Sweden leads the way in the global tech race

Increasing layoffs and fewer new recruitments

Investment climate for continued tech success

The Swedish Tech Industry 2024

Tech entrepreneurs show the way to brighter times

A REPORT FROM TECHSVERIGE

TechSverige

About the report

The report *The Swedish Tech Industry 2024 – Tech entrepreneurs show the way* to brighter times is the second edition of TechSverige's report series The Swedish Tech Industry. The report is published annually to provide an up-to-date picture of the Swedish tech industry's current situation and future prospects. The report is the result of a collaboration between TechSverige and the analysis company Makrologik.

"We must allow ourselves to aspire to reach the heights, to think big and to act powerfully so that we once again earn our place among the stars."

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TechSverige

"Sweden has a tradition of enterprise, entrepreneurship, cooperation and innovative power, but creating new synergies in the ecosystem of advanced technology, economy and people requires hard work."

Preface

Sweden must earn its place among the stars

Crises have succeeded each other in recent years. The tense security situation, with the conflicts in Ukraine and the Middle East in the spotlight, continues to dominate news feeds, while many households and businesses are still in the iron grip of recession. However, both inflation and interest rates have fallen and household real incomes are rising again, which helps to create the conditions for a long-term recovery in Sweden. The macroeconomic focus has shifted from combating inflation on to concerns about growth and the failing labour market.

The economy has cooled, but the tech industry managed to grow in 2023 despite this. Together, Swedish tech companies produced goods and services worth more than SEK 1,100 billion for the first time. That would not have been possible without the 265,000 people who work in the industry's 59,000 companies. It is clear that Swedish tech companies are looking outward and forward, rather than inward and backward. The largest export market for Swedish tech companies in 2023 was not a European country but rather the United States, driven by the rapid growth in export of services.

Going forward, we anticipate high growth in several technology areas such as AI, cloud services and cyber security. There are enormous opportunities to exploit and risks to avoid, even during a recession. New technology makes it possible to rationalise operations, ensure the operation of infrastructure and increase society's sustainability and resilience. You have to be modest in predictions for the future, but our forecasts show that the tech industry will grow by between 18 and 25 percent until 2027. This would mean that the industry's share of GDP will increase from 8.0 percent to between 8.6 and 9.2 percent, which strengthens the tech industry's role as Sweden's new base industry.

The report's in-depth analysis of entrepreneurship shows that Sweden has a very strong starting position as a tech nation, but that other countries are catching up. Fewer people choose to become entrepreneurs in Sweden than in comparable countries, and Stockholm, which previously distinguished itself as an extremely strong tech hub, is losing ground to the global competition. To reverse that trend, we need more tech specialists, to attract venture capital back to Sweden and to stop the regulatory hassle in Sweden and Europe. With the right support and encouragement, our skilled tech entrepreneurs can lead the way through troubled times.

Sweden has a tradition of enterprise, entrepreneurship, cooperation and innovative power, but creating new synergies in the ecosystem of advanced technology, economy and people requires hard work. Tech nation Sweden has an impressive CV, something we should not only be proud of but also nurture and develop. We must allow ourselves to aspire to reach the heights, to think big and to act powerfully so that we once again earn our place among the stars.

Christina Ramm-Ericson
Chief Economist TechSverige

Åsa Zetterberg
CEO TechSverige

December 2024

The tech industry[1] and its outlook in numbers

SEK
1 100
billion

Level that the turnover of tech companies passed in 2023

SEK
193
billion

Annual tax payments for welfare and public services – rougly the same as the government's spending on defence and the police

SEK
352
billion

The industry's GDP contribution/value +added in billions of SEK 2023[2]

18–25 %

Forecast industry growth until 2027

[1] In the report, there are different statistical definitions of the tech industry depending on the availability of data. Unless explicitly stated in the text, the tech industry refers to companies classified according to the SNI codes 26.110, 26.120, 26.200, 26.300-400, 26.510, 26.800, 42.220, 46.142, 46.510, 46.521-522, 58.210, 58.290, 61.100, 61.200, 61.300, 61.900, 62.010, 62.020, 62.030, 62.090, 63.110, 63.120, 82.200 and 95.110. That delineation probably underestimates the extent of the tech industry in a broader sense, including products and services in industries that arise in the overlap between the traditional IT and telecom industry and other traditional industries.

[2] Refers to GDP share or GDP contribution/value added expressed in the 2015 price level. As a rule, fixed prices are used with 2015 as the reference year for GDP variables in the report, including here and in the report's forecasts. Fixed prices are used because the main focus of the report is the development over time. Just using current prices to follow the tech industry leads to the industry's contribution to the economy being underestimated, especially in times of high inflation. For example, the values added of many other industries at current prices have been driven up by the large increases in prices between 2021 and 2023, which have not been realised in tech. Using the GDP contribution in current prices would give the impression that the tech industry's production is decreasing relative to the entire economy, even though, in real terms, the tech industry is growing faster than pretty much all other major industries.

265 000

Number of employed in more than 59,000 tech companies in the second quarter of 2024

SEK

370

billion

The industry's export value in 2023, of which 63 percent comes from services and 37 percent from goods

386 %

Labour productivity growth in tech 1993-2023, as compared with 70 percent in the rest of the business world

8 %

The industry's share of GDP in 2023, expected to increase to between 8.6 and 9.2 percent by 2027[2]

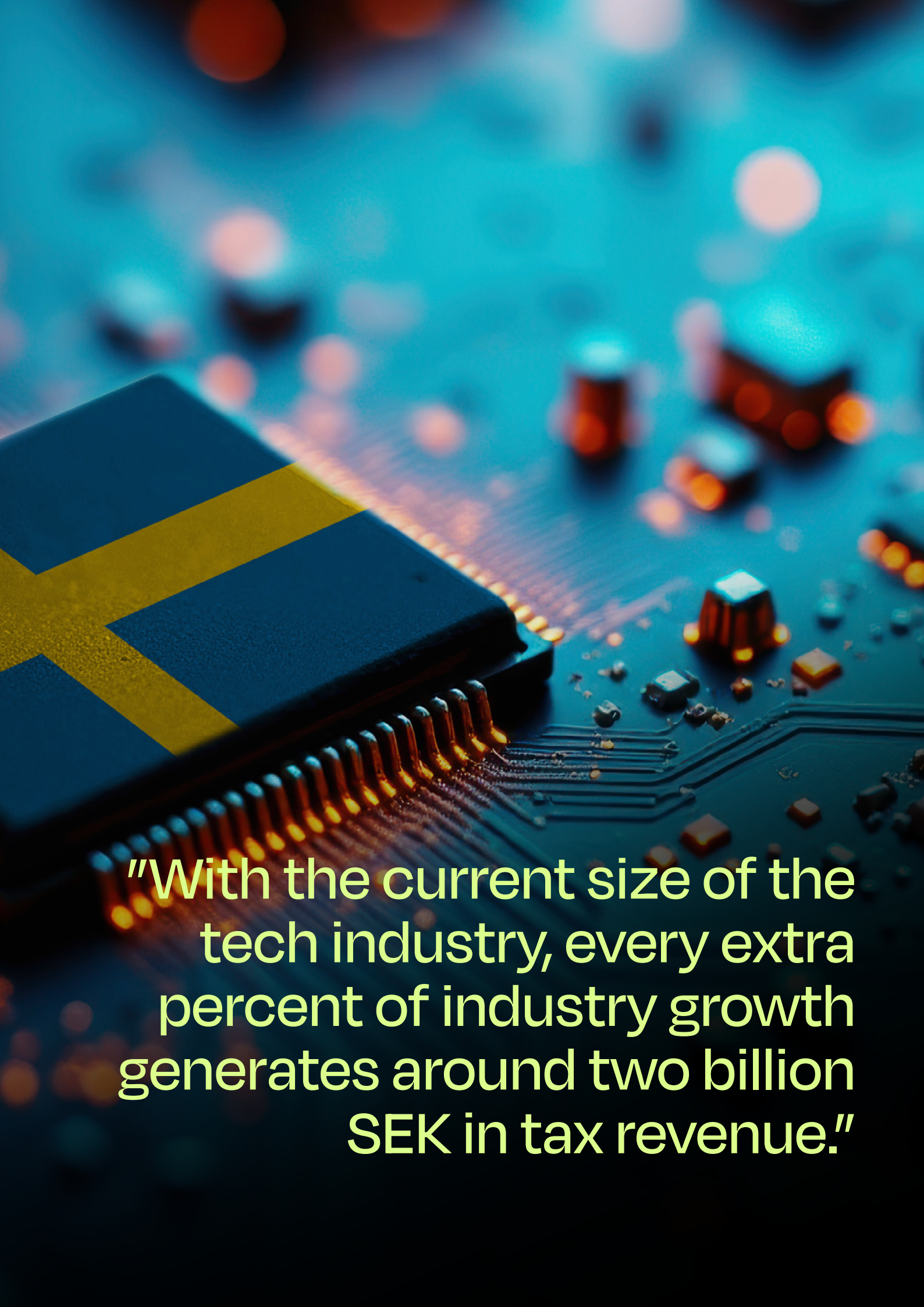
23rd place

Stockholm's world ranking among global start up ecosystems in 2024, down from 10th place in 2020

Chapter 1

The role of the tech industry in the economy

In this chapter, the role of the Swedish tech industry in the economy and society as a whole is highlighted from a variety of angles. The companies' structure and turnover are discussed, as well as the industry's GDP contribution, exports and number of employees. The industry is also explored from a regional perspective and the picture is supplemented by interviews with leading voices in Swedish tech.



"With the current size of the tech industry, every extra percent of industry growth generates around two billion SEK in tax revenue."

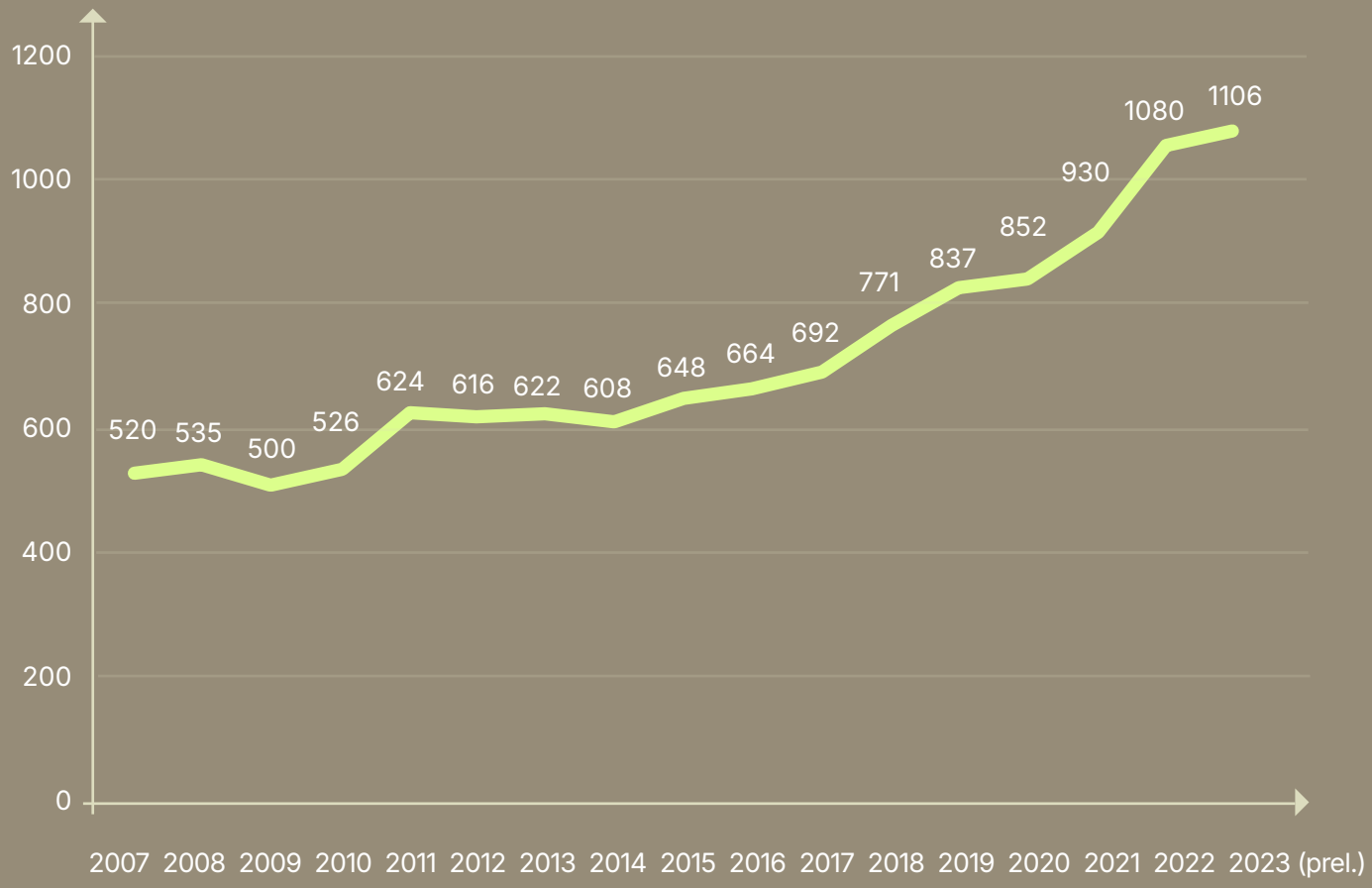
Tech nation Sweden passed SEK 1,100 billion

