tends to enter at a later stage of company development.

In Västerbotten, just under 600 companies increased their turnover by at least 20 percent for three consecutive years during 2020 to 2023. The result shows a broad base of fast growing companies, but growth fades faster than in several other counties. This points to strong breadth but lower persistence in supporting long term scaling.

Challenges related to qualified jobs, housing, and graduate retention

The recruitment situation in the county is strained. Sixty one percent of companies in the county experience recruitment of key skills as difficult. The same skills shortages are found in the public sector. At the same time, the knowledge base is growing. The share of highly educated people aged 25 to 64 increased from 27.9 percent in 2015 to 32.8 percent in 2023, the share of knowledge intensive jobs rose from 42.2 to 44.0 percent during 2020 to 2023, and Umeå University reached 24,309 students in the autumn semester of 2024. The population can therefore be said to be becoming more highly skilled, yet there is still a general shortage of skills. A lack of skills, and of the right skills, is not unique to Västerbotten. However, the retention of incoming students is lower than in many other counties when comparing the share recruited from outside the county to universities with the share who remain after graduation. The county would benefit greatly if more graduates chose to stay after completing their studies, but this requires more qualified jobs and good quality, affordable housing, which students have identified as key conditions for staying in the county.

On the enabling side, fast tracks into the labor market are lacking. There are few organized pathways for students and recent graduates to quickly obtain relevant employment, such as trainee programs, internships, or collaboration projects with companies. Opportunities for partner employment are also limited. This leads more graduates to leave the region after completing their studies and hinders the recruitment of skills.

A need for greater diversity, more women and men

Västerbotten generally has fewer newly created jobs than the national average in relation to population size. The county also has a lower share of newly started companies led by women compared with the national average. This issue concerns both gender equality and growth. Reduced diversity risks hampering innovation capacity, productivity, and breadth in the business sector, while the county also misses out on entrepreneurial potential from women owned companies. Research shows that gender diversity in management and R and D units strengthens innovation capacity and competitiveness. Other findings indicate that higher female representation is often associated with increased productivity and more innovations.

Women are the majority among new students and graduates in higher education, which points to a strong but underutilized base for entrepreneurship, especially within knowledge intensive sectors. The region therefore risks falling behind compared with areas that better harness women's potential. Underrepresentation of women in business ownership and innovation support reduces regional competitiveness and increases vulnerability, as the sectoral breadth of the small business base risks becoming narrower.

The relationship between the number of men and women studying at university is also uneven and is moving in a negative direction, with an increasingly large gap in the share with higher education. Fewer men than women choose to continue studying after upper secondary school. In the long term, this may also affect the supply of skills, as men and women to a significant extent choose different educational fields.

Utilization and governance

Utilization of research

The teacher exemption is unique to Sweden and means that responsibility for commercializing research results largely rests with the individual researcher rather than with the higher education institution. In many other countries, this issue is handled by so called Technology Transfer Offices, TTOs, which are responsible for seeking patents or otherwise protecting research results. In these systems, higher education institutions own the research results in the same way that companies own their assets, which generally means that individual researchers have more limited incentives to drive commercialization.

It would be beneficial if utilization of research results were to a greater extent regarded as merit worthy for researchers, since this would likely promote academic innovation. At present, utilization is generally not formally merit worthy at Swedish universities and higher education institutions, even though engagement in innovation activities alongside academic work is often viewed positively. Technical faculties and institutions tend to take a more permissive approach to these issues. Some institutions have attempted to include collaboration and utilization in merit portfolios, but these initiatives have so far not been particularly successful.

For the county, this argues for clearer merit systems for collaboration and commercialization, simple and standardized intellectual property frameworks, and support close to research groups. Clear IP frameworks mean that ownership, rights of use, and the distribution of potential revenues or licenses are defined in advance. This could reduce the risk that ideas are not captured, enable more licensing opportunities, and shorten the path to a first customer. Even though the teacher exemption is generally considered an advantage, it would be possible to strengthen incentives for utilization. Small steps have been taken in legislation with the aim of promoting the utilization of research. One example is the possibility of joint appointments, where changes to the Higher Education Act and the Higher Education Ordinance have made it easier for higher education employees to hold positions with two different employers. The purpose is to strengthen the link between academia and the surrounding society and to create better conditions for knowledge exchange and practical application of research. In the proposals presented in SOU 2020:59, which discusses utilization of research, relatively few proposals have been taken forward, and the teacher exemption was not an issue addressed in the inquiry.

