

BUSINESS R&D
IN THE WEST 2026

in Europe's top segment

A region with world-class R&D

Sweden is a country that boasts considerable capacity for conducting research and development (R&D). Year after year, Sweden finishes near the top in surveys looking at how much money countries invest in research and development in relation to their GDP. In 2025, Sweden's total R&D as a share of GDP stood at 3.6 per cent, which corresponds to approximately SEK 241 billion. In terms of business R&D expenditure alone, the share of GDP was about 2.7 per cent (approximately SEK 178 billion). In international measurements conducted by the OECD, among others, this means that Sweden has the world's fifth largest R&D budget in relation to its GDP.[1] This is very impressive for a small, open economy like Sweden. What might Sweden's R&D capacity entail?

The empirical stream of innovation studies often analyses the relationship between R&D and innovation. Broadly speaking, the conclusions show that the more R&D companies conduct, the greater the likelihood of innovations being created and demanded on global markets, and that companies' productivity increases. This in turn generates increased value and frees up resources, which can be reallocated to new job opportunities and technologies. The apple is not falling far from the tree in this respect, as Sweden's innovation potential also appears to be exceptional in several international surveys by the European Commission, WIPO and the OECD.[2]

So where is Sweden's R&D conducted in companies and where are the country's innovations and market-leading competitive products, services and processes created?

In 2025, Västra Götaland's share of the country's population and companies stood at approximately 17 per cent. When it comes to the county's share of other indicators, such as employment and wage sum, these also stand at around 17 per cent. However, some indicators for Västra Götaland show completely different shares of the nation's total. These include the county's share of Sweden's exports and business R&D expenditure. In 2025, Västra Götaland accounted for just above one fifth of the country's total export value. When it comes to Sweden's total business R&D expenditure in 2025, Västra Götaland's companies accounted for as much as 35 per cent.

Business R&D expenditure, as a proportion of the country, is more than twice as large in Västra Götaland compared to the county's other regional macro-indicators, which confirms the picture of the R&D-intensive companies that are established in the county. Västra Götaland's companies have a unique ability to earmark large amounts of R&D resources at their own initiative, in order to produce competitive innovations that are later exported on a global market. The companies' innovations (goods, services and processes) in the county are consequently making a major contribution to Sweden's economic growth.

How much do companies in Västra Götaland invest in research and development at their own initiative? In this report we present the business R&D expenditure in Västra Götaland during the period 1997-2025. We start with a brief review of the results from empirical studies. Section two illustrates how the region is doing internationally compared to other European regions. The third section analyses business R&D expenditure in Sweden and the metropolitan counties, including R&D in relation to GDP/GRP, private sector employees as well as the companies' form of ownership. The fourth section asks what is needed to further increase the R&D expenditure in businesses. Here we present both a calculation example and measures that can be implemented and that already are being implemented in the Gothenburg region aimed at further strengthening R&D capacity. The final section presents our conclusions and recommendations.

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[1] OECD (2026), 'OECD Main Science and Technology Indicators', OECD Directorate for Science, Technology and Innovation, March 2026, Paris, France.
[2] Innovation potential refers to the ability to apply for patents and to create new products, new services and new processes for the production of goods and services. In this context, WIPO refers to the World Intellectual Property Organization.

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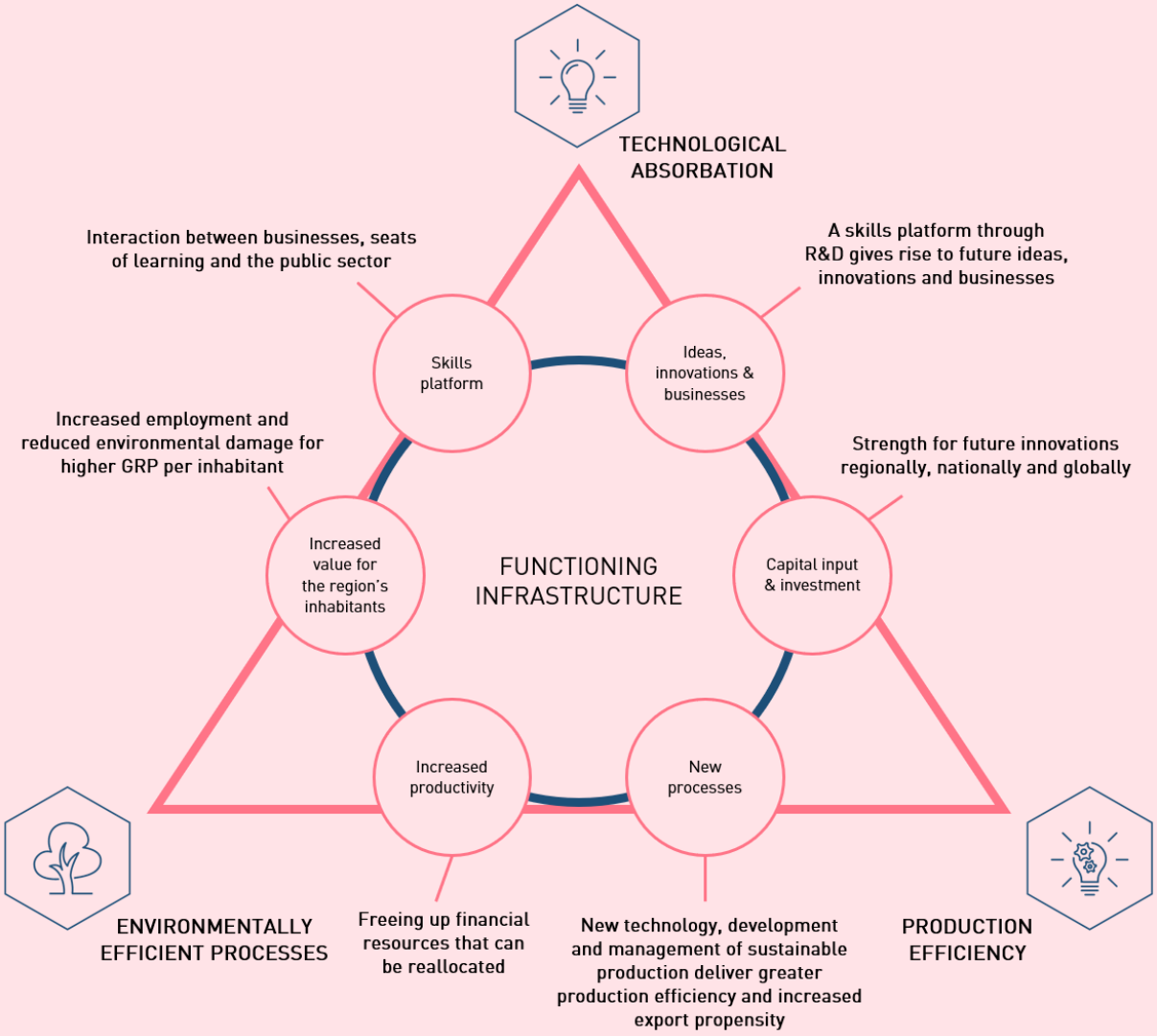
Sustainable growth



1 Theories on R&D in firms' production

The empirical research provides different ways of analysing the role of knowledge in companies and its impact on regional growth. The starting point for this report is based on theory of knowledge that is embodied in the companies' production function (drawn from e.g. Schumpeter 1934 and 1942, Arrow 1962, Chambers 1988, Romer 1990, Grossman and Helpman 1991 and Hamermesh 1993). The theory relates to the way increased human capital (known as R&D work) in the production process results in increased productivity among the workforce (Lucas 1988), but also to how an increase in R&D capital (through R&D investments) in production increases the companies' ability to renew themselves (Romer 1990). In this respect, knowledge is embodied in various forms in the theory, such as:

1. in human capital in the form of skills acquired through learning, practice and meetings, by reading and understanding documents and books, through experience or training (Andersson and Beckmann 2009);

2. in goods and R&D capital in the form of technical solutions (e.g. hardware and software) for specific machines or for certain production procedures (Romer 1990, Johansson and Lööf 2014);

or as knowledge that has been outsourced:

3. in licensing agreements where the production of goods, services, inputs and processes is outsourced to a particular subcontractor possessing the desired knowledge (Cassiman and Veugelers 2000).

The first and second forms of knowledge embodied in the theory can be referred to as distinct channels that disseminate knowledge. Knowledge embodied in people can be transferred through the exchange of ideas when people interact. For example, through meetings with input providers of technical solutions or other knowledge-intensive business services, or through market transactions representing intentional transfer of knowledge (Johansson 2005). The exchange of ideas that takes place when people interact can be related to the theory of human capital (Lucas 1988). In this context, individuals have knowledge traits from which they cannot be separated. Positive externalities arise when the human capital can consequently be disseminated, bearing in mind that individuals are mobile within a location or company, or are mobile between locations or between companies. Other productivity gains from human capital include improved ability to coordinate activities within the company (Gereffi et al. 2005), increased capacity within management to handle information (Backman 2013), and better ability to absorb external knowledge (Cohen and Levinthal 1990).

Knowledge that is embodied in machinery and R&D investments can produce a form of unintentional dissemination of knowledge. This unintentional dissemination of knowledge may occur when equipment and other goods are exchanged through the dissemination of technical know-how (Karlsson and Gråsjö 2014). In endogenous growth models initiated by Romer (1986, 1990, 1993), R&D investments lead to more new ideas that give rise to more new goods, services and processes. The general message from Romer's growth models is that new goods, services and processes are more likely to be developed in companies (or regions) with a greater knowledge of R&D compared to the average companies (or regions).

The third form of knowledge usually follows from a deliberate corporate strategy, for example through outsourcing. There are several underlying reasons for establishing a licensing agreement through outsourcing. One motivation that often constitutes grounds for outsourcing is minimising the cost of certain processes related to production. For example, this might relate to routine assembly, economies of scale or proximity to new markets and customers (van Winden et al. 2011). However, activities related to research, science and innovation could also be strong motivations behind a company's decision to outsource (Veugelers 2010).

Another way of investigating unintentional dissemination of knowledge is through a knowledge production function introduced by Griliches (1979). The starting point within this theory is to analyse how R&D transfers and disseminates knowledge to innovative activities. In this context, knowledge is embodied:

4. within R&D expenditure (e.g. in terms of total effect of R&D, or per inhabitant, or per employee, or as private or public R&D, or as a share of GDP or GRP) and in the form of innovative activities related to patents and publication citations or technology licences (Karlsson et al. 2013).

The fourth form of embodied knowledge can be seen as a distinct form of combined knowledge creation and knowledge dissemination.

1.1 The impact of R&D in empirical studies

Research and development (R&D) expenditure in the business sector, both in terms of R&D work and investments in technology, is seen in many empirical studies as an important driver of increased innovation. Here, the companies' rewards are usually reflected in the form of increased productivity, higher revenues and an increased export capacity.