New technologies increasingly drive the growth and prosperity improvements that make it easier, more convenient and sustainable to live, work and run businesses in modern societies. Although crises have been frequent in recent years – the pandemic was replaced by war and recession – technological development has served as a buffer, which has enabled optimism, growth and resilience during difficult times.

In 2023, the companies in the Swedish tech industry reached a turnover that preliminarily assessments put at SEK 1,106 billion. That is three times as much as Swedes spend on food every year, or almost 80 percent of Sweden's state budget for 2025.[3] The turnover of the tech industry is also greater than the turnover of significant traditional sectors such as the construction industry and retail trade.

The tech companies also contribute SEK 193 billion annually in tax revenue to the state, municipalities and regions.[4] The tax payments correspond to the entire state budget allocation to defence and the Police Authority in 2025.[5] With the current size of the tech industry, every extra percent of industry growth generates around two billion SEK in tax revenue.

Tech companies turnover 2007–2023 in SEK billion



Source: Statistics Sweden - Business finances (2007–2022), the Swedish Tax Agency and our own calculations (2023).
The 2023 figure is preliminary and is based on VAT statistics from companies with SNI codes 26 and 61–63.

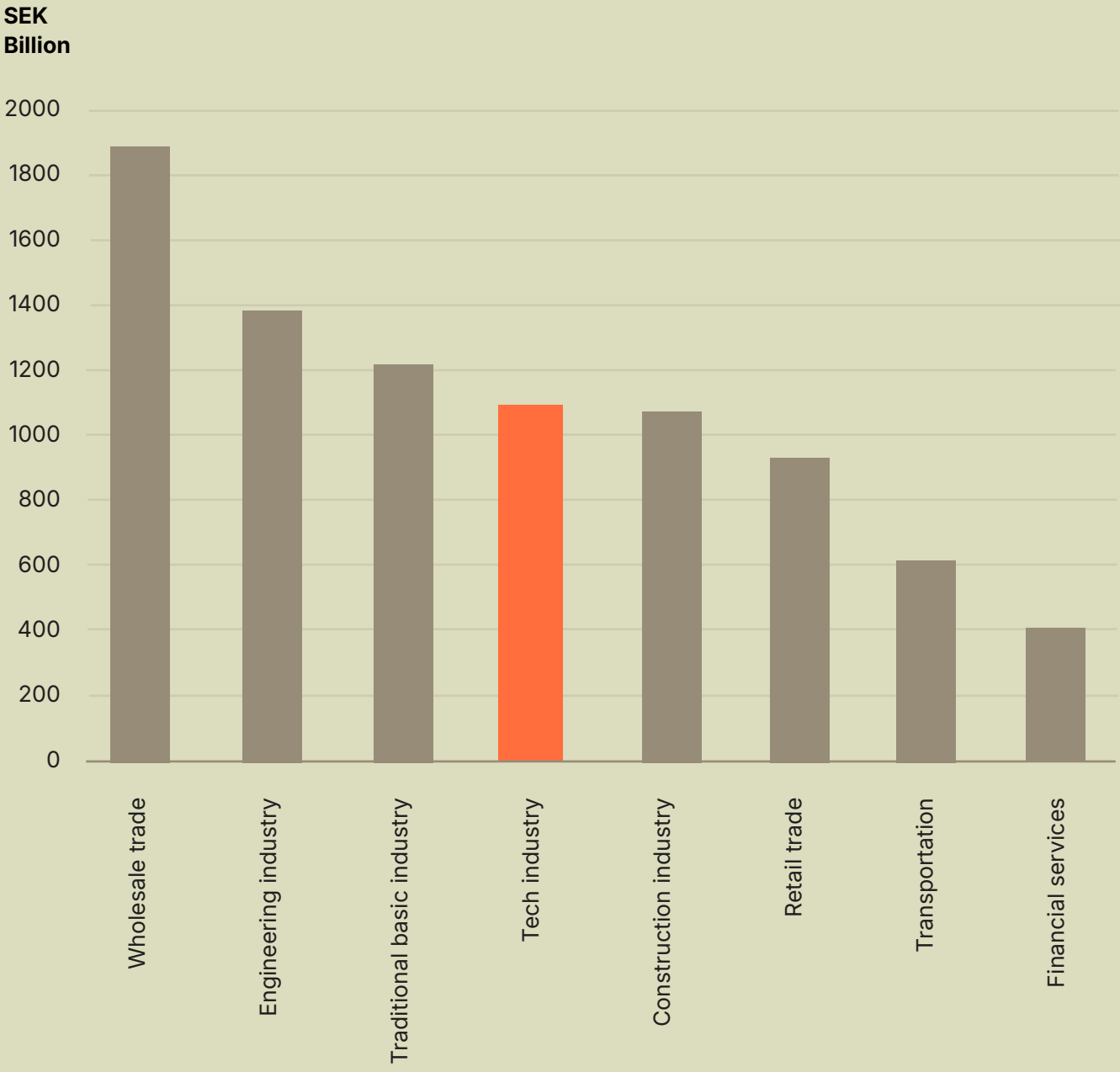
[3] According to the government, the expenditure in the state budget for 2025 amounts to SEK 1,428 billion.

[4] Of the SEK 193 billion of tax payments, SEK 88 billion is estimated to come from VAT, 44 from payroll taxes, 42 from employer contributions and 19 from corporation taxes. The figure is SEK 39 billion greater than in the previous year's report. This is partly because the industry has grown, but also because better data sources for this year's calculations have made it possible to take into account state income taxes that were not included in last year's figure.

[5] Source: The Government Offices of Sweden . According to the government, the appropriation for the military defence in 2025 is estimated at SEK 138 billion (excluding support to Ukraine), with SEK 8.5 billion for civil defence and SEK 45 billion for the Police Agency.

Turnover for Swedish companies in various industries[6]

In SEK Billion.



Source: Statistics Sweden, Handelsfakta, Swedish Tax Agency and our own calculations

[6] The following definitions are used in the chart: The wholesale trade is defined as SNI code 46, the engineering industry as SNI 25–30 plus 33 and the construction industry as SNI 41–43. The retail trade is defined in accordance with the measure Retail sales according to Handelsfakta, which is based on SNI code 47, excluding 47.3. Traditional basic industry is defined in terms of SNI 1–8, 16–18 and 22–25 and transport as 49–53. For the financial industry, the total revenues of the financial companies are referred to, of which net interest and net commissions make up the largest items. The sources for the figures are Statistics Sweden Businesses' economy, Statistics Sweden Financial Companies, annual accounts, Handelsfakta, the Swedish Tax Agency and our own calculations. The figures for tech, retail and finance refer to 2023, other industry figures refer to 2022. Comparisons with last year's report should be made with great caution because method changes to Statistics Sweden's Business Finance database from 2022 onwards will affect the outcome. It should also be noted that turnover is reported in current prices and that, for example, the growth in the engineering industry and the traditional basic industry was largely through rapid price increases during the inflation year 2022, price increases that were not realised in tech.

Tech – an enabling cluster for other businesses

In September 2024, the tech industry consisted of 59,000 active companies. This was an increase of approximately 1,000 companies compared to the same time in 2023.[7]

The tech industry's operations can be divided into four different segments. These are (1) software and IT services, (2) telecommunications and infrastructure, (3) hardware manufacturing, and (4) retail and service. Of the four segments, it is the companies within software and IT services that are growing the fastest. The segment contains many companies with scalable business models and now accounts for close to two-thirds (63 percent) of the tech industry's turnover. Telecommunications and infrastructure, as well as resale and service, each account for between 1/6th and 1/7th of turnover (17 and 15 percent respectively), while hardware manufacturing accounts for just under five percent.

Tech is not only an industry with many IT, telecom and data-intensive companies, but also an enabling cluster for the entire modern economy. The contact surfaces between pure IT, telecom and tech companies and other businesses have given rise to new segments within the tech industry and in the overlap with other industries, such as healthtech in the health area, cleantech in the environmental area and foodtech in food. New technology also creates great opportunities for problem solving and efficiencies in the public sector. Smart electricity grids, AI-driven decisions in healthcare and the defence establishment's investments in cyber security are investments that are expected to be particularly significant for the public sector in the coming years.

[7] Source: Statistics Sweden's Business Register. A total of 58,976 tech companies were active in September 2024.

Three examples of technology applications in the public sector that are expected to be significant in the coming years

1. Smart grids

Smart and connected electricity grids enable the production, consumption and distribution of electricity to be synchronised in real time using price models. Imbalances in the electricity system can be rectified in milliseconds, which, among other things, is estimated will reduce outage times by 50 percent.