Unlike universities and higher education institutions, there is no corresponding teacher exemption for municipalities or regions. However, simpler forms of innovation promoting structures could have an effect and contribute to these actors investing more in innovation, accelerating development, or making better use of ideas. One example could be that municipalities and regions adopt policies that enable various forms of rewards for employees who contribute innovative solutions. Today, there are some initiatives, such as so called "free letters," which allow individual employees to pursue their ideas further. However, there are also several obstacles, including organizational structures, prevailing cultures and norms, and not least a lack of resources. Region Västerbotten has, for example, tried allocating funds so that units can hire temporary staff, allowing employees time to work on their ideas. In practice, this has been difficult to implement, partly because it is hard to recruit temporary staff in areas such as healthcare. This means that it is often difficult for staff to free up time for innovation work.

One of the system level challenges is to create effective intermediaries, organizations, structures, and financing mechanisms that can translate research into market applications. By strengthening actors such as incubators, innovation offices, and industry platforms, the region can shorten the distance between research results and practical application.

4. Conclusions and recommendations

The conclusions and recommendations below are based on results from the METRIC measurement model.

Invest in retaining and attracting skills

To strengthen the county's long term innovation and skills supply, more students need to choose to stay after graduation. This requires a more coordinated strategy in which employers, higher education institutions, and public actors connect students with working life at an early stage through internships, project based courses, and relevant summer jobs. At the same time, good establishment conditions are needed, particularly with regard to housing, mobility, and opportunities for accompanying partners to find employment. By more clearly integrating students into innovation environments and offering simpler pathways into entrepreneurship and test beds, the region can retain more graduates while also attracting new talent.

Strengthen talent circulation and skills mobility

The county's innovation capacity is strengthened when skills can move freely between companies, academia, the public sector, and civil society. The analysis shows that labor mobility in parts of the county is limited, which hampers both the diffusion of knowledge and the development of new ideas. To strengthen talent circulation, a more active strategy is needed to facilitate recruitment, skills transition, and mobility. Areas of focus include trainee programs, career transitions, shared positions between companies and higher education institutions, and better support for international recruitment. By increasing mobility, both company innovation capacity and the region's overall skills supply are strengthened.

Develop knowledge production

Commercialization is a necessary part of a viable innovation ecosystem, but the analysis shows that several key conditions for knowledge production are developing in an unfavorable direction, which in the long term may negatively affect the entire chain. Long term innovation capability and capacity require that research, education, and scientific quality continue to develop in parallel with market orientation. It is therefore crucial that academic infrastructure, research funding, and research quality are safeguarded and strengthened at the same time as utilization is reinforced, so that the balance is not disrupted by an overly one sided focus.

Strengthen collaboration between business and research

Västerbotten has a strong and internationally competitive knowledge base. However, the analysis shows that the link between academic research and commercial application needs to be strengthened. To increase utilization, clearer incentives are required for researchers to engage in innovation processes. Contributing to innovation activities should to a greater extent be regarded as merit worthy. A recognized career pathway for researchers who contribute to societal benefit and application would increase the impact of the knowledge produced at the county's universities and research environments. Utilization does not have to concern commercialization alone, but also the use of knowledge in a broader sense.

The limited research that has been conducted shows that the teacher exemption has had a positive effect, for example on the number of patents in Sweden, but it has also limited higher education institutions' insight into and ability to support utilization. There is likely a substantial dark figure when it comes to research results with high societal relevance and or commercial potential that never come to the attention of innovation offices or institutions. One possible solution is to introduce a disclosure obligation, where researchers are required to inform their institution about research results that may have commercial or societal significance. Such a system could improve transparency, increase coordination, and create better conditions for utilization without restricting researchers' rights under the teacher exemption.

Get more companies to work with innovation management

Despite the county's strong knowledge base, the share of companies that work systematically with innovation is lower than desirable. Among the companies that stated in the business survey, NLE 2024, that they already work with innovation, only 34 percent work systematically with innovation management. There is clear potential to raise knowledge of systematic innovation management, both among companies that already work with innovation and among those that do not work with innovation at all. To strengthen innovation capacity, more companies need access to methods, tools, and support structures that enable them to develop, test, and scale new solutions.

Make procurement more innovation friendly

By increasing the use of procurements in which public actors request new or as yet untested solutions to address a need, early market signals are created that both reduce company risk and increase the likelihood that innovations reach implementation. Municipalities act as key arenas for taking concrete societal challenges as a starting point and inviting new solutions, where challenge driven innovation, digital services, and different forms of collaboration with academia and business are translated into practical value. A more strategic and long term approach to innovation friendly procurement would therefore strengthen both companies' willingness to innovate and the region's ability to address its societal challenges. The public sector has a particularly important role here as an enabler.