For example, the impact of R&D spending and knowledge spillover on innovations and productivity is being investigated in relation to a selection of more than 9,000 UK companies. The study finds strong evidence that R&D spending is an extremely important element for businesses, both in terms of increased innovation and greater productivity. However, the impact on the companies' productivity from knowledge spillover is greater than the impact on productivity from R&D spending.[3]

Another study looks into the relationship between R&D expenditure (broken down by sector) and innovation in EU countries. The empirical analysis finds clear evidence of a positive relationship between R&D expenditure and innovation, regardless of whether the R&D expenditure originates from companies, the public sector or academia. However, business R&D expenditure has the strongest positive impact on innovation capacity in the EU countries.[4] Similarly, an empirical time-series analysis applied to a large selection of Greek companies finds strong correlations between R&D expenditure and innovative activity in companies, the latter measured in terms of companies' patent applications. The results of the study show clear long-term correlations. For example, the correlation between business R&D expenditure and innovative activity in the companies is positive and significant. Total and public R&D expenditure demonstrates a similar correlation in the study.[5]

The relationship between external sources of knowledge (i.e. R&D investments made within the business value chain and outside the business value chain) and innovation capacity is analysed in a selection of more than 3,200 SMEs in South Korea. There is clear evidence of a positive correlation between R&D investments within and outside the value chain and innovation capacity. For example, the study finds that R&D investments made outside the business value chain increase the tendency for the companies to generate a larger number of radical innovations. R&D investments made within the business value chain, also have a positive impact and the companies' capacity to achieve incremental innovations increases.[6]

A study carried out by Medda (2018) analyses R&D intensity and external sources of R&D in relation to innovation, the latter defined according to three categories where manufacturing companies introduce: (i) product innovations, (ii) process innovations and (iii) product and process innovations together. The study focuses on the manufacturing companies' own R&D intensity, but also on R&D expenditure that comes from external sources, where the external R&D source is defined at sector level, such as academia, research institutes and other companies. A large selection of manufacturing companies from five European countries forms the basis for the study, and the results broadly show that the R&D intensity of the manufacturing

[3] Audretsch, D. B. and M. Belitski (2020), 'The Role of R&D and Knowledge Spillovers in Innovation and Productivity', *European Economic Review*, vol.123 (April).
[4] Pegkas, P., Staikouras, C. and C. Tsamadias (2019), 'Does Research and Development Expenditure Impact Innovation? Evidence from the European Union Countries', *Journal of Policy Modeling*, vol.41, no. 5, (September-October), pages 1005-1025.
[5] Voutsinas, I., Tsamadias, C., Carayannis, E. and C. Staikouras (2018), 'Does Research and Development Expenditure Impact Innovation? Theory, Policy and Practice Insights from the Greek Experience', *The Journal of Technology Transfer*, vol.43, pages 159–171.
[6] KonShik, K. (2018), 'The Roles of Knowledge Sources in and out of the Value Chain on Radical and Incremental Innovation: Moderating Effects of Knowledge Sources on the R&D Investment-Innovation Relationship', *Journal of Korea Technology Innovation Society*, vol.21, no.1, pages 454-490.

companies has a positive correlation with innovation capacity, by means of the companies introducing more product innovations, process innovations and both types of innovation together. When the external R&D source is broken down by sector, R&D originating from academia can be seen to have a positive impact on product innovation, although the study finds no significant impact on process innovation. The opposite effect can be seen for external R&D sources coming from other companies, i.e. they have a positive impact on process innovation, but no significant impact on product innovation.[7]

Strategic partnerships and R&D intensity are analysed in greater detail in an empirical study carried out by Bustinza et al. (2019). Above all, the researchers are examining whether there is a correlation between manufacturing companies in industries that are strong in R&D and their implementation of knowledge-intensive services (KIS) from partnerships, and how this affects their innovation potential. 370 major manufacturers worldwide are included in the selection for this study. The results are clear. Strategic partnerships, between industries that are strong in R&D on the one hand and KIS on the other, lead to more successful product innovation in manufacturing companies, driven by a more service-oriented content.[8]

An additional stream of literature within innovation studies relates to the effects of R&D on the companies' propensity to export and their material investments.[9] For example, Carboni and Medda (2018) analyse the mechanisms behind R&D's impact on companies' propensity to export and their material investments, by using a wide range of manufacturing companies from seven European countries. The results from the study show that the correlation between R&D and the propensity to export is positive and significant. In other words, the greater the R&D investment in manufacturing companies, the higher their propensity to export. Similarly, the study finds a positive and significant correlation between R&D and material investments.[10] Falk and Lemos (2019) also find clear links between R&D, productivity and export behaviour in SMEs in Austria. The empirical results show that both R&D and productivity have a positive and significant correlation with the export behaviour of SMEs. In other words, the higher the levels of R&D and productivity, the more SMEs conduct export activities.[11] By using a firm-level panel dataset of South Korean manufacturing industries Kim (2026) examines the relationship between external R&D and internal R&D on firms' export performance. The results show that both external R&D and internal R&D are complementary in high-technology industries and the effect on export intensity is positive and significant. Within medium- and low-technology industries external and internal R&D activities appear to be substitutive, implying a negative effect on firms' export intensity – however, the relationship is not statistically significant. For firms' export participation, such heterogeneous relationships are not observed. This indicates that the synergistic use of internal and external R&D is not a key determinant of export entry, yet the use becomes crucial once firms compete internationally.[12]

In another study by Mavroudi et al (2023) innovative firms must decide whether they should specialise in either exploratory or exploitative R&D or adopt an R&D strategy that pursues both explore and exploit. The study analyses how the effects of a chosen R&D-strategy and firm performance are influenced by the R&D-strategies adopted by other firms in its industry. A large sample of just above 35,500 observations is used to identify which R&D-strategy is optimal for the firm and gives it performance-enhancing advantages. The results indicate that an R&D-strategy that is similar to that of the rest of the industry decreases firm performance. On the other hand, an R&D-strategy that differs from the industry's dominant R&D-strategy

[7] Medda, G. (2018), 'External R&D, 'Product and Process Innovation in European Manufacturing Companies', *The Journal of Technology Transfer*, vol.45, (July), pages 339–369.
[8] Bustinza, O. F., Gomes, E., Vendrell-Herrero, F. and T. Baines (2019), 'Product–Service Innovation and Performance: The Role of Collaborative Partnerships and R&D Intensity', vol.49, no.1 (Special Issue), *Industry and International Aspects on R&D Management*, (January), pages 33-45.
[9] In this regard, material investments refer to investments in real estate, other companies, asset infrastructure, and goods linked to technology.
[10] Carboni, O. A. and G. Medda (2018), 'R&D, Export and Investment Decision: Evidence from European Firms', *Applied Economics*, vol.50, no.2, pages 187-201.
[11] Falk, M. and F. F. Lemos (2019), 'Complementarity of R&D and Productivity in SME Export Behavior', Journal of Business Research, vol.96, (March), pages 157-168.
[12] Kim, M. (2026), 'Heterogeneous Effects of Internal and External R&D on Export Performance by Industry Technology Level', *Applied Economics*, (June 2026), vol. 58, no. 30, pages 5909-5921.

enhances firm performance.[13] Saharti (2025) provides empirical evidence on the impact of innovation (e.g. R&D intensity, R&D-to-assets and R&D growth rate) and firm growth on firm performance. Firm performance in this context is examined in terms of both labour productivity and asset turnover. The study is accomplished using a panel dataset of 252 firms across G7 economies over the period 2020-2024. The results reveal a consistent and significant positive causal effect of innovation on labour productivity, confirming its role as a driver of firm-level efficiency. However, innovation exhibits a negative and significant association with asset turnover, highlighting short-term trade-offs in operational efficiency, particularly in firms with aggressive R&D strategies.[14]

There are, however, studies pointing at other factors that are more important for innovation than pure R&D expenditure. For example, Hervás-Oliver et al (2021) stress that cooperation between firms and other research centres are more important to innovation than the size of R&D investments. Mostly it depends on the regional context, where ability and conditions vastly differ. A creative environment is required, otherwise investments are wasted.[15]

Hilkenmeier et al (2021) also points at other processes than monetary investments as the main force behind innovation, even if they don't specifically address the importance of the level of R&D investments. Their study stresses how technological knowledge transfers though cooperation can lead to development and growth.[16]

Most innovation studies find a significant relationship between R&D and innovation. In this respect, the innovations take the form of new products and processes, new services or patent applications, etc. This relationship is usually positive and long-term in nature. In other words, if the companies' investments in R&D increase, their long-term reward is greater innovation potential through the introduction of more patent applications or more new products, services and processes on the market. There are also a number of empirical studies demonstrating that R&D has a positive impact on companies' propensity to export, their productivity and their material investments. An R&D-intensive business sector can thereby pave the way for the innovative and sustainable solutions of the future. These sustainable innovations from companies are more important now than ever when it comes to reducing our environmental footprint.

[13] Mavroudi, E., Kesidou, E. and K. Pandza. (2023), 'Effects of Ambidextrous and Specialized R&D Strategies on Firm Performance: The Contingent Role of Industry Orientation', *Journal of Business Research*, (January 2023), Vol. 154.
[14] Saharti, M. (2025), 'R&D and Innovation and Its Impact on Firm Performance and Market Value: Panel Evidence from G7 Economies', *Economies*, (August 2025), vol. 13, No. 9.
[15] Hervás-Oliver J-L., Parrilli M., Rodríguez-Pose A. and F. Sempere-Ripoll. (2021), 'The Drivers of SME Innovation in the Regions of the EU', *Research Policy*, (November 2021), vol.50, No. 9.
[16] Hilkenmeier F., Fechtelpeter C. and J. Decius. (2021), 'How to Foster Innovation in SMEs: Evidence of the Effectiveness of a Project-based Technology Transfer Approach', *The Journal of Technology Transfer*, (December).

2 R&D in an international comparison

Annually, the European Commission conducts a focused survey of regional innovation potential within the EU. The Regional Innovation Scoreboard produces comparisons and assessments of the performance of regional innovation systems in the EU. The regional innovation potential is measured on the basis of 23 out of 32 indicators used for countries in the European Innovation Scoreboard (EIS). The innovation potential can be grouped into four major foundations: basic regional conditions, investments, innovation activities as well as external and internal impact on companies (i.e. on their sales, employment, sustainability, trade and productivity). The regions' innovation potential is assessed according to performance groups ranging from 'emerging' to 'leader', where each performance group has three status levels. For example, the 'emerging' performance group may deteriorate to 'emerging -' or improve to 'emerging +'.

The 'leader' performance group includes a total of 38 regions with innovation potential that is more than 125 per cent above the EU average (see Table 1). Regions with a 'strong' innovation potential lie at between 100 and 125 per cent of the EU average and include 69 regions in the EU. The 'moderate' innovation potential performance group includes 74 regions, and here the capacity lies at between 70 and 100 per cent of the EU average. A total 60 regions within the EU have an 'emerging' innovation potential, which means that their results are below 70 per cent of the EU average. Within the group 'leader', Stockholm is top ranked in the latest survey, followed by the Copenhagen region (Hovedstaden). West Sweden places ninth.

TABLE 1 INNOVATION POTENTIAL PERFORMANCE GROUP IN REGIONAL INNOVATION SCOREBOARD 2025

- Emerging +	- Moderate +	- Strong +	- Leader +
Regions: 60	Regions: 74	Regions: 69	Regions: 38
1. Alentejo (Portugal)	1. Mellersta Norrland (Sweden)	1. West Midlands (UK)	1. Stockholm (Sweden)
2. Valle d'Aosta (Italy)	2. Saarland (Germany)	2. East Midlands (UK)	2. Hovedstaden (Denmark)
3. City of Belgrade (Serbia)	3. Budapest (Hungary)	3. Northern and Western (Ireland)	3. London (UK)
4. Thessalia (Greece)	4. Pays de la Loire (France)	4. Mittelfranken (Germany)	4. Zürich (Switzerland)
5. Thraki (Greece)	5. Lombardia (Italy)	5. Övre Norrland (Sweden)	5. Oberbayern (Germany)
			9. West Sweden (Sweden)

Source: Regional Innovation Scoreboard 2025, European Commission

2.1 West Sweden – an innovation leader

It is then reasonable to ask how the region's innovation potential compares to other regions within the EU. In the Regional Innovation Scoreboard 2025, the geographic regions appear to be larger than we are used to in our comparisons at various geographic levels such as county, labour market region or metropolitan region. Here, the European Commission uses NUTS2 units, which for the Gothenburg region means that the geographic region refers to all 55 municipalities that make up both the counties of Västra Götaland and Halland. In Stockholm's case, the NUTS2 unit refers to the 26 municipalities of Stockholm County, which also defines the unit for Stockholm's metropolitan region. This means that Stockholm benefits from better accuracy, which corresponds to developments in the metropolitan region. The situation is reversed in the Gothenburg region, as West Sweden's results are less accurate when it comes to depicting actual developments in the Gothenburg region.

Table 2 shows West Sweden's results from the Regional International Scoreboard between 2018 and 2025. In 2018, West Sweden's innovation potential was ranked as the 15th strongest within the EU. The ranking has varied between position 15 and 18 over the period 2019-2022. The last three surveys show that West Sweden's innovation potential has improved and belongs to the top 10 in the EU. In the latest survey from 2025, West Sweden's innovation potential was ranked at 9 out of 241 regions. Throughout the period 2018-2025, West Sweden's innovation potential has belonged in the performance group 'leader'. In view of the

latest study, there are still some innovation potential factors that need to improve to further strengthen the position of West Sweden, from 'leader' to 'leader +'.

For example, the indicator 'non-R&D innovation expenditures', has a result below 60 per cent (0.50). Also 'sales of new-to-market and new-to-firm innovations' (0.60) is a borderline indicator with a score close to being below acceptable. Other indicators which are just above the passing threshold are 'R&D expenditure in the public sector' and 'employment in innovative enterprises' (0.61). What is remarkable in the latest survey are the indicators showing the strengths of West Sweden's business sector. For example, the indicators 'R&D expenditure in the business sector' and 'innovative SMEs collaborating with others' (1.00) are at the maximum 100 per cent mark. Several other indicators score a result over the 90 per cent mark such as 'PCT patent applications' (0.95), 'public-private co-publications' (0.93) and 'cloud computing in enterprises' (0.90).