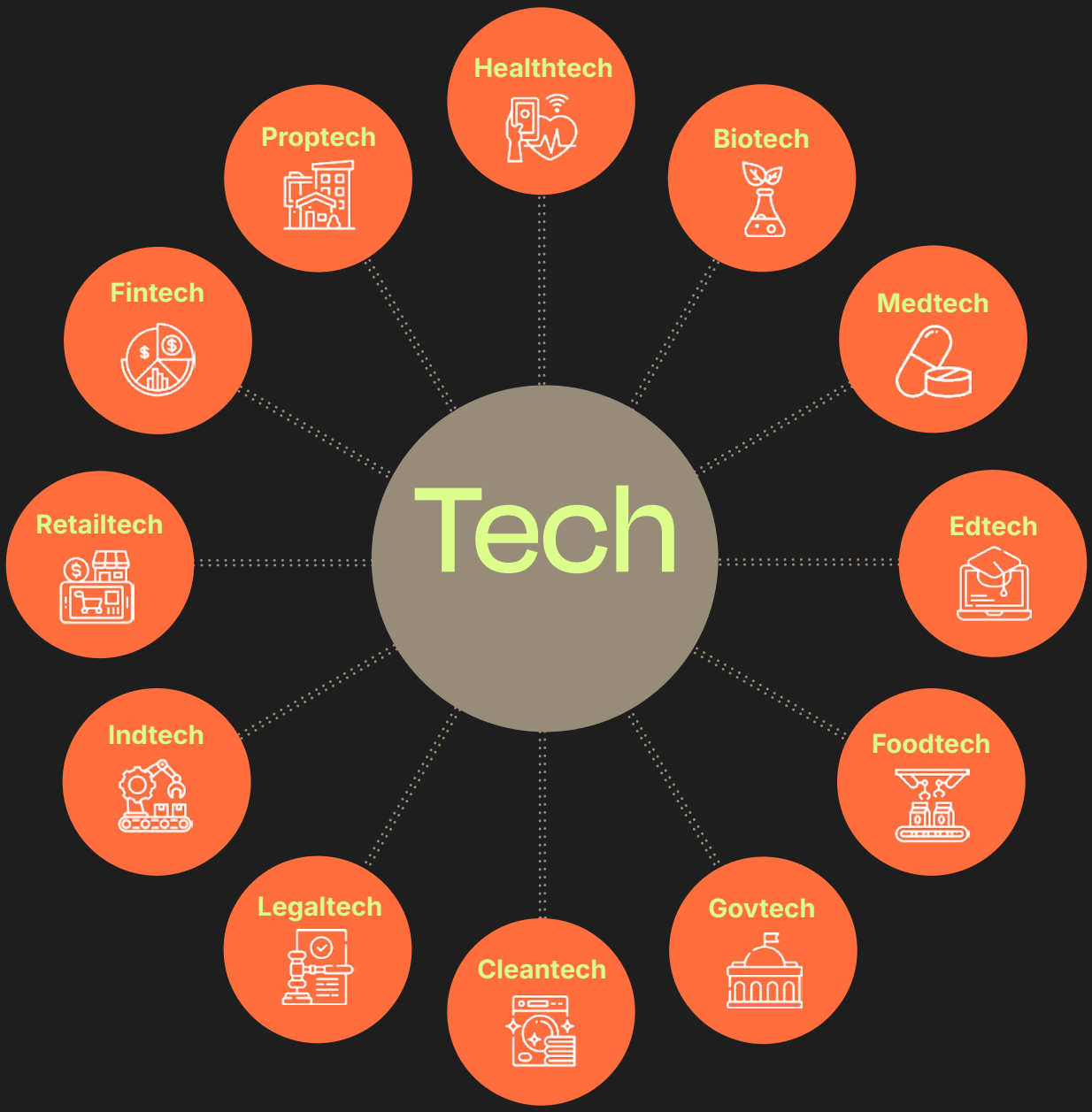
2. AI and data-driven decisions in healthcare

Artificial intelligence can be used to analyse patient data for better diagnoses and treatments. This is expected to streamline the flow of care, increase patient safety and reduce the burden on the care staff.

3. Defence cyber security protection development

The number of cyber attacks reaches an all-time high. Large-scale investments in defence aim to protect Sweden's critical infrastructure and to ensure robustness against cyber attacks.

Tech as a market cluster




"Tech constitutes an enabling structure for the entire modern social economy."

A new basic industry for Sweden

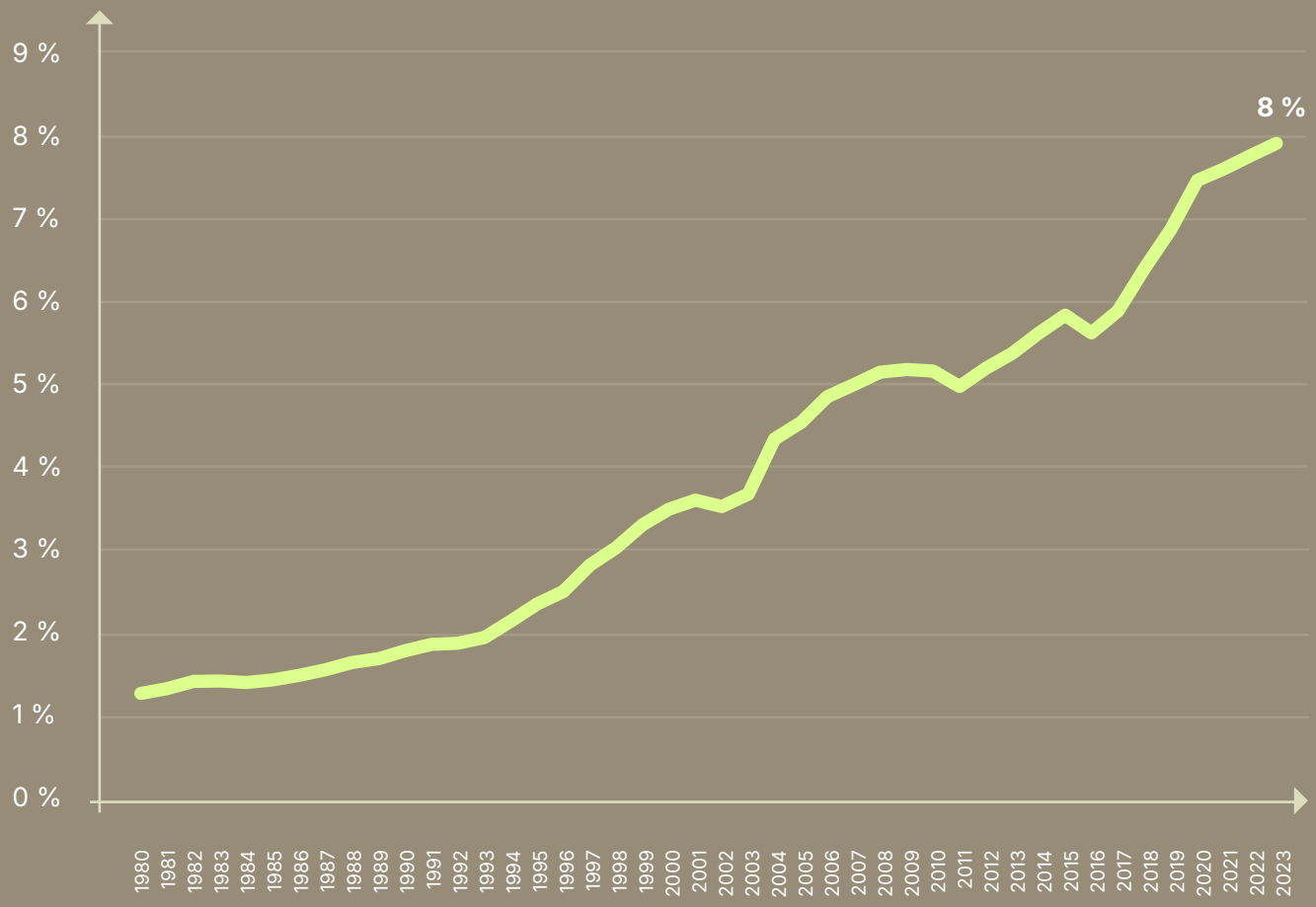
The Austrian economist Joseph Schumpeter coined the term ”creative destruction”, to describe how industry and innovation clusters replace each other as locomotives in a dynamic market economy. In this spirit, in recent years the tech industry has assumed the main role in the economy in terms of growth opportunities, investments and social impact. Symptomatically enough, the world’s most highly valued companies today are within tech, including Apple, NVIDIA and Microsoft.

The need for physical raw materials and materials are of course still important elements in production. However, technology is clearly increasing the fastest in value and relevance from a socio-economic perspective. The tech industry now provides other industries with smart digital services and products that are indispensable for modern production, skills development and logistics. The tech sector has thus become the backbone of today’s and tomorrow’s social infrastructure.

The value added from the tech industry in 2023 was SEK 352 billion,[8] corresponding to a GDP share of 8.0 percent. The tech industry’s contribution to GDP surpassed that of traditional basic industries in 2019. The exponential growth in tech is creating rapid upheavals in the economy, as investment, entrepreneurs and skills migrate to the sector to capitalise on its great future opportunities.

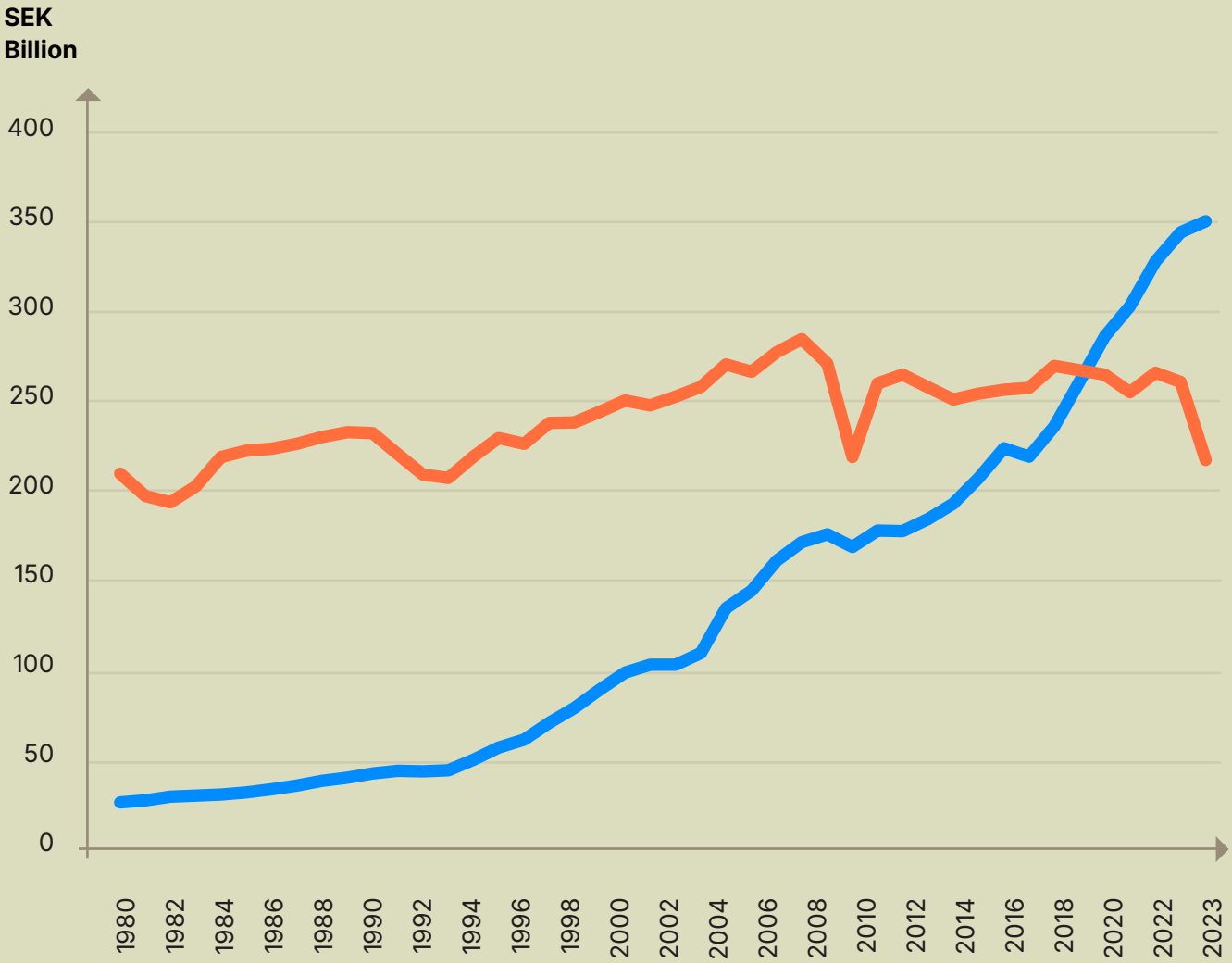
[8] In fixed prices with 2015 as reference year. In current prices, the tech industry’s value added amounted to SEK 380 billion in 2023.

The Tech industry's share of GDP 1980-2023



Source: Statistics Sweden - National Accounts. Refers to the value added by the Tech industry (in fixed prices with 2015 as reference year), defined as SNI 26+61-63, in relation to the value added of the entire economy (GDP at base price).

GDP contribution from Tech and traditional basic industry respectively



Tech industry

The tech industry is defined in the diagram as "computer, electronics and optical industry", "telecommunications" and "computer programming, computer consulting and information services." For technical reasons, and as a result of the way the national accounts are designed, this leads to a certain underestimation of the tech industry, because the definition excludes certain tech companies, including the resale and after-sales service of IT products and certain software development.

Traditional basic industry

Traditional basic industry refers to the sum of the industries "agriculture, forestry and fishing", "mineral extraction", "wood pulp, paper and graphic industry", "rubber and plastics industry; and other non-metallic mineral products", "steel and metal fabrication; and manufacture of metal goods (not machines)" according to the official industry classification of the business world.