Create a bridge between development and market

There are clear shortcomings in early stage financing and in the understanding of how innovative companies actually move from idea to market. To strengthen the county's innovation capacity, a shared sense of responsibility is needed, where both public and private actors view the county's innovative companies in the same way as when they actively choose to support local retailers. By stabilizing early capital investments and complementing them with public pilot purchases and other forms of early customer commitments, a bridge is created between development and market, giving companies stronger opportunities to grow within the county.

Stimulate Västerbotten's innovation and growth capacity based on differing conditions

There are clear intra regional differences in conditions for innovation, productivity, and collaboration, which means that the county should not be viewed as a homogeneous development area. Capacity is generally stronger in coastal corridors with good access to university knowledge and innovation environments, which is reflected in transport and digital infrastructure, labor market density, and access to innovation support. Regional development policy should therefore continue to be clearly place based and strength oriented, with measures designed according to actual conditions rather than uniformity. Development initiatives with high requirements for critical mass should be prioritized in high capacity environments, while accessibility and support structures are strengthened in other parts of the county. In this way, the region's overall innovation and growth capacity can be strengthened through clearly differentiated and complementary roles.

Help more innovations reach new markets

To strengthen the region's competitiveness, more companies need to reach markets outside Sweden. Measurements show that the contribution of innovations to turnover and exports is still limited. The focus should therefore be on linking early regional investments that make it possible to develop and test new solutions, seed capital, and support to verify that an idea works in practice, proof of concept, with targeted market introduction efforts, go to market initiatives, that help companies reach their first customers in new markets, in collaboration with actors such as Business Sweden.

Accelerators should be distinguished from incubators. While incubation focuses on developing new ideas and companies, accelerators should support companies that are already operating and aiming to grow in international markets. By using the public sector as a first customer,

strong reference cases can be created, which increase the likelihood that innovations reach export markets.

Build knowledge through measurement

Continuous monitoring of the innovation ecosystem is crucial in order to adjust regional strategies in line with changing needs. By continuously measuring and further developing the model, both the shared understanding of challenges and internal competence are strengthened, which improves the quality of future decisions. To avoid the loss of important system knowledge over time when projects end or staff change, indicators that capture collaboration, networks, and flows should be monitored just as carefully as traditional measures of research production, such as publications and degrees. These indicators clarify how relationships and knowledge exchange evolve over time and reduce the risk of knowledge leakage.

In depth analysis and follow up at the intra regional level

The follow up of METRIC should be used as a bridge to more in depth analysis at the intra regional level in order to strengthen learning and practical usefulness. The focus should be on tracking how innovations are translated into market outcomes, for example the share of companies that reach their first customer within twelve months, increased turnover from new products and services, and the number of intellectual property cases, such as patent and trademark applications, licenses, and company spin offs, that is new companies formed from established firms or research environments. By monitoring these indicators over time, a better understanding is created of where the regional innovation ecosystem functions well and where targeted interventions are needed to strengthen the region's capacity and capability.

Change based approaches for new actors

The innovation ecosystem is constantly changing, both in terms of which actors participate and which needs are to be addressed. To strengthen the ecosystem's relevance and inclusion, it should be continuously monitored to make visible how participation and resource allocation change over time. Indicators should therefore be tracked by gender, especially within early innovation activities, business and export support, capital allocation, and market outcomes. Set clear interim targets, for example that the share of women among new founders and in capital allocation increases.

Method and data sources

1. Overview

METRIC, Measurement of Regional Innovation Capacity, is a measurement model used to analyze and monitor regional innovation ecosystems. The purpose is to create a systematic and comparable picture of a region's innovation ecosystem and its innovation capacity and capability, and to identify strengths, weaknesses, and development needs.

The METRIC model consists of three parts:

Part	Content
Measurement model	Defines what is to be measured, and which dimensions and indicators describe the region's innovation ecosystem.
Measurement method	Specifies how the measurement is carried out, including data collection, analysis, and validation.
Governance model	Describes how the results are used for strategic development, learning, and follow up over time.

2. Measurement model

The measurement model comprises eleven dimensions that together describe a regional innovation ecosystem:

1. Technology
Measures, among other things, the region's capacity to produce, use, and import high technology products and advanced digital tools.

2. Research and development, R and D
Measures, among other things, investments in R and D within academia, business, and the public sector, as well as the degree of collaboration.