If we look at long-term changes (going back five years), West Sweden's innovation potential has been strongest within the indicator 'innovative SMEs collaborating with others', followed by 'innovation expenditures per person employed' and 'employed ICT specialists'. The weakest indicator development, 2025 compared to 2021, is observed for 'broadband penetration' and within 'SMEs introducing product innovations'. In the overall ranking, West Sweden's position within the EU has improved with 6 ranking positions, from 15th in 2021 to 9th in 2025.

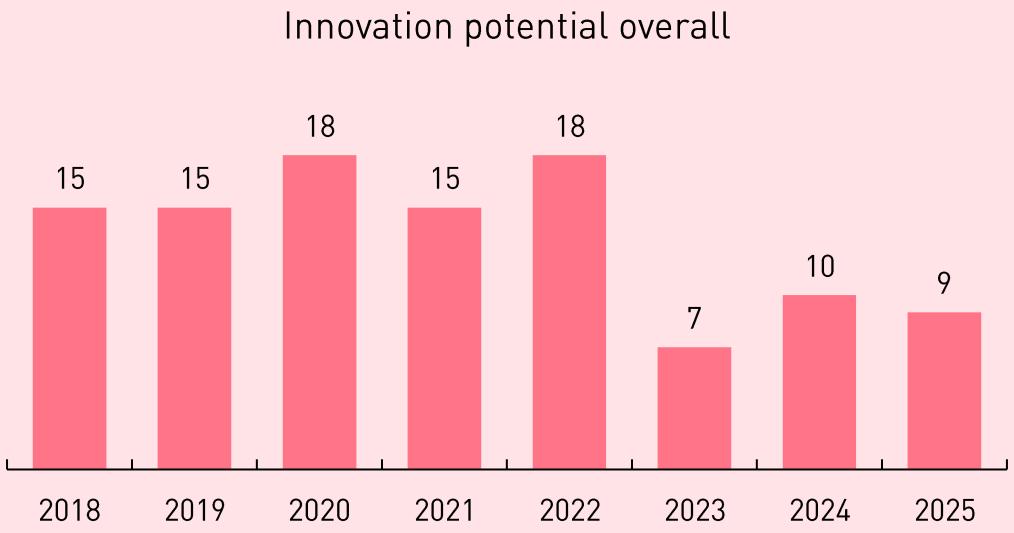
TABLE 2 WEST SWEDEN'S POSITION IN REGIONAL INNOVATION SCOREBOARD 2018-2025

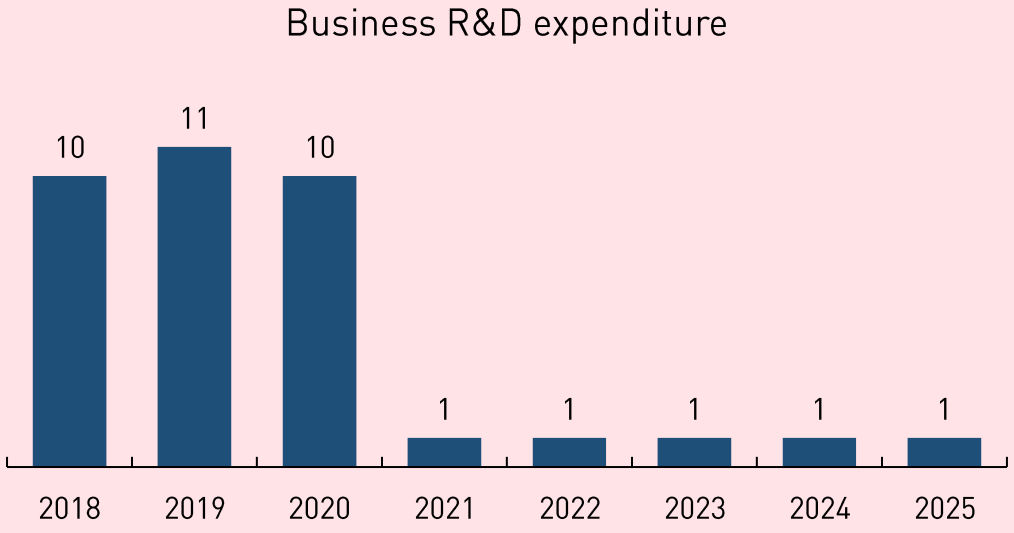
Indicator	2018	2019	2020	2021	2022	2023	2024	2025	Change 5 years (vs. 2021)
Population with tertiary education	0.67	0.67	0.67	0.67	0.67	0.78	0.82	0.84	+0.18
Population involved in lifelong learning	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	±0.00
International scientific co-publications	0.54	0.57	0.60	0.63	0.66	0.64	0.64	0.70	+0.07
Scientific publications among the top 10% most cited	0.79	0.85	0.79	0.86	0.84	0.80	0.76	0.77	-0.09
Broadband penetration	0.88	0.88	0.88	0.88	0.88	0.88	0.75	0.68	-0.19
R&D expenditure in the public sector	0.57	0.57	0.57	0.57	0.57	0.58	0.58	0.61	+0.03
R&D expenditure in the business sector	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	±0.00
Non-R&D innovation expenditures	0.47	0.47	0.47	0.46	0.46	0.59	0.59	0.50	+0.04
Innovation expenditures per person employed	0.55	0.55	0.55	0.56	0.56	0.92	0.92	0.80	+0.24
Cloud computing in enterprises	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	±0.00
Employed ICT specialists	0.56	0.56	0.56	0.56	0.56	0.70	0.78	0.80	+0.24
SMEs introducing product innovations	0.52	0.52	0.52	0.88	0.88	0.80	0.80	0.72	-0.16
SMEs introducing business process innovations	0.48	0.48	0.48	0.64	0.64	0.79	0.79	0.67	+0.03
Innovative SMEs collaborating with others	0.38	0.38	0.38	0.50	0.50	0.64	0.64	1.00	+0.50
Public-private co-publications	0.85	0.91	0.90	0.92	0.92	0.92	0.91	0.93	+0.01
PCT patent applications	0.96	0.98	1.00	1.00	1.00	1.00	0.95	0.95	-0.05
Trademark applications	0.80	0.85	0.84	0.77	0.77	0.82	0.77	0.70	-0.07
Design applications	0.75	0.75	0.70	0.67	0.68	0.64	0.63	0.67	±0.00
Sales of new-to-market and new-to-firm innovations	0.48	0.48	0.48	0.47	0.47	0.50	0.50	0.60	+0.13
Employment in innovative enterprises	0.56	0.56	0.56	0.67	0.67	0.76	0.76	0.61	-0.06
Exports of medium and high technology products	0.66	0.66	0.69	0.69	0.63	0.60	0.69	0.69	±0.00
Air emissions by fine particulates	0.79	0.80	0.85	0.79	0.84	0.87	0.77	0.81	+0.03
Labour productivity	0.66	0.66	0.68	0.67	0.70	0.69	0.69	0.70	+0.03
Ranking	15	15	18	15	18	7	10	9	+6
Innovation potential	Leader	Leader	Leader	Leader	Leader	Leader	Leader	Leader	

Source: Regional Innovation Scoreboard 2018-2025, European Commission

Notes: SME is an abbreviation for small and medium-sized enterprises. PCT patents refer to patent registrations with the Patent Cooperation Treaty.

West Sweden's ranking in Regional Innovation Scoreboard over time





3 Business R&D expenditure

The question might then be asked as to what is included in the data over businesses expenditures that are earmarked for R&D. The data are drawn from a survey selection that is adjusted to achieve approximate values per county. As a result, the intramural business R&D expenditure data do not refer to an entire population. The development of the companies is monitored over time, where new R&D actors are added and old actors that have ceased conducting R&D are removed over the years. The survey is carried out by Statistics Sweden and is published every two years. The data only include R&D expenditure for R&D activities in Sweden. R&D that is carried out by Swedish and foreign-owned companies abroad is not included in the data. The survey selection covers companies with at least 10 employees and relates to the companies' expenditure for R&D that they themselves perform and support. The R&D expenditure consists of two components: expenditure for R&D work and expenditure for R&D investments.

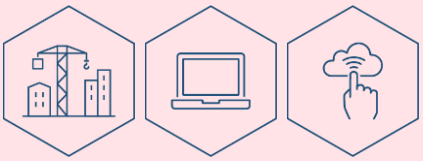
Expenditure for R&D work relates, for example, to 'salaries of intramural R&D staff'. R&D work also includes the company's expenditure for purchasing R&D work from other companies, as well as expenditure the company has for supporting R&D work in other organisations. On the other hand, R&D investments consist of expenditure on physical and technological necessities that are required to carry out the R&D work of the company. This includes entries such as 'buildings, land and real estate', 'machinery and equipment', 'software and other IT systems'. For example, Geely's establishment of an innovation centre in Gothenburg is included in the data under the entry 'buildings, land and real estate', 'machinery and equipment' and 'software and other IT systems', while its employees go under the entry 'salaries of intramural R&D staff'.

What is included in business R&D expenditure?



Expenditure for intramural R&D work

- Salaries of intramural R&D staff
- Expenditure for purchasing R&D work
- Expenditure for supporting R&D work



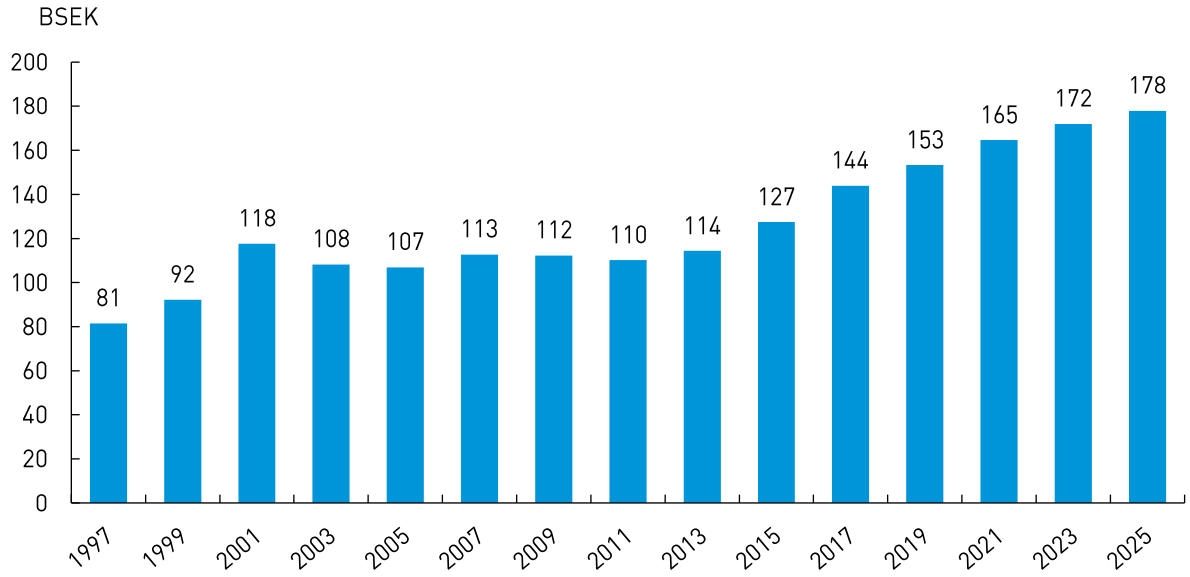
Expenditure for intramural R&D investments

- Buildings, land and real estate
- Machinery and equipment
- Software and other IT systems

3.1 Business R&D expenditure in Sweden

Sweden's companies invest enormous resources in conducting intramural research and development. In real terms, R&D expenditure has more than doubled since 1997. Figure 1 shows how business R&D expenditure has developed over time in Sweden. In 1997, the companies invested about SEK 81 billion (calculated at 2025 prices). In 2025, business R&D expenditure stood at approximately SEK 178 billion, which corresponds to an increase in real terms of 118 per cent or SEK 96 billion compared to 1997. In particular, it is the period 2015-2025 that reports large R&D investments among the companies in Sweden – but also in 2001, business R&D expenditure were slightly higher than the average for the whole period.