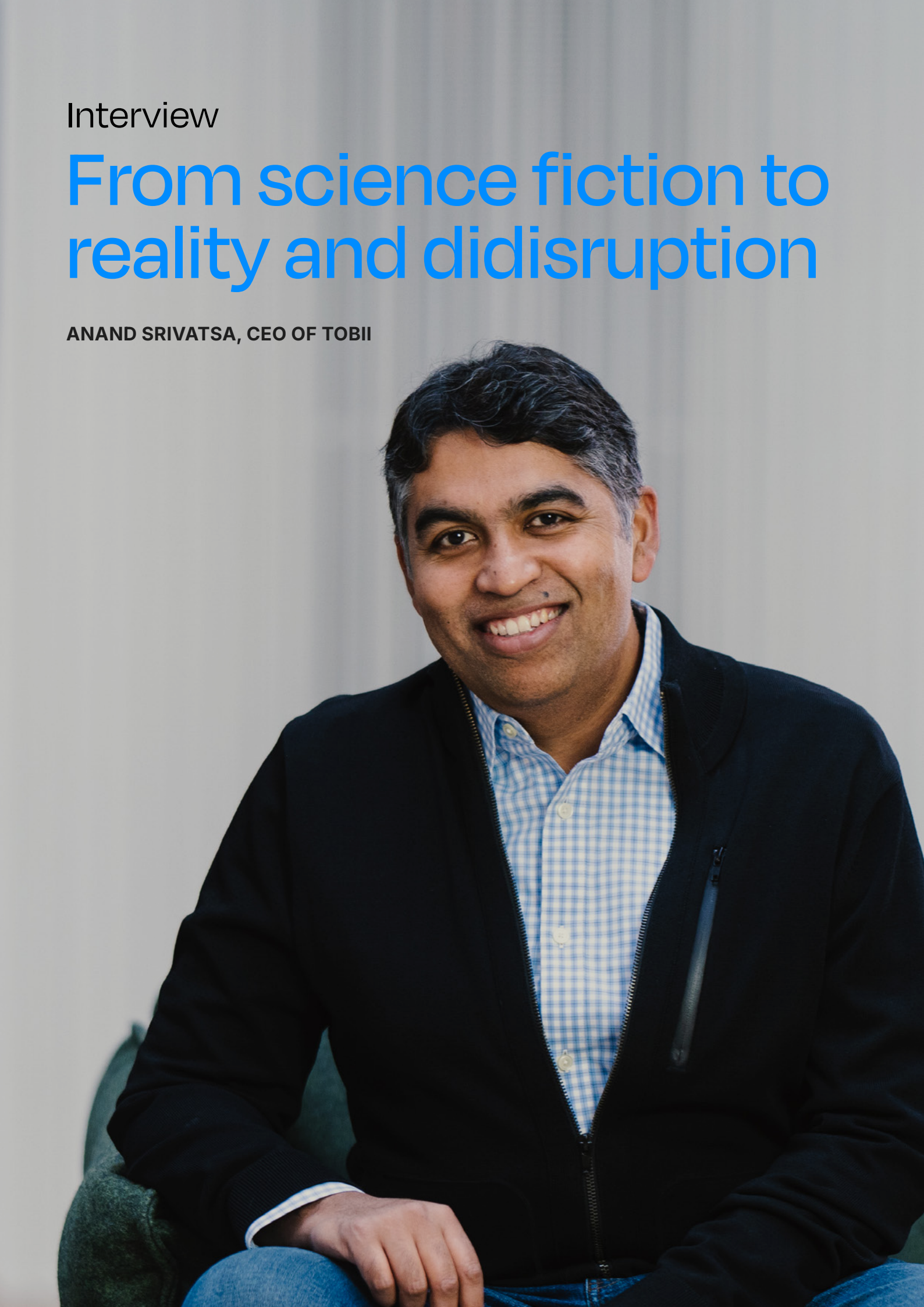
Source: Statistics Sweden - National accounts. Refers to fixed prices with reference year 2015. The Tech industry refers to SNI codes 26 and 61–63.

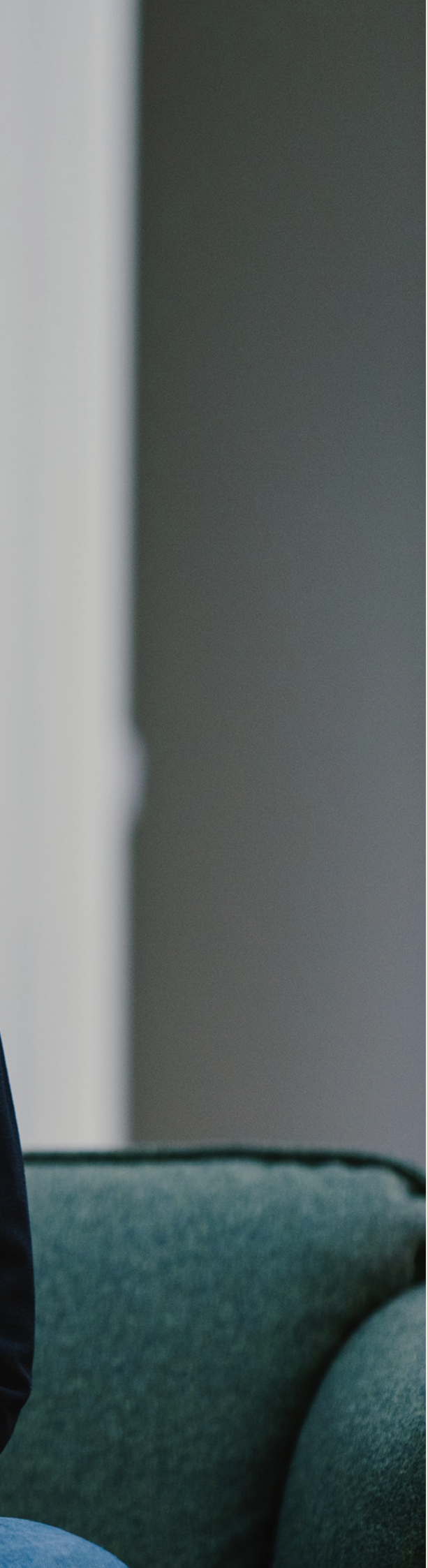
"Symptomatically enough the world's most highly valued companies today are within tech, including Apple, NVIDIA and Microsoft."

Interview

From science fiction to reality and didisruption

ANAND SRIVATSA, CEO OF TOBII





Anand Srivatsa leads the publicly traded company Tobii, which has been developing tools for eye-tracking and attention computing since 2001. The technology enables machines to read and interpret non-verbal, human behaviour and intentions in ways that a few decades ago were only possible in science fiction movies. The technology's mature application areas are in behavioural research and aids for the disabled, but several new segments are on the rise, including vehicle safety, the gaming sector, VR experiences and medical technology.

"The clearest emerging market for our technology right now is the automotive industry. There is a legal requirement for driver monitoring systems in the EU and more and more parts of the world, and car companies are striving to make their vehicles safer. By using eye-tracking and attention computing, we can monitor the driver's focus and detect signs of distraction or fatigue in real time. The system can then warn the driver or even intervene to prevent accidents," explains Srivatsa.

The challenge of tech entrepreneurship: to create and educate its market

Commercialisation of cutting-edge technology is an entrepreneurial challenge on several levels. Srivatsa notes that Tobii's founders were ahead of their time and saw the potential of eye-tracking technology long before the market did. Only now, 20 years later, has the technology begun to be used in millions of units each year. The protracted maturation process means that the company has experienced some growing pains, as a result of the extensive need to educate the market about the value of the technology.

"When you have a completely new technology like our eye-tracking , where the market often doesn't even exist yet or is just in its infancy, step one is to prove to our customers that the technology creates value. Step two is that our customers must demonstrate that the products they build, which are inherently innovative, can create value for their own end users. It is a challenge where we have to educate the market and at the same time manage the uncertainty of where the demand will arise," says Srivatsa.

"From a system perspective, Sweden is in the premier league of tech"

Global competition requires investment, incentives and the enabling of an ownership perspective

From a system perspective, Srivatsa states that Sweden is in the premier league of tech, despite its small size. While the US, China and India have indisputable economies of scale from natural supply of skills and huge domestic markets, Sweden must play smart and capitalise on its positive brand. In order to bring more leading Swedish tech companies to the fore, Srivatsa calls for a policy that supports companies' opportunities to develop and validate their technology. He believes this should mean increased investment in research and development in small and medium-sized enterprises (SMEs), support or tax incentives to educate the market about new technologies, encouragement of deeper cooperation between business and academia, and faster visa processes for international talent recruitment. He also identifies imbalances in the incentive structure for employees in Sweden, relative to how it looks in the outside world.

"In the United States, and especially in Silicon Valley, it is common to have stock programs that both adjust the compensation to the company's results and encourage employees to think and act like owners. In Sweden, such share programs can be difficult to implement, partly due to tax policies and how institutional investors view employee share ownership. It makes it harder for Swedish companies to compete for talent, especially when we are fighting for the same skills as American companies," points out Anand Srivatsa.

3 quick ones

to Anand Srivatsa about...

1. The tech landscape since the pandemic : "As working life has become less location-bound and we move towards more software-based industries, the barriers preventing more parts of the world from becoming technological heavyweights are decreasing. Barriers for companies that grow in unexpected places – like Estonia or Australia – places that may not have previously been seen as tech hubs – are much lower today when software is the distribution mechanism. In this way, brilliant ideas can come from anywhere in the world and gain a foothold."

2. Innovation in recession: "For a start-up, recession can actually be an advantage because it can provide time for the development of ideas, provided the company can get funding. For a listed company, it is more difficult because the pressure to deliver financial results makes it challenging to focus on long-term innovation."

3. The future of eye-tracking technology: "We see a clear trend towards an increasing adoption rate for attention computing , not only in research but also in commercial applications such as the automotive industry, where the development is being driven by legal requirements. As we now see the technology appearing in more and more consumer products, from VR headsets to medical devices, it is clear that eye-tracking can become a central component in the interactive experiences and security systems of the future."

From regional goods export to global service export

Sweden is a small country in a big world. It is therefore natural for growing Swedish tech companies to start considering international markets quickly, in order to be successful. A third of the tech industry's production is exported. The export value amounted to SEK 370 billion in 2023, which corresponded to 12 percent of Sweden's total exports.[9] This means that tech products are one of Sweden's heaviest export segments.