3. Human capital
Measures, among other things, access to educated and qualified labor, knowledge intensive occupations, and STEM fields.

4. Entrepreneurial capacity
Measures, among other things, new business formation, entrepreneurship, and innovation driven enterprise.

5. Business support
Measures, among other things, access to support structures such as incubators, science parks, and innovation offices.

6. Actors and connections
Measures, among other things, networks and relationships between actors in the public sector, academia, business, and civil society.

7. Financial capital
Measures, among other things, access to financing for innovation, such as venture capital and public innovation funding.

8. Infrastructure
Measures, among other things, how physical and digital infrastructure supports innovation, such as broadband, transport networks, test beds, and research facilities.

9. Legal and regulatory environment
Measures, among other things, how laws, regulations, and policies affect innovation capacity.

10. Culture
Measures, among other things, social and organizational attitudes toward innovation, openness, risk taking, and entrepreneurship.

11. Markets
Measures, among other things, access to local, national, and international markets, as well as innovation driven procurement.

Each dimension consists of a set of indicators that quantify relevant aspects of innovation capacity, such as R and D expenditure as a share of gross regional product, patent applications, level of education, and the degree of collaboration between companies and universities, among others.

3. Measurement method

3.1 Data collection
The measurement is based on a combination of official statistics and survey data.

The data sources are divided into two main categories:

Data category	Examples of sources	Examples of indicators
National and regional official statistics	SCB, UKÄ, PRV, Tillväxtanalys,	R and D expenditure, education level, patents
Survey data	Näringslivsenkäten (NLE 2024), Inkubatorenkäten 2024	Innovation activities in companies, collaboration

For some indicators, dedicated regional surveys are required because corresponding data are not available in national databases. Of the original 62 indicators, 10 indicators have been excluded from this analysis due to methodological difficulties or a lack of reliable data sources.

3.2 Phases of the measurement process
The measurement is carried out in five steps:

1. Planning
Definition of geography, selection of indicators, and timeline.

2. Data collection
Collection of data from national databases, regional sources, and surveys.

3. Data analysis
Processing and statistical compilation of indicator values.

4. Validation
Qualitative review and dialogue with regional actors to ensure interpretation and relevance.

5. Improvement planning
Identification of development areas and formulation of proposed actions.

4. Analysis and interpretation

The results should, where possible, be analyzed and interpreted in relation to:

Regional areas of strength
National and international benchmark values
Previous measurements for trend analysis

The quantitative analysis is complemented by qualitative dialogues with actors in the region's innovation ecosystem to increase understanding of relationships and policy implications.

5. Follow up

The measurement is proposed to be carried out every two to three years. The results are used as a basis for:

Follow up of regional innovation strategies, for example RIS
Prioritization of measures within the innovation support system
Continuous improvement and governance of innovation activities

6. The Business Survey, (NLE 2024)

To complement the quantitative data, a business survey was carried out in spring 2024 targeting companies operating in Region Västerbotten. The purpose was to collect information on companies' innovation activities, use of technology, collaboration, and skills supply.

Factor	**Description**
Target population	All companies in the region with at least one employee (N = 4 979).
Sample	Random stratified sample of 2,000 companies, of which 1,740 in the main sample and 260 in an oversample for the region's areas of strength, according to SNI codes.
Data collection	Conducted by Verian during the period 13 May to 5 June 2024.
Method	Postal mailing with a web based survey; two reminders sent on 20 May and 29 May.
Response rate	305 responses, approximately 15 percent.
Questionnaire	Developed jointly by Region Västerbotten, Krux, and four collaborating regions, with methodological support from Verian.

The questionnaire is designed to measure key indicators in the METRIC model, especially in areas where official data sources are lacking.

7. References and data sources

Almi. (2024). Statistik om företagande och innovation.

Daams, M., McCann, P., Veneri, P., & Barkham, R. (2023). Capital shocks and UK regional divergence (Working Paper No. 035). The Productivity Institute.

Entreprenörskapsforum. (2025). Rapporter och statistik om entreprenörskap.

Objektvision. (2025). Statistik om kommersiella fastigheter.

Ozan, H., & Steiber, A. (2025). Aligning regional innovation ecosystems: The MEAM-3LAM model and CAM actor mapping. I Proceedings of the 21st European Conference on Management, Leadership and Governance (ECMLG 2025).

Ozan, H., & Steiber, A. (2025). The interrelationship between public innovation ecosystems, business innovation ecosystems, and organizational innovation management systems. Paper presenterat vid XXXVI ISPIM Innovation Conference, Bergen, Norge.