FIGURE 1 INTRAMURAL BUSINESS R&D EXPENDITURE (SEK BILLION, REAL TERMS) IN SWEDEN, EVERY TWO YEARS FROM 1997



Source: Statistics Sweden

What proportion of intramural business R&D expenditure can be attributed to a specific industry? Is there any sector that stands out in terms of business R&D? Table 3 presents business R&D expenditure in 2025 by breaking down the total of about SEK 178 billion by sector.[17]

The largest share of business R&D expenditure relates to the 'automotive industry'. In 2025, the 'automotive industry' accounted for approximately 27 per cent of the business R&D expenditure in Sweden, corresponding to just above SEK 47 billion.

The 'information and communication' sector also represents a significant portion of the business R&D expenditure in Sweden, accounting for just above 20 per cent of the country's total R&D expenditure in companies (equivalent to about SEK 36 billion). Within 'information and communication', the SNI segments 61-63 in particular account for the majority of the business R&D expenditure (approximately 94 per cent of the total R&D expenditure in 'information and communication'). This segment includes companies in telecommunications, computer programming and computer consultancy, IT and data services, as well as other information services.

In 2025, companies in 'other industries for machinery' (just above SEK 17 billion), 'research and development institutions' (about SEK 15 billion) and 'pharmaceutical base products and medicines' (about SEK 15 billion) reported the third, fourth and fifth largest expenditure for conducting intramural R&D in Sweden.[18] In total, the three sectors account for approximately one tenth each of the business R&D expenditure in Sweden.

If we instead look at more broadly defined sectors in which companies are included, such as goods manufacturers and service providers, we see that a majority of the business R&D expenditure in Sweden is earmarked within goods-producing companies.[19] In 2025, the goods-producing part of the economy accounted for 56 per cent (corresponding to just above SEK 100 billion) of the business R&D expenditure.

[17] Refers to the Swedish Standard Industrial Classification (SNI 2025) at the two-digit level.
[18] Research and development institutions include companies that are active in the following industries: 'biotechnological research and development', 'other scientific and technological research and development' and 'research and development within social sciences and humanities'.
[19] Statistics Sweden defines goods-producing companies as companies in SNI segments 01-43, i.e. agriculture, forestry and fisheries, all of the manufacturing and mining industry and construction. Service-providing companies fall under SNI segments 45-99, which include the commerce sector along with the transportation sector, business services, public sector companies as well as cultural and personal services.

The remaining 44 per cent, which is invested in the service-providing part of the economy, thereby accounted for just above SEK 77 billion of the business R&D expenditure in Sweden.

TABLE 3 INTRAMURAL BUSINESS R&D EXPENDITURE (SEK BILLION) IN SWEDEN, BY SECTOR 2025

Sector	SNI code	BSEK	Share
Agriculture, forestry, fishing and mining and mineral extraction	01-09	0.83	0.5%
Food, beverages and tobacco	10-12	0.49	0.3%
Textiles, leather, wood and wood products, cork and rattan (excluding furniture) and graphic reproduction	13-16+18	0.23	0.1%
Pulp, paper and paper products	17	1.88	1.1%
Coal products, petroleum products and the chemical industry	19-20	0.82	0.5%
Pharmaceutical base products and medicines	21	14.73	8.3%
Rubber and plastics	22	0.36	0.2%
Other non-metallic mineral products	23	0.13	0.1%
Steel and metalworks	24	1.65	0.9%
Metal products except machinery and equipment	25	3.31	1.9%
Computers, electronics and optical products	26	4.85	2.7%
Electrical equipment	27	4.60	2.6%
Other industries for machinery	28	17.36	9.8%
Automotive industry	29-30	47.25	26.6%
Furniture industry and other manufacturing	31-32	0.35	0.2%
Repair and installation of machinery and equipment	33	0.06	0.0%
Energy, water and waste	35-39	0.95	0.5%
Construction	41-43	0.65	0.4%
Commerce and hotels and restaurants	46–47+55–56	9.67	5.4%
Transportation and warehousing	49-53	0.19	0.1%
Information and communication	58-63	36.20	20.3%
Financial services and insurance	64-66	2.61	1.5%
Property, travel services and other support services	68+77–81	0.23	0.1%
Legal and financial consultancy firms	69–70	1.70	1.0%
Architectural offices, technical consultancies, technical testing and analysis	71	10.73	6.0%
Research and development institutions	72	14.79	8.3%
Advertising and market research, other business services as well as civil authorities and defence	73–75+82+84–99	1.32	0.7%
Total business R&D expenditure in Sweden	01-99	177.92	100%
of which goods-producing companies	01-43	100.48	56%
of which service-providing companies	45-99	77.44	44%

Source: Statistics Sweden

3.2 The regional spread of business R&D expenditure in Sweden

When it comes to the distribution of business R&D expenditure per county in Sweden, a clear concentration can be seen around the country's three metropolitan areas. Just above three fourths (76%) of the business R&D expenditure in Sweden in 2025 can be attributed to Västra Götaland, Stockholm and Skåne. In 2025, companies' earmarked budgets for conducting R&D in Sweden totalled at about SEK 178 billion. Of this amount, Västra Götaland accounted for the largest share of the country's total business R&D expenditure with 34.8 per cent. The corresponding share for Stockholm was 31.5 per cent, while Skåne accounted for 10 per cent. A significant proportion of the business R&D expenditure is also located in Östergötland, whose share of the Sweden's business R&D expenditure stands at just above 7 per cent (see Figure 2).

FIGURE 2 INTRAMURAL BUSINESS R&D EXPENDITURE (BSEK) AND SHARE OF SWEDEN, PER COUNTY 2025



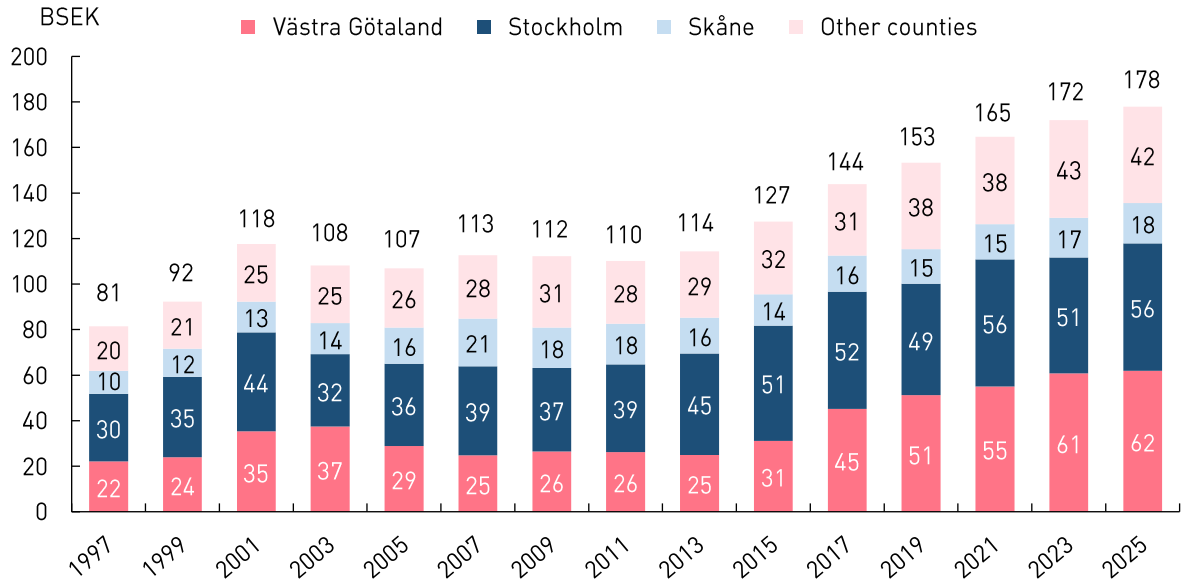
County	BSEK	Share
Västra Götaland	61.8	34.8%
Stockholm	56.0	31.5%
Skåne	17.8	10.0%
Östergötland	12.8	7.2%
Uppsala	4.5	2.5%
Södermanland	3.5	2.0%
Jönköping	3.5	2.0%
Västmanland	3.4	1.9%
Örebro	3.0	1.7%
Blekinge	2.1	1.2%
Norrbotten	1.9	1.1%
Kronoberg	1.5	0.8%
Västernorrland	1.3	0.7%
Gävleborg	1.2	0.7%
Västerbotten	1.2	0.7%
Dalarna	0.8	0.5%
Värmland	0.8	0.4%
Kalmar	0.5	0.3%
Halland	0.3	0.2%
Jämtland	0.1	0.1%
Gotland	0.0	0.0%
Sweden	177.9	100.0%

Source: Statistics Sweden

Figure 3 shows how the business R&D expenditure has developed over time in the metropolitan counties as well as in other counties from 1997. Over the entire period, Stockholm County has accounted for the largest share of business R&D expenditure, except for the years 2003, 2019, 2023 and 2025 when Västra Götaland reported the largest R&D expenditure in absolute values. Between 1997 and 2025, real-terms business R&D expenditure in Stockholm has fluctuated between SEK 30-56 billion. Over the entire period, Stockholm's companies invest an average of around SEK 43 billion in R&D. Västra Götaland's companies also account for a large proportion of business R&D in Sweden, with varying R&D investments over the period ranging from SEK 22-62 billion in real terms. On average, over the entire period, the companies in Västra Götaland invest around SEK 37 billion in R&D. The corresponding figure for Skåne and other counties shows averages of SEK 16 billion and SEK 31 billion respectively, while Sweden as a whole invests an average of SEK 126 billion, over the entire time period 1997-2025.

In 2025, business R&D expenditure stood at about SEK 62 billion in Västra Götaland and at SEK 56 billion in Stockholm. The two counties' companies thereby accounted for almost two-thirds (66%) of Sweden's total business R&D expenditure in 2025. In Skåne, business R&D expenditure amounted to approximately SEK 18 billion. When it comes to real-terms changes between 2023 and 2025, Stockholm's companies accounted for the largest share of the growth in business R&D expenditure. With an increase in real terms of SEK 5 billion in business R&D expenditure in Stockholm between 2023 and 2025, the county accounted for approximately 85 per cent of Sweden's increase of about SEK 6 billion.

FIGURE 3 BUSINESS R&D EXPENDITURE (SEK BILLION, REAL TERMS) IN METROPOLITAN COUNTIES, EVERY TWO YEARS FROM 1997



Source: Statistics Sweden

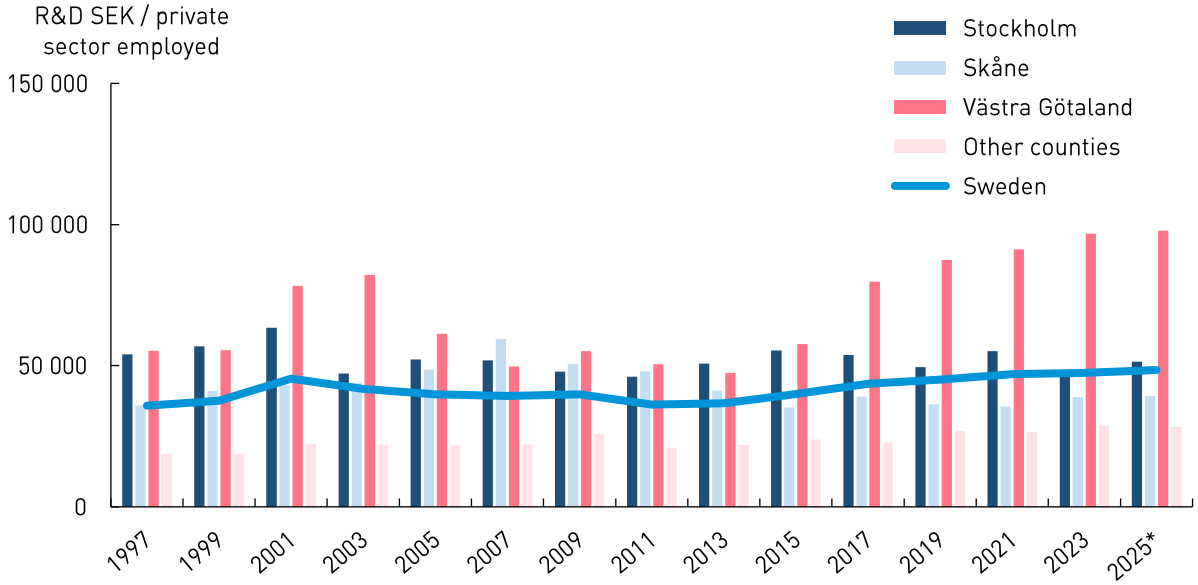
Note: The figures above the bars show Sweden's total intramural business R&D expenditure for each reference year.