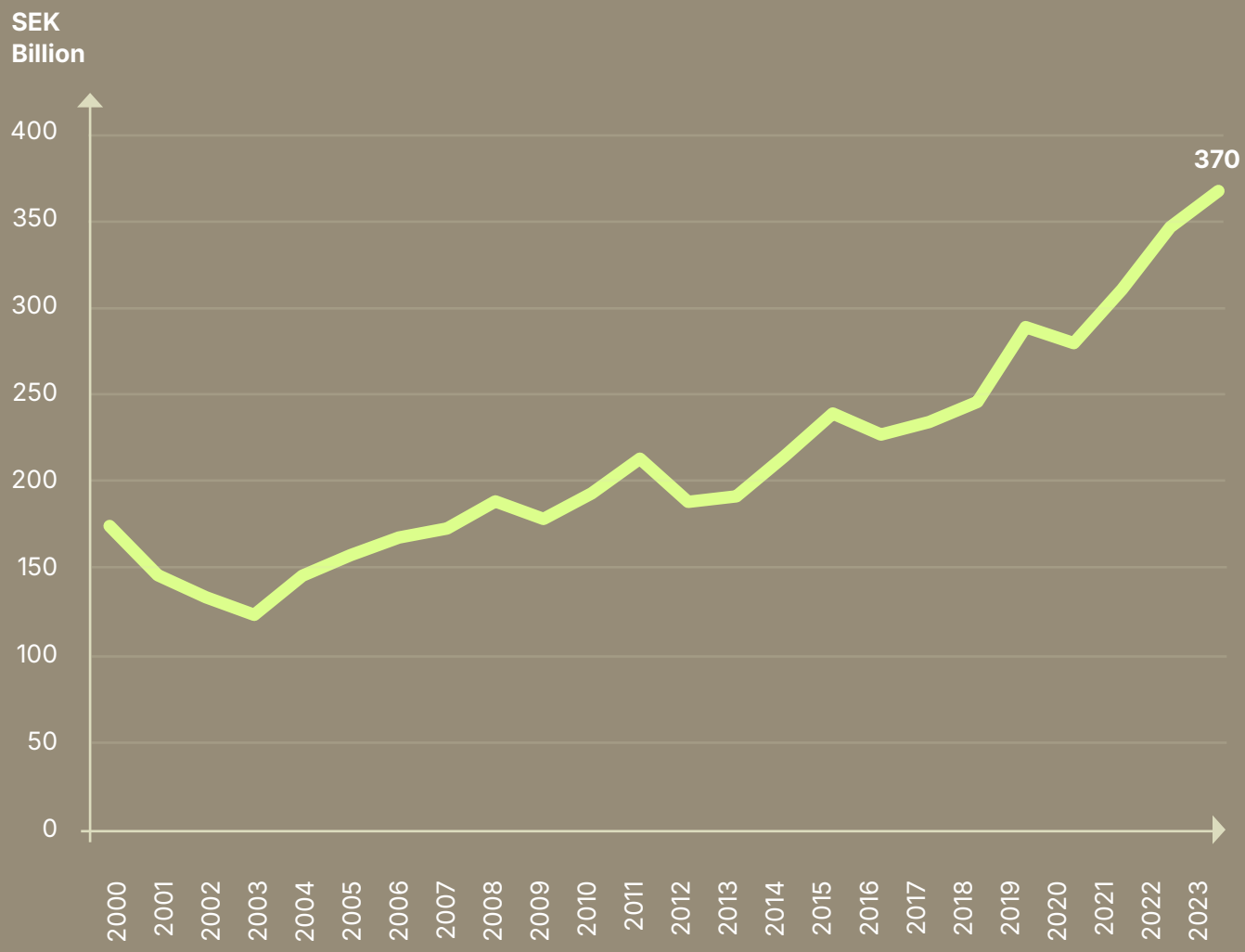
During the 21st century, knowledge-intensive service exports have accelerated the most. Service exports within the tech sector increased from ten percent of the export value in 2000 to 63 percent in 2023. These are, for example, services in mobile communication, software development, streaming services and game development.

One effect of the tech industry's increased share of service production is that exports are more global than traditional goods exports, which are based to a greater extent on geographic proximity. The largest export market for tech is the USA, which accounts for 15 percent of the total export value. Between 2008 and 2021, around 30 percent of the fastest-growing European companies moved their headquarters outside the EU – the lion's share of which were to the US – due to the greater opportunities to scale up their operations there.[10] Limited financing opportunities and regulatory barriers are some of the obstacles to expansion in Europe. Swedish exports to Europe are also affected by both the difficult security policy situation and by the weak growth in large regional export markets, such as Germany and France. A gathering of strength and better adapted regulations for the expanding trade in services are necessary for the tech industry to be able to increase its competitiveness and expand globally with Sweden as a base.

[9] Refers to the loss-adjusted export of goods corresponding to the SPIN15 codes 26.110, 26.120, 26.200, 26.300, 26.400, 26.510, 26.800, 58.290 and account item 9 (telecommunications, data and information services) within the service export. According to Statistics Sweden, total exports for Sweden amounted to SEK 3,207 billion in 2023.

[10] Draghi, 2024.

Exports by Tech industry 2000-2023 in SEK billion



Source: Statistics Sweden - Foreign trade statistics. Refers to both goods and services exports at current prices.

"The largest export market for the tech industry is the United States."

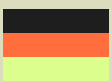
Biggest export markets in tech for Swedish companies?


1. USA (15 %)

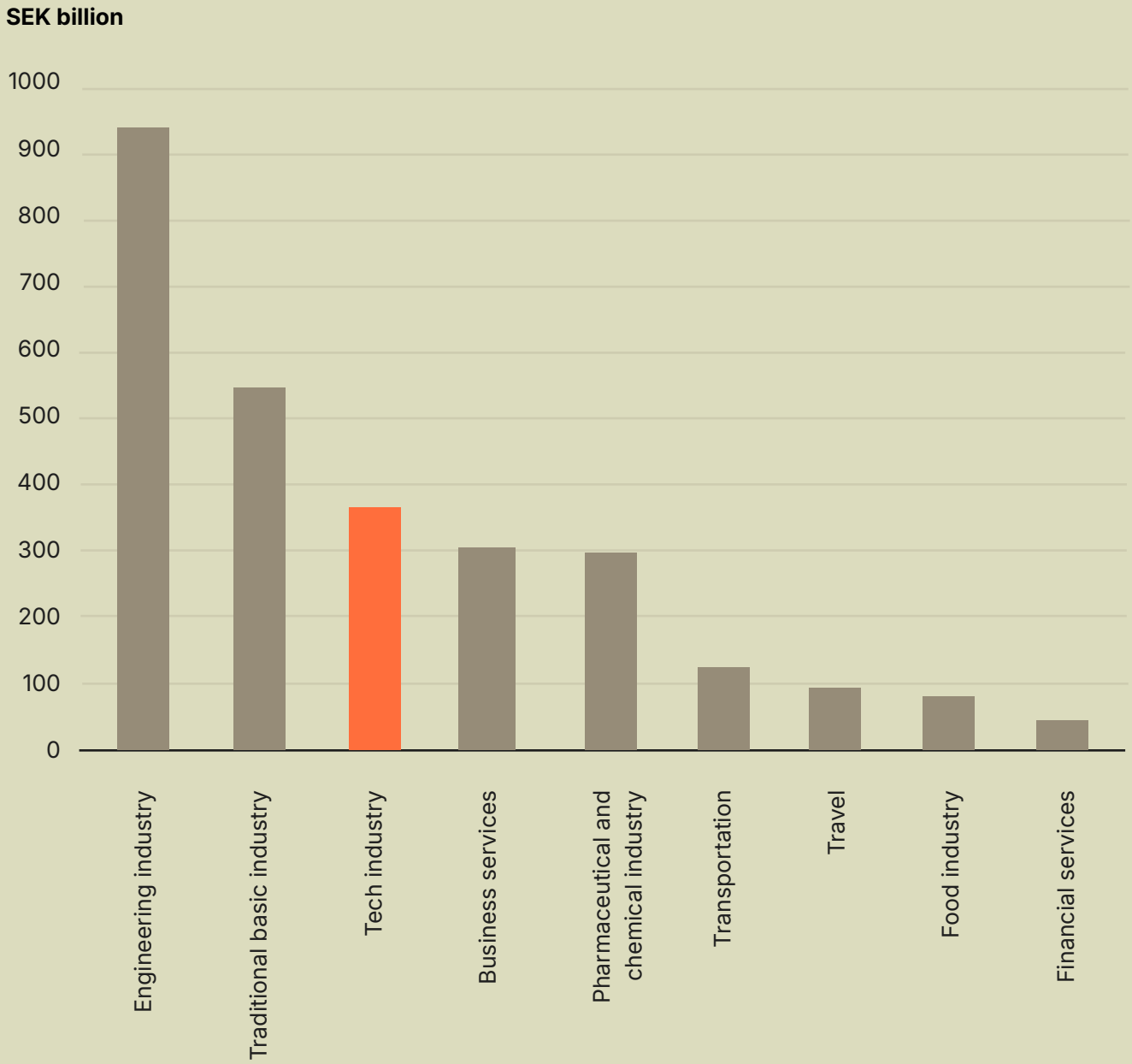

2. Norway (10 %)


3. Denmark (9 %)


4. United Kingdom (7 %)


5. Germany (6 %)

Export value per industry[11]



Source: Statistics Sweden - Foreign trade statistics. Refers to the year 2023.

[11] Definitions of several industries can be found in previous footnotes. The SNI codes here correspond to SPIN codes in the foreign trade statistics for goods. In addition to the industries mentioned previously, the pharmaceutical and chemical industry is defined as export according to SPIN code 20–21 and the food industry according to SPIN 10–12. Within the framework of the service export statistics, transport is derived from account item 3, travel from account item 4, financial services from account item 7 and business services from account item 10.

The tech industry is keeping productivity up

The growth that enables increased prosperity, lower prices, a better environment and social services requires that productivity increases over time, that is, that we get more out of the resources used in production. Technical innovation and more efficient organisation, together with capital formation – investments in companies, knowledge, infrastructure and intangible assets, are the main drivers of productivity.

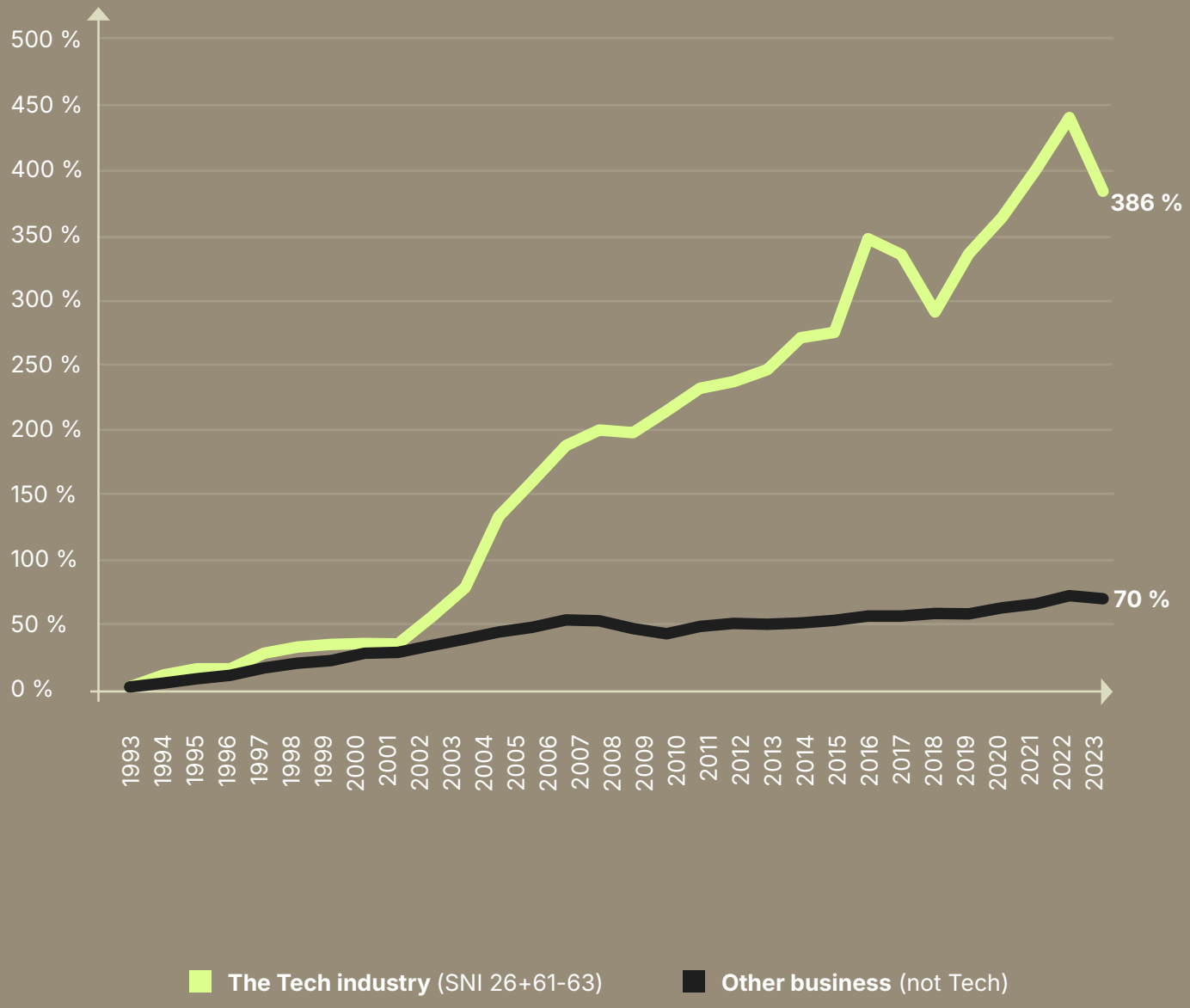
A major societal problem is that the growth in productivity in Sweden has almost halved during the 21st century. The slowdown, which has also occurred in many other high-income countries, began a few years before the 2007–2009 financial crisis and was exacerbated by it. The cause of the decline has been debated, but it is clear that the large drop in productivity occurred despite the positive effects of digitisation and technological development.[12] Since 1993, labour productivity in tech has increased by 386 percent; an almost fourfold increase in 30 years. During the same period, labour productivity in the rest of business increased by only 70 percent.