Organisation for Economic Co-operation and Development, & Eurostat. (2018). Oslo manual 2018: Guidelines for collecting, reporting and using data on innovation (4th ed.). OECD Publishing.

Patent- och registreringsverket. (n.d). Patentstatistik per län.

Post- och telestyrelsen. (n.d). Statistik om elektronisk kommunikation och digital infrastruktur.

Region Västerbotten. (2020). Västerbotten – en attraktiv region där olikheter skapar utvecklingskraft: Regional utvecklingsstrategi 2020–2030. Region Västerbotten.

Region Västerbotten. (2022). Regional innovationsstrategi för Västerbotten 2022–2030. Region Västerbotten.

Region Västerbotten. (2024). Inkubatorenkäten 2024.

Region Västerbotten. (n.d). METRIC – Presentation av mätmodell och metodik [PowerPoint-presentation].

Region Västerbotten. (n.d.). Indikatorer för mätning av regionala innovationsekosystem med METRIC (Version 4.4).

Region Västerbotten. (n.d.). Metodguide METRIC (Version 0.9.4).

Region Västerbotten. (n.d.). Metodbok för utveckling av regionala innovationsekosystem: METRIC (Measurement of Regional Innovation Capacity). Region Västerbotten.
Regeringskansliet. (2020). Innovation som drivkraft – från forskning till nytta (SOU 2020:59). Statens offentliga utredningar.

Regeringskansliet, Utbildningsdepartementet. (2021). Remissvar på betänkandet Innovation som drivkraft – från forskning till nytta (SOU 2020:59) (Diarienummer U2020/05545).

Skatteverket. (n.d). Skattestatistik.

SVCA – Swedish Private Equity & Venture Capital Association. (n.d.). Statistik om riskkapital.

Statistiska centralbyrån. (n.d.). Statistikdatabasen.

Svenskt Näringsliv. (n.d.). Näringslivsstatistik och analyser.

Talmar, M., Walrave, B., Podoynitsyna, K. S., Holmström, J., & Romme, A. G. L. (2020). Mapping, analyzing and designing innovation ecosystems: The ecosystem pie model. Long Range Planning, 53(4), 101850. https://doi.org/10.1016/j.lrp.2018.09.002

Tillväxtanalys. (n.d). Statistikdatabas.

Universitetskanslersämbetet. (n.d). Statistikdatabas.

Verian. (2024). Näringslivsenkäten 2024.

World Intellectual Property Organization. (2024). WIPO statistics database.

This report provides a consolidated and evidence based picture of the state, development, and interaction of Västerbotten's innovation ecosystem. Based on the METRIC measurement model, Measurement of Regional Innovation Capacity, the report analyzes the region's innovation capability and capacity over time. The report is built on a combination of official statistics, regional data, and survey studies, and covers eleven core dimensions that together describe the innovation ecosystem as a whole, from research and human capital to entrepreneurship, capital, infrastructure, culture, and markets.

The results show that Västerbotten has strong fundamental conditions for innovation. The region is characterized by a strong knowledge base through universities and research environments, growing human capital, good digital infrastructure, and increasing access to venture capital. At the same time, the analysis identifies clear challenges. The link between research and commercialization is weak, access to early stage capital is uneven, and many companies have limited collaboration with academia and innovation support actors. Few companies work systematically with innovation management, and innovation friendly procurement is used to a very limited extent.

The report also shows that the innovation ecosystem has shifted over time, from a more research and knowledge based logic toward a more market and digitalization driven development. This shift has strengthened certain parts of the system, while at the same time weakening others. To strengthen the region's long term innovation capacity, the interaction between knowledge production, entrepreneurship, capital, and market introduction needs to improve, so that ideas, research, and skills are more effectively translated into products, services, and societal value.

The report identifies both strengths and areas for development and results in a set of strategic recommendations. These include the need to retain and attract skills, strengthen the utilization of research, improve access to early stage capital, increase the use of innovation friendly procurement, and create better conditions for companies to reach new markets.

Taken together, the report constitutes a knowledge base for strategic decisions, prioritization, and continued development work. It is intended to serve as a shared platform for dialogue and collaboration between public actors, academia, business, and other parts of Västerbotten's innovation ecosystem, with the aim of strengthening the region's innovation capacity and long term competitiveness.

Read more about METRIC here:

Interreg
Co-funded by the European Union
Northern Periphery and Arctic
RI
region västerbotten