Stockholm is Sweden's most populous county and the county with the highest density of companies. In theory, its absolute figures and nationwide shares ought to be the highest, as can also be seen from Figure 3 (business R&D expenditure) for most of the period 1997-2025. However, if we instead normalise the comparison between the counties by taking the size of their geographic area into account in the analysis, we can obtain more information on how intensive and productive the companies are in terms of their R&D expenditure.

In Figure 4, the R&D expenditure is normalised by measuring the development per person employed in the private sector. In other words, people employed in operations that are owned by municipalities, regions and the state have been excluded from the denominator, and only those employed in the private sector are included. Västra Götaland and Stockholm both have the highest amounts spent on R&D in real terms per

person employed in the private sector, viewed over the entire period. Over time, however, Västra Götaland's companies invest more in R&D per employed in the private sector compared to Stockholm. The exception to this is in 1999 and in 2013 when Stockholm's companies invested more R&D SEK per private sector employee, as well as in 2007, when companies in both Stockholm and Västra Götaland invested less in R&D per person employed in the private sector compared to companies in Skåne. In 2025, Västra Götaland's companies invested about R&D SEK 98,000 per person employed in the private sector, compared with just over R&D SEK 51,000 in Stockholm. In Skåne and Sweden as a whole, the corresponding figures were just above 37,000 and just above 48,000, respectively per person employed in the private sector. Västra Götaland's companies report the largest R&D expenditure per person employed in the private sector in an impressive 12 out of the 15 two-year periods. This intensity shows that the companies in Västra Götaland have a great ability to conduct research and development at their own initiative.

FIGURE 4 INTRAMURAL BUSINESS R&D EXPENDITURE PER PRIVATE SECTOR EMPLOYEE (IN SEK, REAL TERMS), EVERY TWO YEARS FROM 1997



Source: Statistics Sweden

* Private sector employment is estimated on the basis of the long-term trend (1993-2024) for metropolitan counties and Sweden.

Västra Götaland's business R&D expenditure represents a significantly larger proportion of Sweden's total compared to other macro-indicators for the county, such as population, employment, wage sum etc. As regards to Sweden, the country appears high up in international surveys on how much money is allocated to R&D as a share of GDP. In 2025, Sweden had the world's fifth largest R&D budget in relation to GDP, with total R&D accounting for as much as 3.6 per cent of Sweden's GDP. Business R&D expenditure accounted for 2.7 per cent of Sweden's GDP in the same year, which is also considered to be very high in an international perspective.

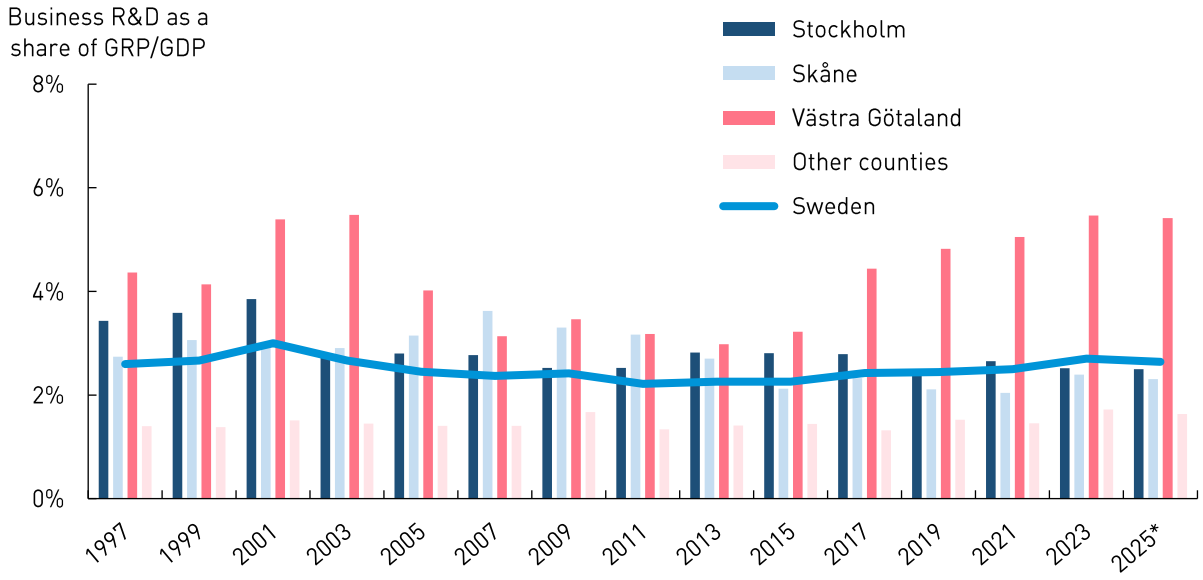
What is the situation at the regional level? Is there a similar earmarking of business R&D expenditure as a proportion of the metropolitan counties' total gross regional product (GRP)?

According to Figure 5, the metropolitan counties generally have a higher proportion of business R&D expenditure in relation to GRP than Sweden as a whole. This relates in particular to Västra Götaland and Stockholm. Out of 15 periods over time (every two years between 1997-2025), Västra Götaland's business R&D expenditure as a share of GRP is highest in every year except for 2007, when Skåne achieved the highest share.

2001, 2003 and over the period 2017-2025 are years in which companies have reported exceptionally high R&D expenditure in Västra Götaland. Companies spent on average 5.2 per cent of the county's total GRP on R&D during these years. In 2025, Västra Götaland's companies invested about SEK 62 billion in R&D, which means that business R&D expenditure as a share of GRP for the last year stands at 5.4 per cent.

An interesting observation is that business R&D as a share of GRP in Västra Götaland is, on average, 1.8 percentage points higher compared to Sweden over the entire time period. Once again, we can see clear evidence of the companies' considerable R&D capacity in Västra Götaland. A significantly higher proportion of the gross regional product is earmarked by companies for conducting R&D at their own initiative.

FIGURE 5 INTRAMURAL BUSINESS R&D EXPENDITURE AS A SHARE OF GRP IN METROPOLITAN COUNTIES, AND INTRAMURAL BUSINESS R&D EXPENDITURE AS A SHARE OF GDP FOR SWEDEN, EVERY TWO YEARS FROM 1997



Source: Statistics Sweden

* GRP estimated based on long-term trend (1993-2024) for metropolitan counties. GDP for Sweden is preliminary.

The county's R&D expenditure, by sector 2025

Total R&D Västra Götaland	R&D private sector	R&D public sector	R&D academia
71.8 BSEK	61.8 BSEK	1.8 BSEK	8.2 BSEK
100 % of R&D in county	86.1 % of R&D in county	2.5 % of R&D in county	11.4 % of R&D in county
29.8 % of R&D in Sweden	34.8 % of R&D in Sweden	15.9 % of R&D in Sweden	16.0 % of R&D in Sweden

Source: Statistics Sweden

How is the ownership form of the companies defined?

Foreign-owned

Companies in which more than half of the shares are held by one or more owners abroad. If the company is part of a group in Sweden, it is counted as foreign if the parent company in Sweden is foreign. If the company is owned in several segments, it is the group parent company that determines the nationality of the company.

Swedish international

Refers to companies in Sweden belonging to a Swedish international group.

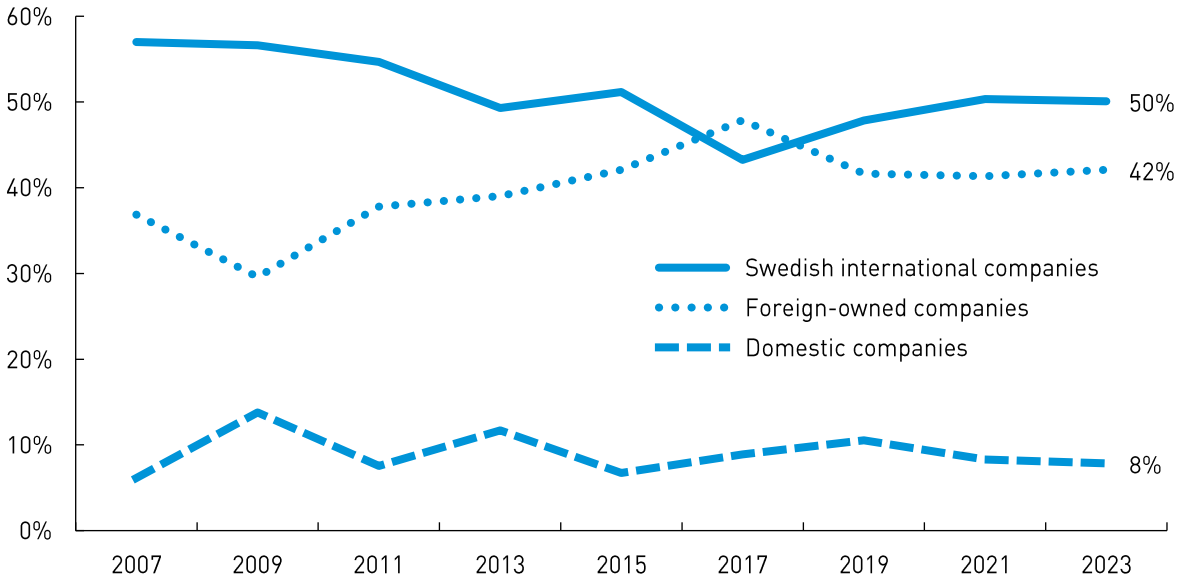
Domestic

Swedish-owned companies without subsidiaries abroad.

3.3 Business R&D expenditure by ownership form in the metropolitan counties

It is possible to see a clear characteristic among companies that conduct intramural R&D in Sweden. A vast majority of them are either foreign-owned or globally accessible. Unfortunately, we can only see developments by form of ownership up until 2023, as the 2025 R&D data by ownership form will not be published until May 2027. Out of just above SEK 166 billion in business R&D expenditure in Sweden in 2023 (refers to 2023 prices), Swedish international companies accounted for half (50%). Foreign-owned companies accounted for just above two-fifths (42%) of the Swedish R&D expenditure in businesses, whereas domestic companies accounted for less than a tenth (8%) of the total (see Figure 6). Developments over time show that foreign-owned companies are investing more money in conducting intramural R&D. In recent years, however, it appears that foreign-owned companies' share of Sweden's total business R&D expenditure has decreased. Despite this, we can conclude that the country's foreign-owned companies play a very important role in Sweden's innovative capacity.

FIGURE 6 INTRAMURAL R&D EXPENDITURE IN VARIOUS TYPES OF BUSINESS FORM, SHARE OF SWEDEN'S TOTAL EVERY TWO YEARS FROM 2007

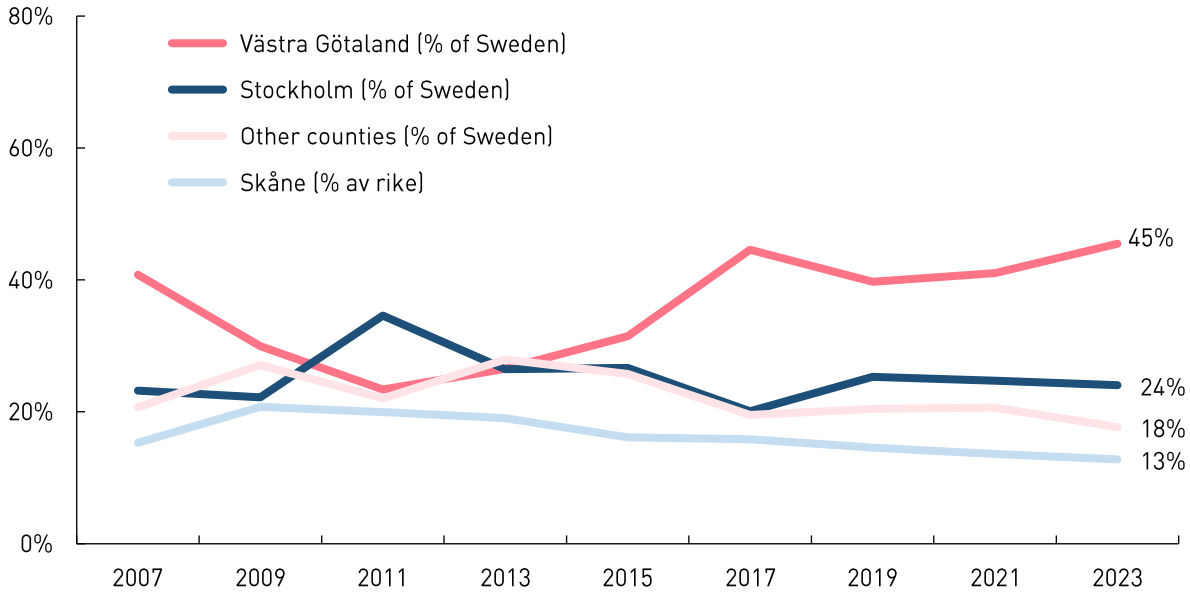


Source: Statistics Sweden and Growth Analysis

If we instead break down business R&D data by metropolitan counties and as a share of Sweden's total for the companies' various forms of ownership, we get a regional overview of the spread in the country.