The Productivity Commission, among others, has pointed out that AI and digitisation create huge opportunities for efficiencies. However, Europe has failed to fully utilise the opportunities of digitisation and developments in tech, which largely explains why Europe has fallen behind the US in terms of productivity.[13] Business creativity needs to be encouraged more and the opportunities of technology need to have a wider impact on parts of the economy where productivity has stagnated.

[12] For an in-depth discussion of this problem and possible explanations and solutions, see the theme chapter on productivity from last year's edition of the Swedish tech industry (TechSverige, 2023). The theme chapter is written by the economist Mårten Blix.

[13] Draghi, 2024.

Labour productivity growth 1993-2022



Source: Statistics Sweden - National accounts, our own calculations. Cumulative development in value added per hour worked, fixed prices

Every eighth new job created is in the tech industry

In the second quarter of 2024, the tech industry employed approximately 265,000 people. This corresponds to a decrease of 1,000 people compared to the same period in 2023. This is a consequence of the weakened economic situation, which has held back new recruitment and led to a shift in focus from growth to profitability among many companies.

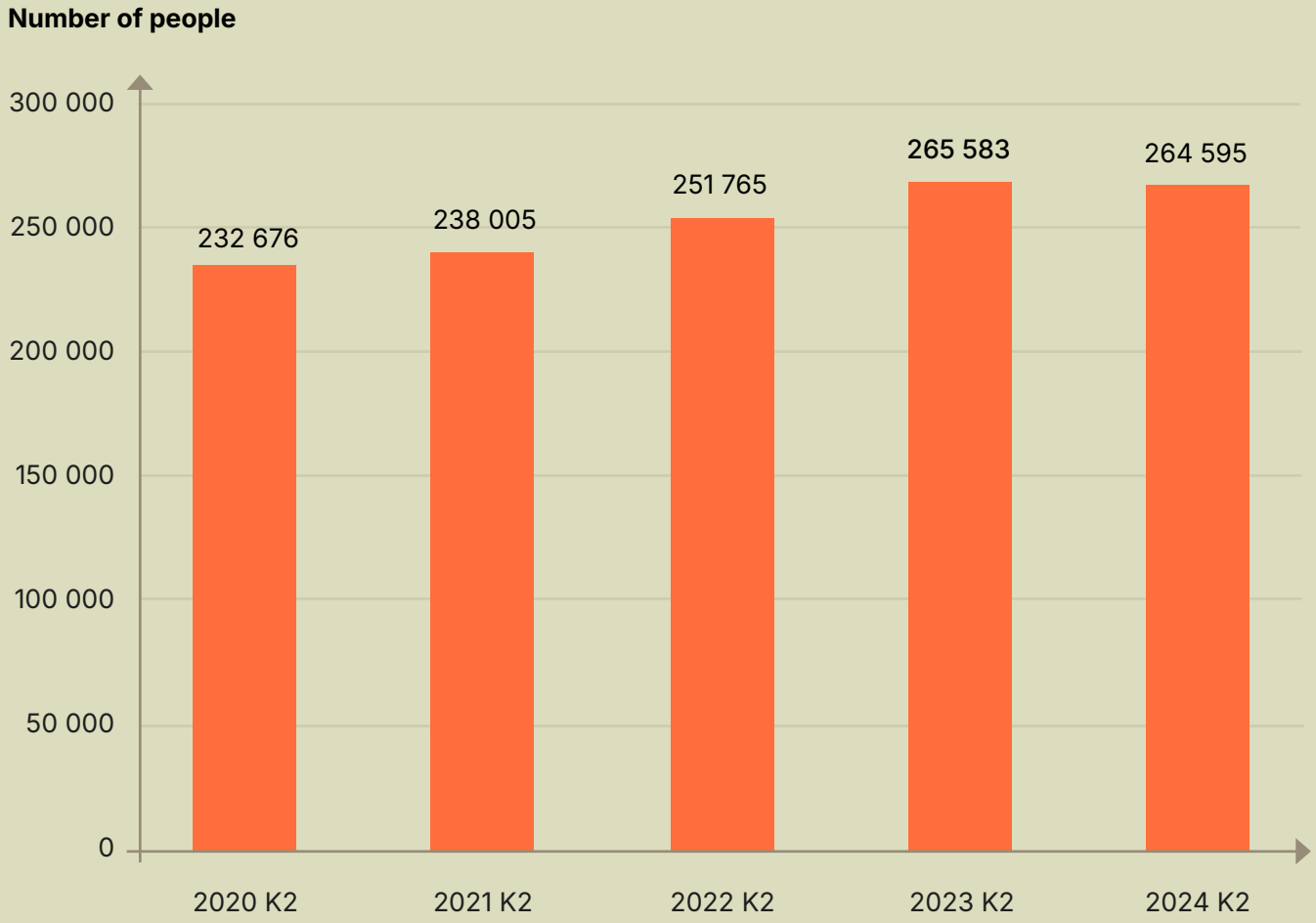
Since the pandemic in 2020, 32,000 new tech jobs have been created and every eighth new job opportunity has come from the tech industry. This means that job creation in the tech industry during this period was 2.6 times higher than in the rest of the economy. Regionally, employment has increased most in Kronoberg County (+29 percent), followed by Uppsala County (+23 percent) and Jönköping County (+22 percent).

Finding the right skills is a crucial challenge for tech companies. In the Swedish Agency for Economic and Regional Growth's surveys, nearly a third of all Swedish companies (31 percent) state that the lack of suitable labour or skills is a major obstacle to growth.[14] This applies in particular to companies outside the metropolitan counties. Between 2024 and 2028, around 18,000 new tech specialists will be needed annually in Sweden. The need for the tech industry itself is expected to be around 10,000 specialists per year, which corresponds to an increase of 30 percent during the entire period. The remaining 8,000 specialists per year are needed in the rest of business and in the public sector.

Stockholm county has almost twice as high a proportion of tech specialists among its employees (see definition below) as the next best region, Västra Götaland. The proportion has also increased most over time in Stockholm. Between 2014 and 2022, the proportion of tech specialists among employees increased by 1.5 percentage points in Stockholm, compared to an average of 0.4 percentage points in other counties.

[14] The Swedish Agency for Economic and Regional Growth, 2023.

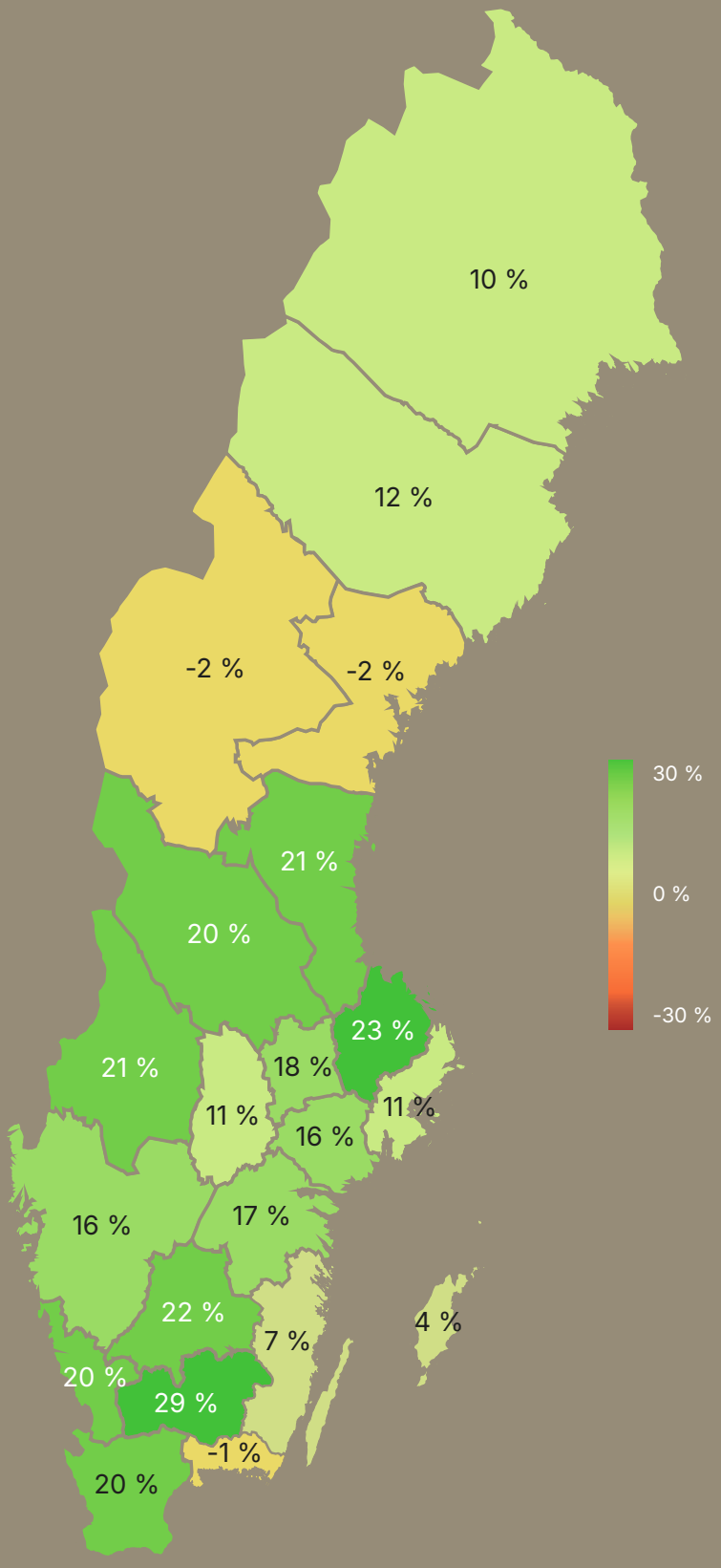
Number of people in Tech industry 2020-2024



Source: Statistics Sweden - Labour market status of the population. Refers to those employed during the second quarter.