Figure 7 shows that 45 per cent of Sweden's R&D expenditure in foreign-owned companies in 2023 (SEK 32 billion out of a total of SEK 70 billion in 2023 prices) is in Västra Götaland. About one fourth is located in Stockholm, while 13 per cent of the R&D expenditure in foreign-owned companies is in Skåne.

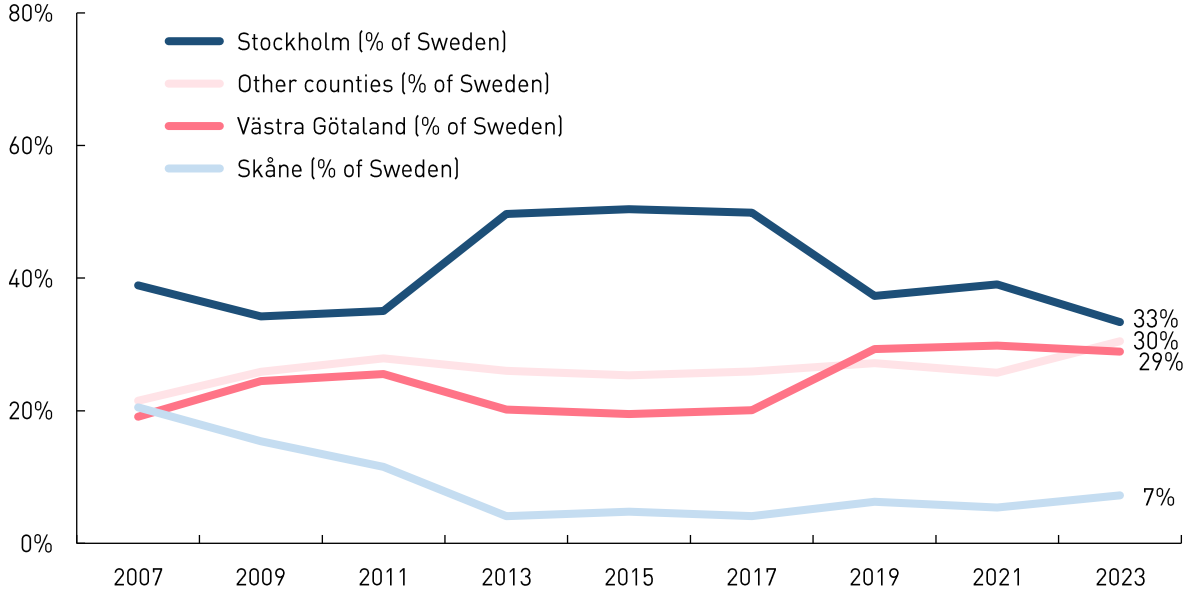
FIGURE 7 INTRAMURAL R&D EXPENDITURE IN FOREIGN-OWNED COMPANIES, SHARE OF SWEDEN'S TOTAL EVERY TWO YEARS FROM 2007



Source: Statistics Sweden and Growth Analysis

When it comes to R&D expenditure in Swedish international companies (just above SEK 83 billion in 2023 prices), the country's largest concentration of one third (SEK 27.8 billion) is observed in Stockholm. 30 per cent of the country's business R&D expenditure (SEK 25.4 billion) in Swedish international companies is located in other counties, followed by Västra Götaland with a share of 29 per cent or about SEK 24 billion (see Figure 8).

FIGURE 8 INTRAMURAL R&D EXPENDITURE IN SWEDISH INTERNATIONAL COMPANIES, SHARE OF SWEDEN'S TOTAL EVERY TWO YEARS FROM 2007



Source: Statistics Sweden and Growth Analysis

Intramural R&D

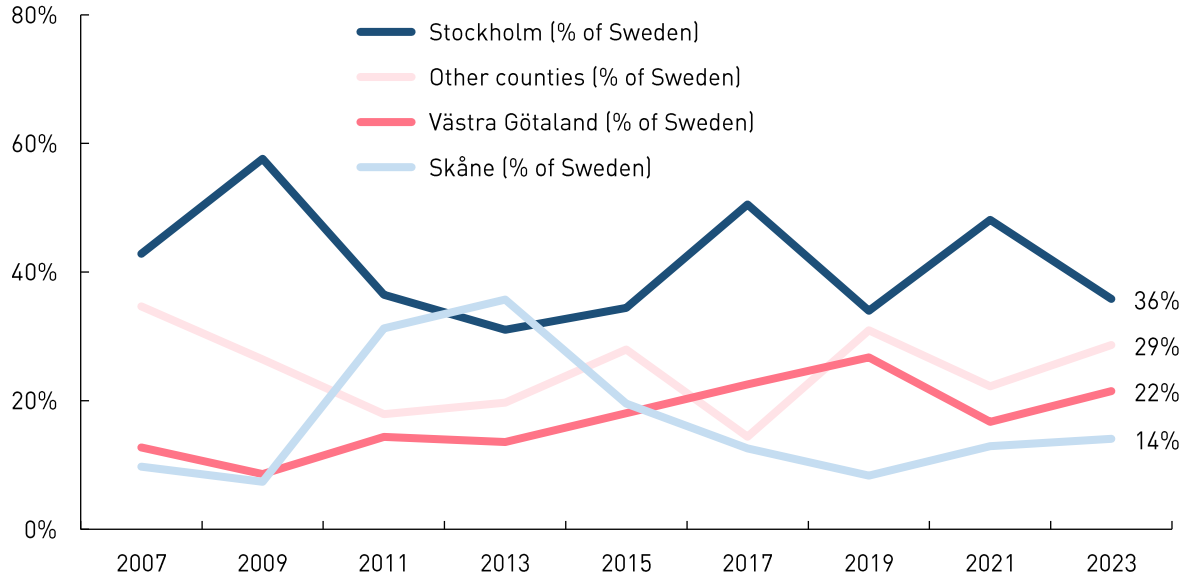
R&D activities that have been carried out by an organisation with its own staff, or been carried out by consultants in R&D projects that have been led by the organisation and in which the company's staff has worked alongside the consultants.

Intramural R&D also includes R&D carried out at the request of others. Expenditure for intramural R&D consists of both operating costs and investment expenditure.

What is meant by 'intramural R&D'?

When we look at domestic Swedish companies, Stockholm accounts for just above one third (SEK 4.7 billion) of the country's total R&D expenditure at just above SEK 13 billion (calculated in 2023 prices) for this particular ownership form of company (see Figure 9). Overall, however, R&D expenditure in domestic companies is significantly lower compared to the two previous company forms. Just above one fifth (SEK 2.8 billion) of the total can be attributed to domestic companies in Västra Götaland, while Skåne's share is 14 per cent (SEK 1.8 billion).

FIGURE 9 INTRAMURAL R&D EXPENDITURE IN DOMESTIC COMPANIES, SHARE OF SWEDEN'S TOTAL EVERY TWO YEARS FROM 2007



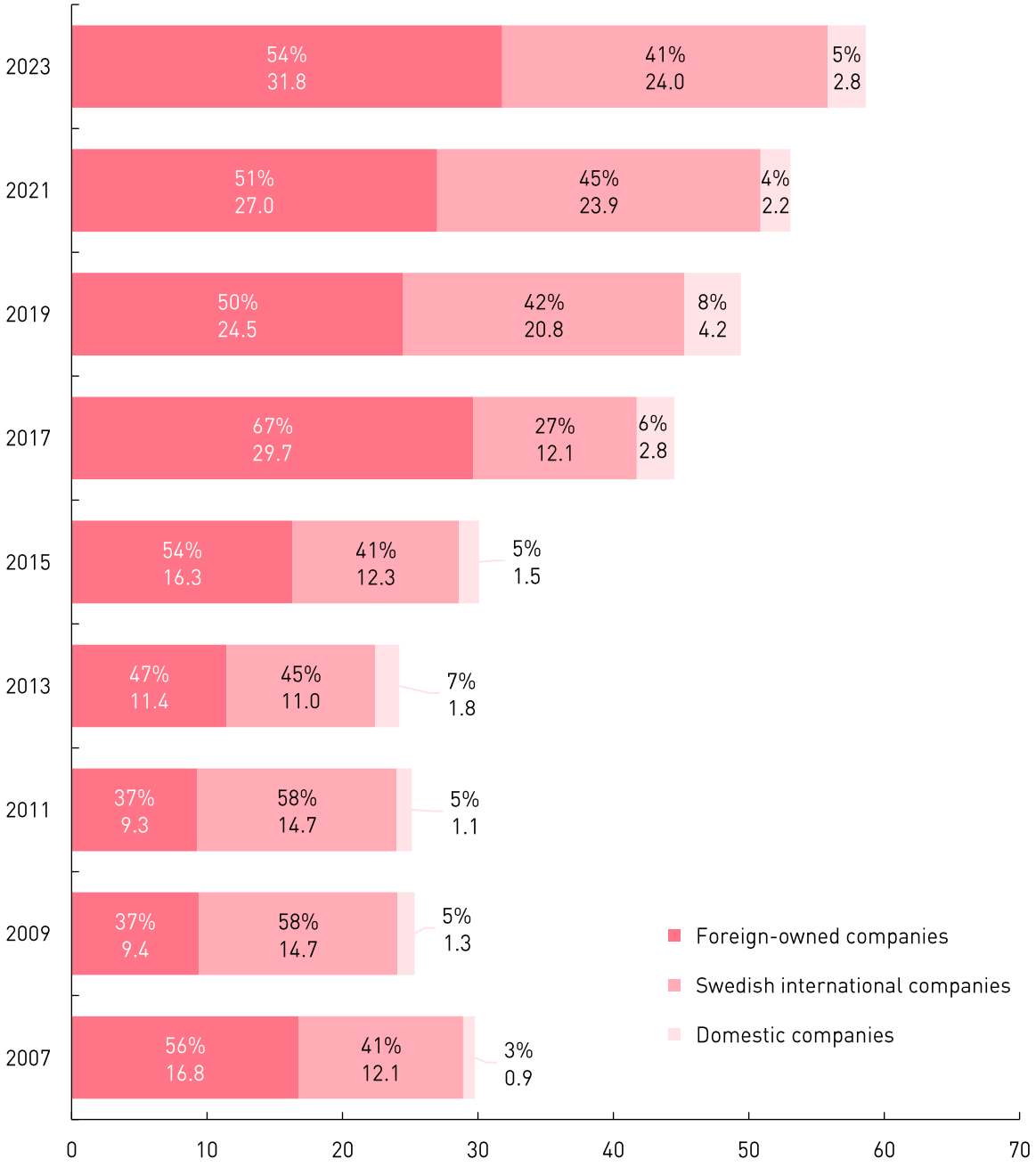
Source: Statistics Sweden and Growth Analysis

3.4 Business R&D expenditure in Västra Götaland – form of ownership, SEK and share

The statistics for Västra Götaland are clear. More than half (54%) of the intramural business R&D expenditure carried out takes place in foreign-owned companies. In 2023, foreign-owned companies accounted for approximately SEK 32 billion of the county's total business R&D corresponding to SEK 58.6 billion (calculated in 2023 prices). In this respect, foreign-owned companies in the region, such as Volvo Cars, AstraZeneca, Borealis (Borouge International), Zeekr Technology, Geely, Preem and many others, appear as major drivers of the county's overall business R&D expenditure (see Figure 10). For Swedish international companies, R&D expenditure in 2023 amounted to SEK 24 billion (41% of Västra Götaland's

total business R&D expenditure). This group of companies includes a large number of successful businesses, such as Volvo Group, SKF, Ericsson, Stena, Carl Bennet, Essity and many more companies. Most of these companies conduct intramural R&D on a global stage, which means that not all of the R&D budget invested by the companies ends up in Västra Götaland. For example, Volvo Group and Ericsson invest significantly more than SEK 24 billion in R&D, but large parts of the R&D expenditure end up in research centres around the world where the companies conduct R&D. Domestic companies, i.e. Swedish companies without subsidiaries abroad, reported approximately SEK 3 billion in business R&D expenditure in 2023 (corresponding to 5% of the total intramural business R&D in Västra Götaland).

FIGURE 10 INTRAMURAL BUSINESS R&D EXPENDITURE (SEK BILLION IN 2023 PRICES) IN VÄSTRA GÖTALAND AND SHARE OF THE COUNTY'S TOTAL (IN %), EVERY TWO YEARS FROM 2007



Source: Statistics Sweden and Growth Analysis

Global R&D expenditure 2025

1.9 BSEK
Carl Bennet

- Swedish international company
- Sector: Industry and medical technology
- Head office: Gothenburg

139.4 BSEK
AstraZeneca

- Foreign-owned company (United Kingdom)
- Sector: Pharmaceuticals and biotech
- Head office: Cambridge

26.2 BSEK
Volvo Group

- Swedish international company
- Sector: Automotive industry
- Head office: Gothenburg

3.4 BSEK
SKF

- Swedish international company
- Sector: Manufacturing of bearings, gears and more
- Head office: Gothenburg

26.1 BSEK
Volvo Cars

- Foreign-owned company (China)
- Sector: Automotive industry
- Head office: Gothenburg

4 What is required to increase the level of business R&D expenditure?

The fact that the Gothenburg region's business sector is investing a lot of money in R&D is no news. In previous sections, we have seen that Västra Götaland's share of intramural business R&D expenditure amounts to over a third of the total business R&D expenditure in Sweden. A large amount of the businesses R&D in Västra Götaland is invested by companies with operations located in the Gothenburg region. As a result, it is important to create good conditions for further strengthening the region's already R&D-intensive business sector. From a majority of empirical studies, there is strong evidence that R&D-intensive activities within companies generate future increased value for the companies through improved products, services and processes, as well as new markets opening up. The increased value can be invested into further improving the company's productivity through investments in new technology and/or increased resources for recruiting new skilled labour. In this way, the companies' productivity and competitiveness are both strengthened.

4.1 Calculation example – business R&D as a share of GRP increases by 1 percentage point

In order to estimate how much the Gothenburg region's companies invest in intramural R&D, we use a number of indicators with data at a more detailed level in order to weight the Gothenburg region's share of the county's total. For example, we look at establishments, establishments with more than 50 employees, population, job opportunities, wage sum and export value during the period 2009-2025. The arguments for using these particular indicators for weighting are drawn from empirical literature where, for example, R&D-intensive companies tend to be close to regions with dense populations, and where access to skilled labour and wage premiums for workers are highest. In this respect, control variables also include the total export value for the region, as we have previously seen that many companies that conduct R&D have operations on international markets. An additional control variable that we include refers to the proportion of establishments in the region, as well as the proportion of establishments with 50 or more employees, since R&D expenditure among corporate groups (foreign-owned and Swedish) accounts for a significant share of total business R&D expenditure.

Median shares over time show that the Gothenburg region's share of the county's total stands at between 57-79 per cent, depending on which indicator we are looking at (see Table 4). By obtaining an average of the medians, we can determine a reasonable share for the Gothenburg region, which is estimated to be 64 per cent during the period 2009-2025. A certain amount of the Gothenburg region's business R&D expenditure ends up in Halland County, as Kungsbacka is located in Halland. However, this is deemed to have only a minimal impact on the overall picture in the Gothenburg region.

TABLE 4 GOTHENBURG REGION'S SHARE OF VÄSTRA GÖTALAND FOR VARIOUS MACRO INDICATORS, FROM 2009

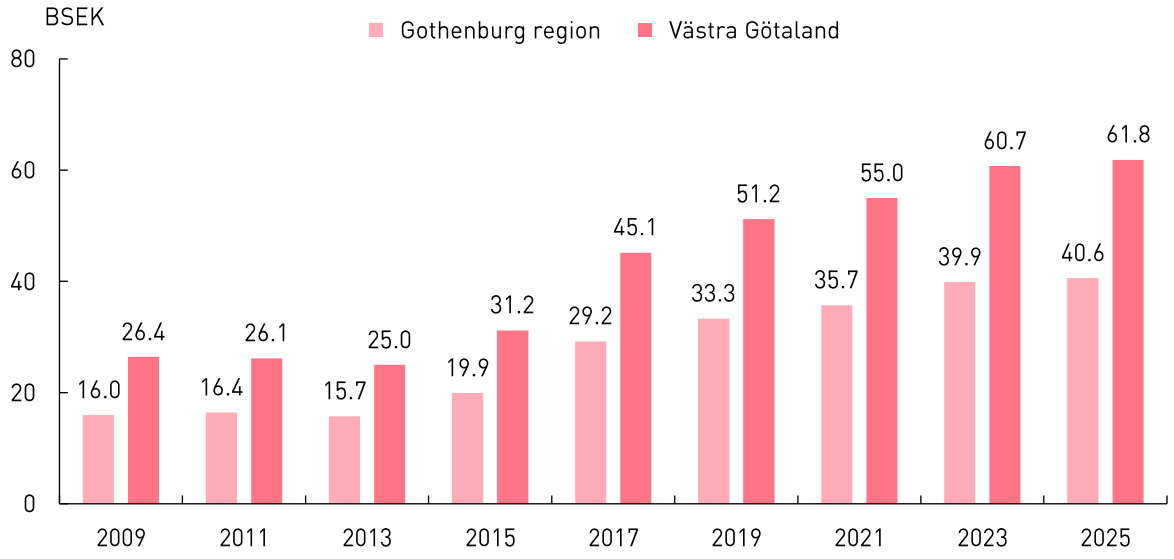
Year	Establishments (total)	Establishments (50+ employees)	Population	Job opportunities	Wage sum	Export value	Average across indicators
2009	56%	60%	58%	60%	63%	65%	60%
2011	56%	60%	59%	60%	64%	77%	63%
2013	56%	61%	59%	61%	65%	76%	63%
2015	57%	62%	60%	62%	65%	79%	64%
2017	57%	62%	60%	62%	66%	81%	65%
2019	58%	62%	60%	63%	67%	81%	65%
2021	58%	61%	61%	63%	67%	80%	65%
2023	59%	62%	61%	64%	68%	81%	66%
2025	59%	61%	62%	64%	68%	80%	66%
Mean	57%	61%	60%	62%	66%	78%	64%
Median	57%	61%	60%	62%	66%	79%	64%

Source: Adapted based on data from Statistics Sweden

Figure 11 shows estimated business R&D expenditure (in real SEK billion) in the Gothenburg region. Here, we have used the Gothenburg region's annual averages from Table 4 and estimated what the Gothenburg region's share is expected to be, based on the actual business R&D expenditure in Västra Götaland. For 2025, around two-thirds (66

per cent) of the business R&D expenditure in Västra Götaland have been allocated to the Gothenburg region. This corresponds to SEK 40.6 billion of the county's business R&D expenditure totalling at SEK 61.8 billion.

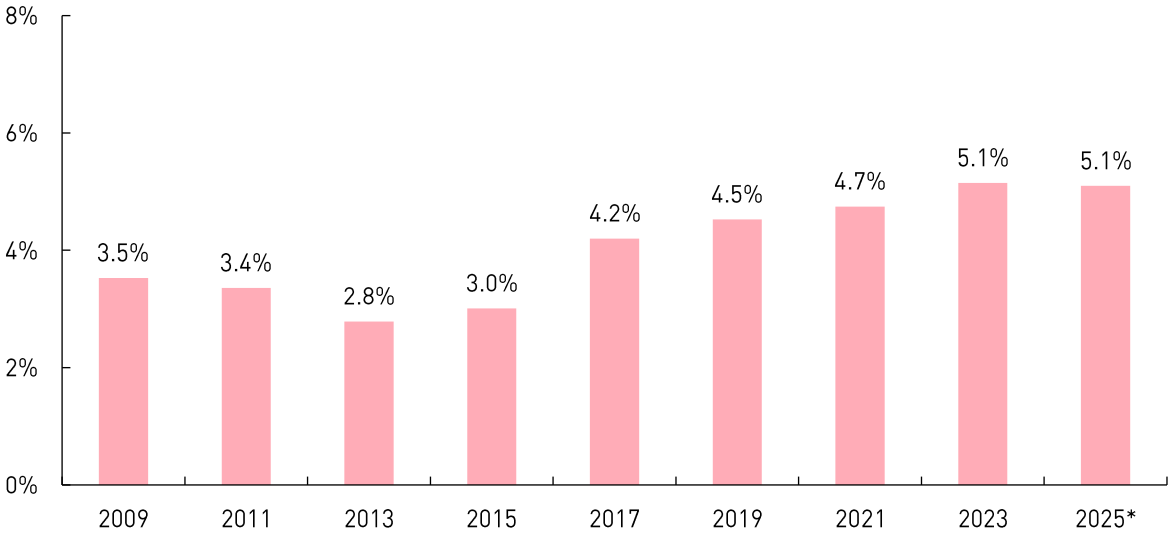
FIGURE 11 ESTIMATED BUSINESS R&D EXPENDITURE IN THE GOTHENBURG REGION AND BUSINESS R&D EXPENDITURE IN VÄSTRA GÖTALAND (IN SEK BILLION, REAL TERMS), EVERY TWO YEARS FROM 2009



Source: Adapted based on data from Statistics Sweden

For normalisation purposes, international comparisons between countries and between regions are usually calculated on the basis of shares of e.g. gross domestic product (GDP) or gross regional product (GRP), employed in the private sector, population etc. Here, we choose to analyse business R&D expenditure as a share of the Gothenburg region's GRP. The Gothenburg region's private and public sectors generate considerable value added, which goes to the region's overall GRP. In 2025, the Gothenburg region's total GRP for goods and services is estimated at SEK 796 billion. If we view the estimated business R&D expenditure in relation to GRP in the Gothenburg region, they amount to 5.1 per cent in 2025 (see Figure 12).

FIGURE 12 BUSINESS R&D EXPENDITURE (ESTIMATED) AS A SHARE OF GRP IN THE GOTHENBURG REGION, EVERY TWO YEARS FROM 2009



Source: Adapted based on data from Statistics Sweden

* GRP is estimated on the basis of the long-term trend for the Gothenburg region (1993-2024).

The main question for this section remains: What does it take to increase business R&D expenditure as a share of GRP, for example by 1 percentage point?

For 2025, the Gothenburg region's business R&D expenditure is estimated at SEK 40.6 billion, or 5.1 per cent of GRP. If this share is to increase by 1 percentage point, business R&D expenditure as a share of GRP must increase from 5.1 per cent to 6.1 per cent. In order to achieve this share increase, the R&D expenditure must increase by more than the GRP increases. Business R&D expenditure as a share of GRP could also increase in the event of a recession: for example, by companies keeping earmarked resources for R&D unchanged, or by business R&D expenditure being reduced by less in proportion to the decrease in GRP, or by companies instead opting to increase their R&D expenditure while GRP decreases.

Increase in percentage points

Business R&D ↑↑	and GRP ↑	Business R&D / GRP ↑
Business R&D ↑	and GRP ↓	Business R&D / GRP ↑
Business R&D ↓	and GRP ↓↓	Business R&D / GRP ↑
Business R&D ±0	and GRP ↓	Business R&D / GRP ↑

Decrease in percentage points

Business R&D ↓↓	and GRP ↓	Business R&D / GRP ↓
Business R&D ↓	and GRP ↑	Business R&D / GRP ↓
Business R&D ↑	and GRP ↑↑	Business R&D / GRP ↓
Business R&D ±0	and GRP ↑	Business R&D / GRP ↓

How do business R&D expenditures change as a share of GRP?

Between 2009 and 2024, the Gothenburg region has reported an average annual real GRP growth of 3.5 per cent, which is considered to be clearly above the long-term trend of the 2000s at 3.1 per cent. If we take into account a recovering economy in both 2025 and 2026 and go back to the calculation example, we can assume that GRP will continue to increase – however, it is more likely that the regional GRP growth will be clearly below the long-term trend with growth at 2.4 per cent. With a development that is below the long-term trend, the Gothenburg region is expected to report a GRP equivalent to SEK 834 billion in 2027. An increase in business R&D expenditure as a share of GRP by 1 percentage point from 2025 means that the share will be 6.1 per cent in 2027. 6.1 per cent of SEK 834 billion implies that total business R&D expenditure must be SEK 50.9 billion in order to satisfy the share increase of 1 percentage point in 2027. In real terms, this development requires an increase of just above SEK 10 billion in business R&D expenditure in the Gothenburg region in 2027 compared to 2025 (see Table 5).