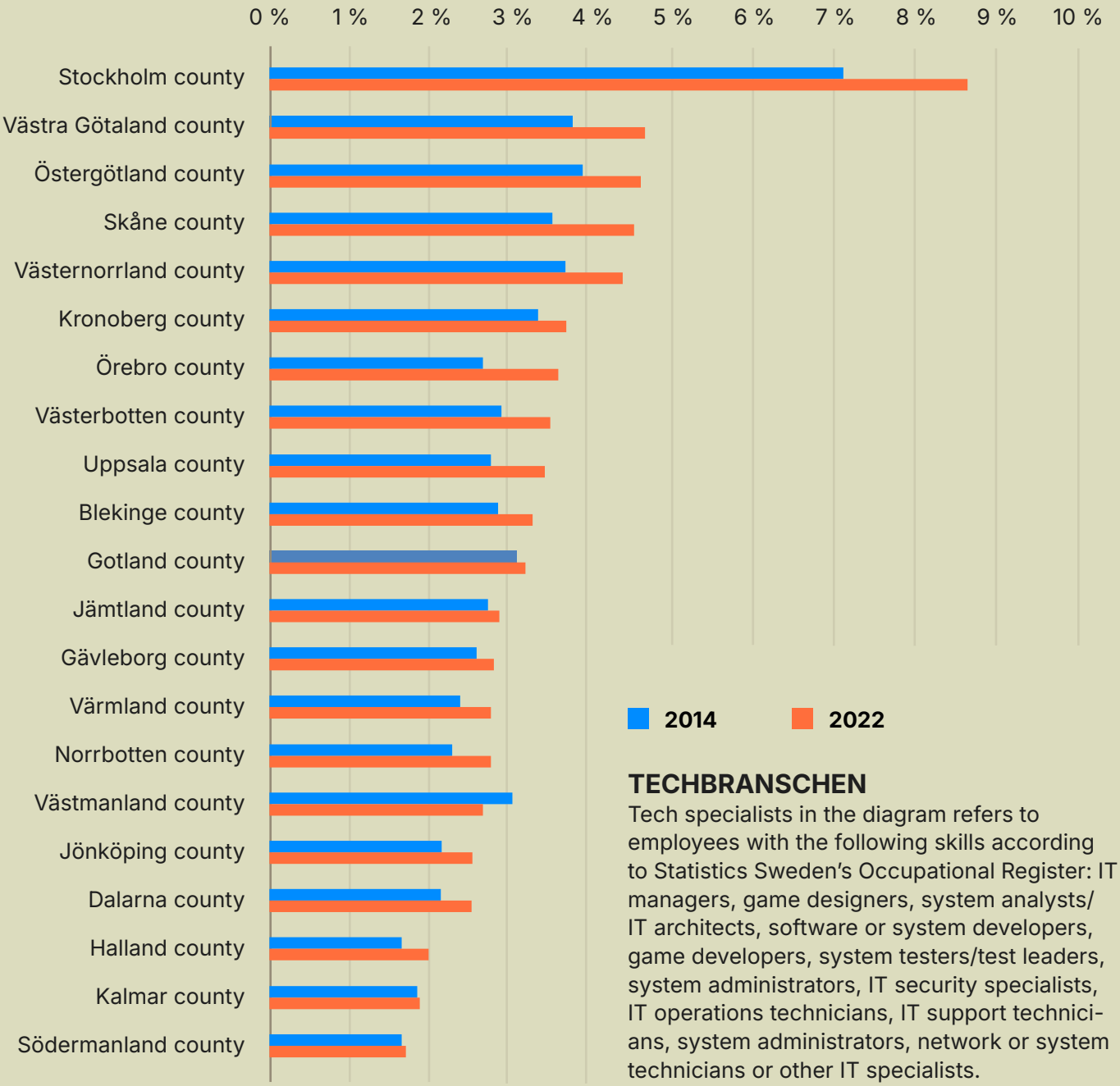
"However, since the pandemic in 2020, 32,000 new tech jobs have been added and every eighth new job has been created in the tech industry."

Employment development in Tech per county 2020-2024



Source: Statistics Sweden - Labour market status of the population.

Portion of Tech specialists among the employees in the economy



TECHBRANSCHEN

Tech specialists in the diagram refers to employees with the following skills according to Statistics Sweden's Occupational Register: IT managers, game designers, system analysts/ IT architects, software or system developers, game developers, system testers/test leaders, system administrators, IT security specialists, IT operations technicians, IT support technicians, system administrators, network or system technicians or other IT specialists.

Source: Statistics Sweden - Occupational Register

"Stockholm county has almost twice as high a proportion of tech specialists among its employees as the next best region, Västra Götaland."

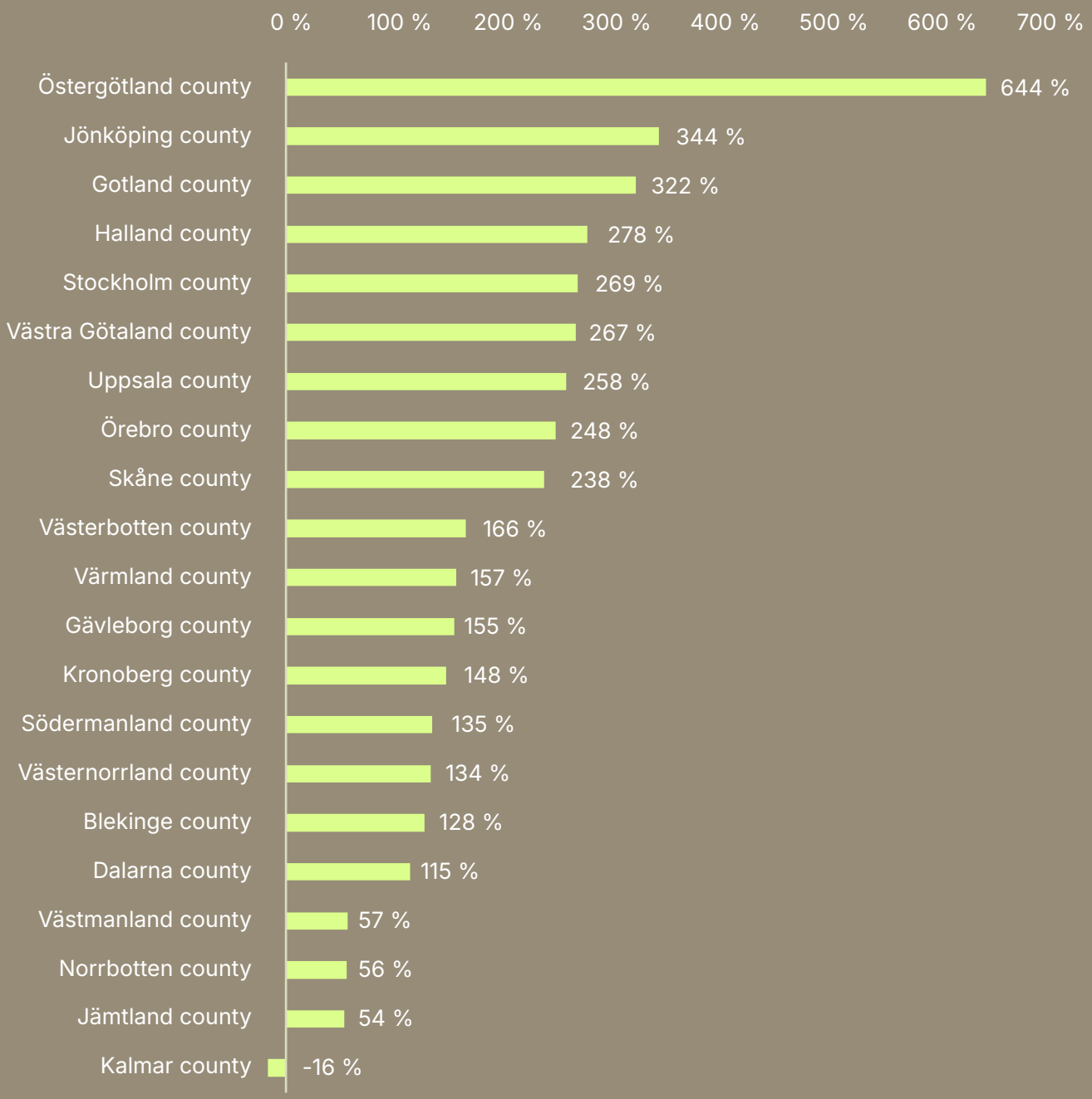
Broad tech hubs in big cities and niche clusters around the country

The development of technology and the progress of the digital economy leave a wide impression throughout the country. During the 2000s, value added increased fastest in Östergötland. Well-known technology solutions from the Östgöta plain came, for example, from Saab in defence technology and aviation, IFS in business systems, Sectra in medtech and cyber security, and Cambio, which provides IT solutions for healthcare. The county is also home to Linköping University, which has a strong focus on technical education and research.

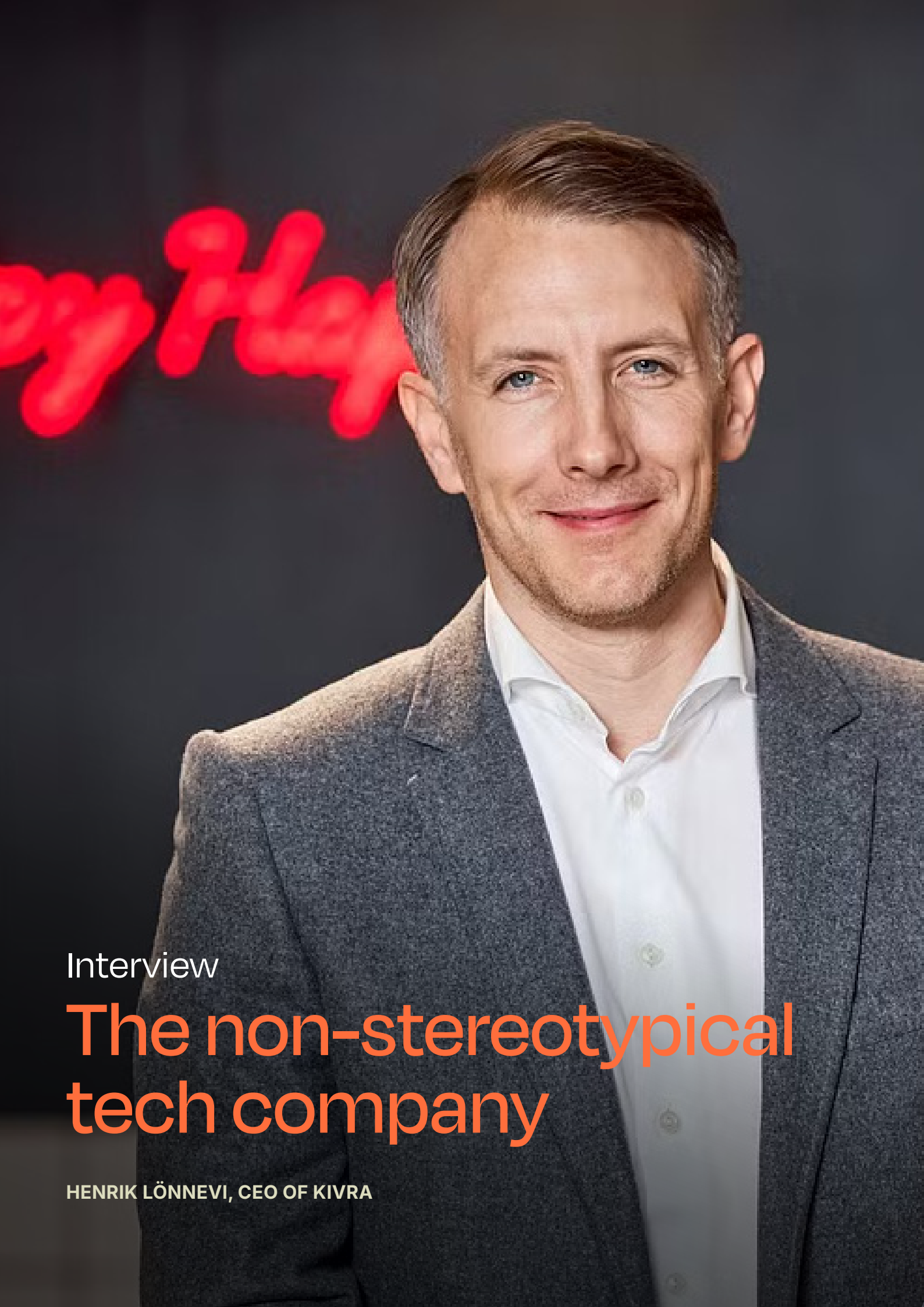
The country's metropolitan areas are otherwise the natural hubs, with strong attractions for both competence and capital. Stockholm, Västra Götaland and Skåne account for roughly three-quarters of the national growth contribution, which can be compared to the fact that roughly half of the country's inhabitants live in these areas.