TABLE 5 CALCULATION EXAMPLE – BY WHAT AMOUNT DOES BUSINESS R&D EXPENDITURE HAVE TO INCREASE IN ORDER TO RAISE ITS SHARE OF GRP BY 1 PERCENTAGE POINT BETWEEN 2025 AND 2027, GOTHENBURG REGION

GRP development	Annual real GRP growth (in %) up to 2027	GRP (BSEK), 2027	Business R&D as a share of GRP (in %), 2027	Business R&D (BSEK), 2027	Required real increase in business R&D (BSEK)
Above trend	3.5%	853	6.1%	52.0	11.5
Follows trend	3.1%	845	6.1%	51.5	11.0
Below trend	2.4%	834	6.1%	50.9	10.3

Source: Adapted based on data from Statistics Sweden

So how can we get more companies to earmark further resources for R&D and thereby strengthen the Gothenburg region's R&D expenditure by an additional SEK 10 billion by 2027?

4.2 Measures to increase the R&D capacity in businesses

What measures can be put in place to increase businesses R&D capacity and what do these efforts result in? This question relates to companies of all sizes. Additional characteristics of these companies are that they have high levels of skilled labour and possess a considerable willingness to cooperate. Empirical studies show that greater R&D investment in companies tends to increase the likelihood of capturing disruptions, by means of the companies succeeding in introducing more innovative goods, services and processes in the market.

Being innovative as a company requires a great many different tools. These tools, large and small alike, can affect the companies' ability to seize the moment for the disruption that exists in time and space. Some factors play a particularly large role, and a great deal of empirical evidence is available to support these. In particular, this includes access to skilled labour, meeting places, individuals' mobility on the labour market, proximity to customers and cluster initiatives, stability in legal systems, patent protection and intellectual property rights, access to collaborative platforms, testing and demonstration environments and research infrastructure, and access to financially strong investors. It is important to point out that there are a number of other underlying factors that strengthen the companies' innovative capacity, but which we are not covering here. In IVA's R&D Barometer 2026, heads of R&D in companies in Sweden list the most important factors for the localisation of R&D (see Table 6).[20] In the survey, a stable legal system is viewed as the single most important factor when localising R&D for companies in Sweden. Access to skilled R&D labour, as well as Sweden's research and innovation policies are also factors that play an important role for locating R&D.

TABLE 6 HOW IMPORTANT ARE THE FACTORS FOR LOCATING R&D ON A FIVE-POINT SCALE?

Rank	Factor	Grade
1	A stable legal system	4.7
2	Access to skilled R&D labour	4.6
3	Sweden's research and innovation policies	4.4
4	Patent protection and intellectual property rights	4.2
5	Opportunities to collaborate with universities in R&D	4.0
6	Proximity to customers and markets	3.9
7	Direct public support to companies	3.8
	The tax system as a whole	3.8
	Proximity to knowledge-intensive clusters	3.8
	Possibility of tax deduction for R&D	3.8
8	Access to research infrastructure	3.7
	Opportunities to R&D cooperation with other companies	3.7
9	Access to test and demonstration environments	3.6
	R&D collaboration with research institutes	3.6
	R&D collaboration with authorities and other public organisations	3.6
10	Opportunities to collaborate with universities in education	3.5

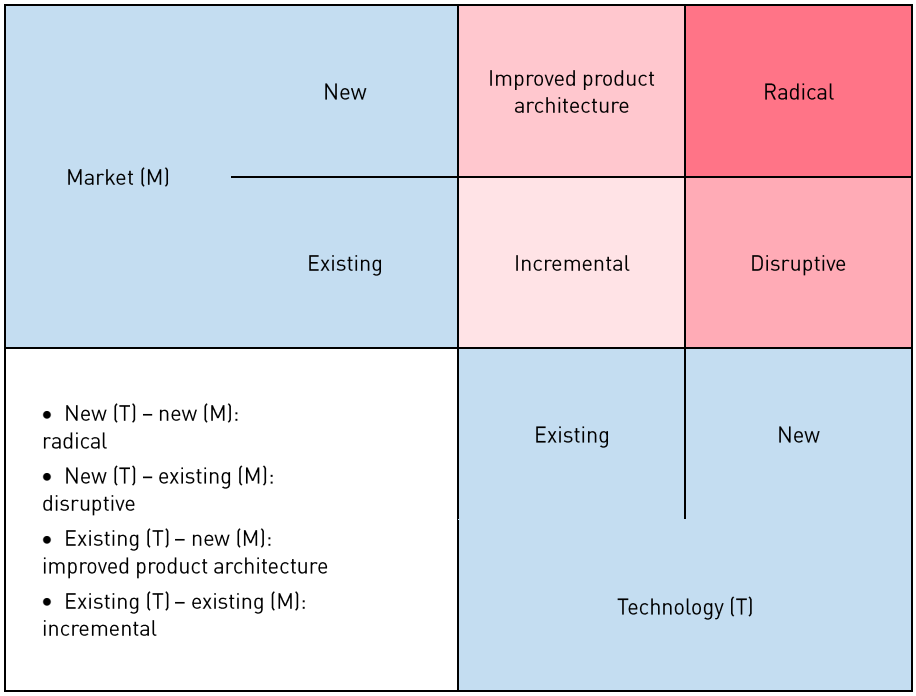
Source: IVA (2026)

A review of various types of innovations shows that there are four roughly defined stages for an innovation. In this context, the innovation can take the form of a good, or a service, or a process (where the latter is linked to the production of goods and services). The innovation stage is determined by how it relates (either as new or existing) to market and technology. Figure 13 sets out the four types of innovation. When both market and technology exist for an innovation, the innovation is considered to be incremental.[21] If an innovation is deemed to be new to the market, although it exists technologically, this relates to an innovation

[20] IVA (2026), 'R&D Barometer 2026', R&D Investment in the Business Community, Royal Swedish Academy of Engineering Sciences (IVA), November 2026, Stockholm, Sweden.
[21] Incremental innovations with existing market and technology refer to small regular improvements to an existing product, service or process.

with improved product architecture. When an innovation uses a new technology at the same time as the market already exists, the innovation is considered to be disruptive. If the technology behind the innovation is new and new markets are being opened up for the innovation, the innovation is considered to be radical. It is in the latter two segments that the greatest successes are achieved by the companies.

FIGURE 13 VARIOUS TYPES OF INNOVATION FOR MARKET AND TECHNOLOGY



Source: Slater et al (2013) [22]

Creating the conditions for the region's companies to strengthen their R&D capacity can be achieved in several different ways. One approach is through collaborative projects. A number of major collaborative projects are already taking place in the Gothenburg region, where the focus is on developing and testing goods, services and processes in actual testing and demonstration environments.

Another way of strengthening the R&D capacity in the Gothenburg region is to work more strategically with new establishments, above all by attracting more R&D-intensive companies to establish operations in the region. Companies that have a clear focus on work and investments linked to R&D can help to further strengthen the region's future innovative capacity and competitiveness.

Allocation-oriented initiatives can also help strengthen businesses R&D capacity through transition and renewal on how to enhance the future production of goods and services in the region. Here, for example, resources can be allocated (or earmarked) to a particular type of innovation linked to construction, infrastructure and production, making it possible for companies to strengthen their capital flow in order to build more sustainably or use less energy for industrial production, or to develop more sustainable solutions for transportation etc. An example of this in the City of Gothenburg is the 'Green Bonds' allocation system.

Large companies account for a significant proportion of the R&D expenditure in the Gothenburg region. However, small and medium-sized enterprises (SMEs) are equally important for the region's overall R&D capacity. We have seen in previous analyses that the Gothenburg region ended up around the average or below in the Regional Innovation Scoreboard (2018-2020) when it comes to the innovation potential among SMEs. However, from 2021 and onwards this group of companies receives a greatly improved rating in the scoreboard for the indicators 'SMEs introducing product innovations' (average score at 82% for the period 2021-2025) and 'SMEs introducing

[22] Slater, F. S., Mohr, J. J. and S. Sengupta (2013), 'Radical Product Innovation Capability: Literature Review, Synthesis, and Illustrative Research Propositions', *Journal of Product Innovation Management*, vol.31, no.3, pages 552-566.

business process innovations' (average score at 71% for the period 2021-2025). An indicator that has been weaker in the rating over time is 'innovative SMEs collaborating with others' (average score 49% for the period 2018-2024) – yet the indicator improves strongly in 2025 as its score reach a full 100 per cent. Strengthening the SMEs' capacity to collaborate with others does not only enhance the innovation potential among SMEs, but it also raises the innovation potential and R&D capacity among other companies in the region. This has succeeded well within the Gothenburg region over the last two years.

A number of initiatives are already being conducted in various collaborative projects in the Gothenburg region. Triple helix collaborations, where companies cooperate with public bodies and academia/research institutes, are common in the Gothenburg region. In the Gothenburg region, 35 testbeds (some 60 across the whole of Västra Götaland) are currently in operation in R&D-intensive environments, all of which are helping to increase the likelihood of developing the innovative solutions of the future within sustainable consumption, production, transportation, construction and housing.

5 Conclusions and recommendations

Following the above review, we can state that Västra Götaland's companies have a great capacity to conduct research and development (R&D) at their own initiative. Previous empirical studies present strong evidence of a positive link between R&D and innovation in the business sector. An increase in business R&D is also reflected in a significant strengthening of the companies' export capacity, productivity and investments. As a result, R&D activities in companies can be viewed as strategically important for a region, as they have a major spillover effect on the rest of the economy in the form of more job opportunities, increased productivity and a larger international market.

Some challenges are, however, stressed here that could hamper the region's R&D capacity in the long term:

- This relates in particular to our companies' sales of innovations that are new to the market or new to technology or new to both market and technology (i.e. radical and disruptive innovations), which in recent years have improved somewhat in international measurements, but the grade remains low relative to other indicators that measure innovation potential. This challenge is difficult to influence, but with the right conditions and encouragement an idea behind a future product, service or process that is new to the market and/or technology can grow big.
- Previously, we have observed that the region's small and medium-sized enterprises collaboration with others has remained at a modest level compared to other European regions. However, there has been a significant improvement here where efforts in recent years have resulted in the region ranking among the top performers in Europe within this category. It is important for the region to maintain this position. In this respect, we must continue our work to invite these companies to participate in collaborative projects, where their innovations can be tested and demonstrated in order to subsequently reach out to national and international markets.
- Foreign-owned and Swedish international companies account for a significant portion of business R&D expenditure in Västra Götaland (95%). This means that an overwhelming share of the region's active companies (which are made up of domestic companies without subsidiaries abroad) only account for a small portion of the county's total R&D expenditure in businesses. This composition of business R&D expenditure could increase the vulnerability of the overall R&D capacity in the county, as large global companies can quickly make decisions to reorganise their research activities.

Strong collaboration in terms of the innovation work (between companies, the public sector and academia) through R&D is important for achieving sustainable development. Why? Because R&D lays the foundations for the new ways of consuming and producing – smarter and more environmentally efficient.

R&D activities in the region need to be safeguarded, nurtured and grown:

- The companies in Västra Götaland are at the forefront when it comes to work and investments in R&D. Västra Götaland is Sweden's leading region in conducting R&D in the business sector and our innovation potential ranks among the very best in Europe. It is important to safeguard this position and view it as an important strength in Sweden's and Europe's future development towards more sustainable growth.
- At the same time, the region is extremely strong in running collaborative projects. One of Sweden's most concentrated locations for testing and demonstration environments is situated in Västra Götaland, including in the Gothenburg region. Testbeds are considered to be incredibly important for discovering the new ways of consuming and producing in future. These need to be nurtured, developed, and grown so that we can maintain our leading position in innovation efforts.

The public sector can achieve a great deal, among other things by supporting and collaborating with companies and academia. More permissive environments can be created, where goods, services and production processes can be demonstrated and/or tested in real-world environments. In this respect, meeting places are important for gathering the R&D capacity and working together. The aim is jointly to strengthen Västra Götaland's position as a world-leading region, whose innovations are driving the sustainable growth of the future.

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