A well-developed digital infrastructure and transport infrastructure, as well as smart investments in education, research and incubators, can pave the way for niche technology clusters, even in less densely populated counties. One example among many is Arctic Business in Luleå with the focus on space technology, mining and energy technology, which collaborates with Luleå University and Esrange Space Center in Kiruna . Since the pandemic, the opportunities for employers in sparsely populated regions to attract competence from the big cities have increased, through the application of hybrid models and remote working.

Value added growth within Tech 2000-2022



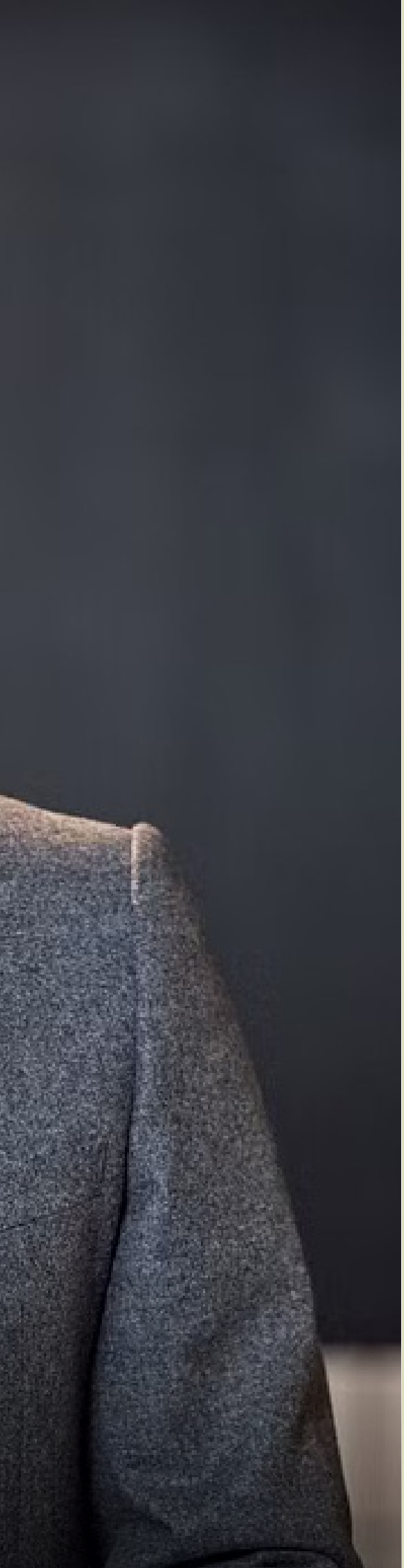
Source: Statistics Sweden - Regional Accounts. Refers to current prices.



Interview

The non-stereotypical tech company

HENRIK LÖNNEVI, CEO OF KIVRA



Kivra wants to be Sweden's largest and safest platform for "important things", as CEO Henrik Lönnevi puts it. The platform is used today by around six million Swedes and over 50,000 companies and authorities. In addition to digitised mail, a range of services are offered, including payslips, receipt storage, digital agreements, booking systems and integration with bookkeeping.

"The unique thing about Kivra is that there is no truly comparable platform in the world, which means we have no playbook to follow. We have to innovate ourselves and expand the concepts of what we are - and that is deep in our DNA," says Lönnevi.

Resilience in recession

Henrik Lönnevi describes a non-stereotypical tech company that has succeeded in combining disruption with a conservative strategy. The secret is a long-term focus on the vision, gradual building of network effects for the platform and persistence in the Swedish domestic market. The strategy has contributed to security and resilience during the already protracted recession, in a period when there is a shortage of capital in the economy.

"Many tech companies have been forced to question their business models. We have always tried to think smart about how we invest our capital, so for us it is rather a return to what we already do. We also have a broad customer base and our customers save money by using Kivra's services, which means that, relatively, we have been spared from the recession," says Lönnevi.

”One of Sweden’s strengths as a tech country is our relative small size”

Turning threats into opportunities

In a volatile world, Swedish tech companies must become increasingly fast-paced. One of Kivra’s specialities is turning threats into business opportunities, with regulations being an important example. New legislation that required individuals to be notified of completed credit reports was transformed into a digital and cost-effective business service. A similar manoeuvre was launched in the wake of GDPR:

”We have become quite good at capturing the intention behind regulations and trying to create opportunities based on that. When GDPR was introduced and many companies began to question how they sent out salary statements, we saw a chance to create a better and safer solution. Now we send out 1.8 million salary notices every month,” says Lönnevi.

Building bridges between players breeds success

One of Sweden’s strengths as a tech country is our relative small size, reasons Lönnevi. The small size makes it easier to build bridges between different players, which enables a high pace in innovation processes. A problem can be that the bridges to the public are sometimes incorrectly constructed. Until recently, a loophole in legislation made it impossible to get paid by authorities for digital – as opposed to physical – postage services, to the detriment of Kivra. However, cooperation with the public sector often works well. Lönnevi particularly highlights the Swedish Tax Agency as being ”incredibly progressive” in pursuing a simplification agenda for citizens. Lönnevi emphasises the importance of being able to build on the successes of others.

”For example, we would not have been able to build a service like ours if BankID had not succeeded as well as it did. It shows how important the ecosystem is - it is rarely one successful company alone that drives development, but when several players work together and learn from each other we become stronger as a nation and as a tech sector.”

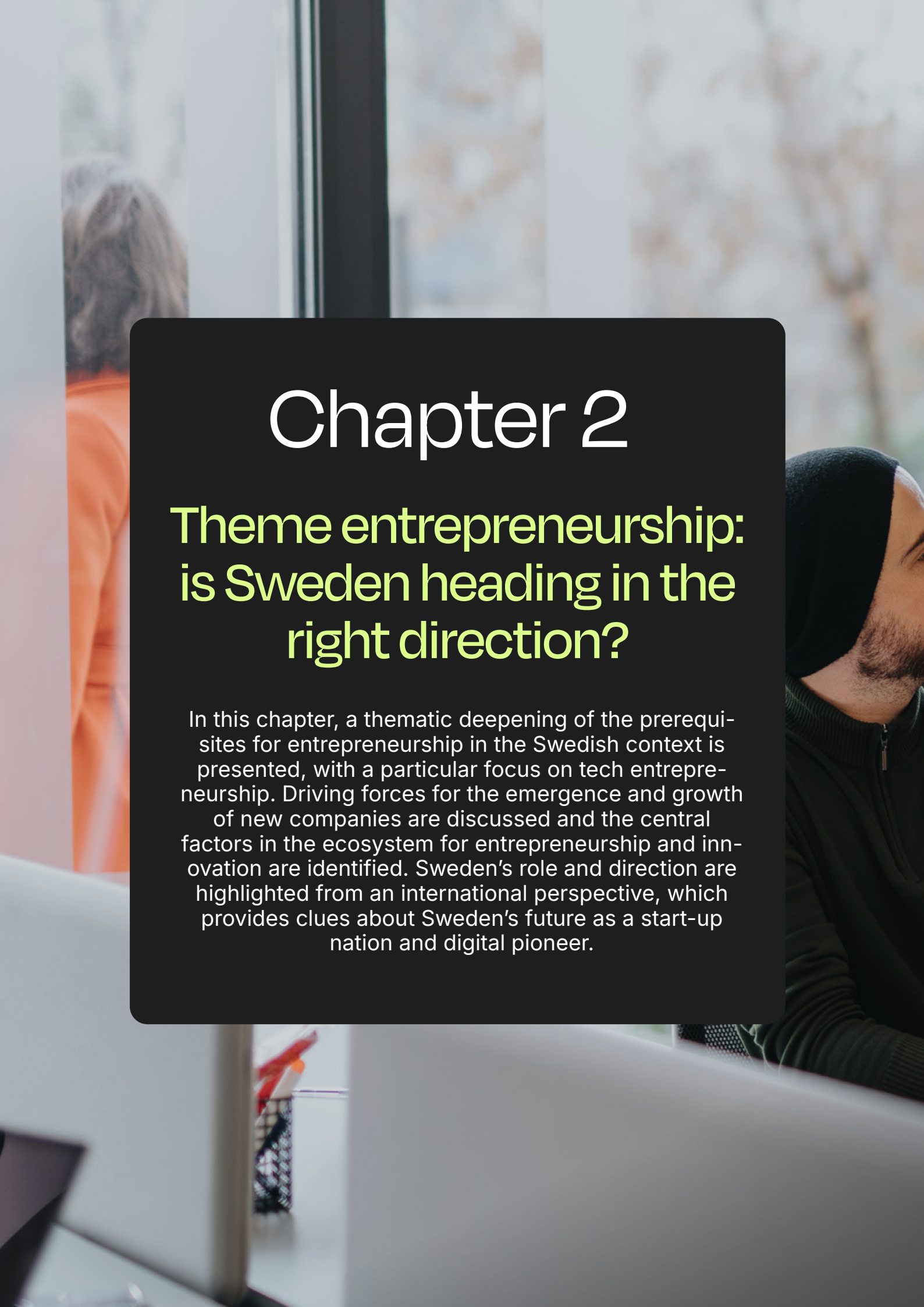
3 quick ones

to Henrik Lönnevi about...

1. **The AI Revolution:** "AI is really moving the dial for Kivra. Automation is enabled by everything from coding to incident reporting, and the user experience will be enhanced through personalisation and more dynamic features."

2. **State of the labour market:** "Three years ago, when capital was super cheap, recruitment was rampant everywhere and then it was very difficult to find the right people. Now I feel that we are finding great people who are ready to start. In that respect, the situation is better today than three years ago."

3. **Cyber Security:** "We want to create a safe bubble with verified senders and verified users. If you receive something from us, you can trust that it is from the correct sender. This security aspect increases our relevance, but also means that we must constantly stay one step ahead in our security work to continue to keep the platform safe and secure."



Chapter 2

Theme entrepreneurship: is Sweden heading in the right direction?

In this chapter, a thematic deepening of the prerequisites for entrepreneurship in the Swedish context is presented, with a particular focus on tech entrepreneurship. Driving forces for the emergence and growth of new companies are discussed and the central factors in the ecosystem for entrepreneurship and innovation are identified. Sweden's role and direction are highlighted from an international perspective, which provides clues about Sweden's future as a start-up nation and digital pioneer.


"In 2023, a total of 65,000 new companies were started in Sweden, of which approximately 5,500 were new tech companies"

Everyone is an entrepreneur – some more than others

Entrepreneurship forms a foundation of the social economy. Without new companies and innovation, productivity, employment and prosperity stagnate. A society where the role of entrepreneurship is neglected or treated harshly tends to become poorer over time – economically, socially and culturally.

Entrepreneurship has several faces in the literature. In a very broad sense, entrepreneurship can refer to the willingness and practical ability to solve problems through an alertness to opportunities in life. In some sense, we are all entrepreneurs: we all face different projects ("enterprises"), where opportunities are identified and solutions are put into action. This broad definition captures the creative, forward-looking and coordinating elements in the nature of entrepreneurship. Entrepreneurs identify the discrepancies between today's reality and tomorrow's possibilities, and then act and create solutions to concrete problems.

In the eyes of most people, however, entrepreneurship is specifically linked to the start-up and operation of (formal) businesses, especially businesses in the early stages of their development. It is also this type of entrepreneurship that is followed up in public statistics and evaluated through various surveys. In 2023, a total of 65,000 new companies were started in Sweden, of which approximately 5,500 were new tech companies.[15] Taken as a whole, this corresponds to 6.2 new companies per 1,000 inhabitants. This means a reduction in the frequency of new entrepreneurs by 11 percent compared to 2022 and 17 percent compared to the peak year 2021. One explanation for the decline since 2021 is the weakened economic situation which, together with structural factors that we shall come back to, determines how many people dare to take the plunge.

[15] Refers to new companies within SNI codes 58–63, according to statistics from Tillväxtanalys.

"Entrepreneurs identify the discrepancies between today's reality and tomorrow's possibilities, and then act and create solutions to concrete problems."

Number of new companies and Tech companies per 1000 inhabitants 2011–2023

Source: Statistics Sweden - Growth analysis

Doubling of entrepreneurship – but other countries are ahead

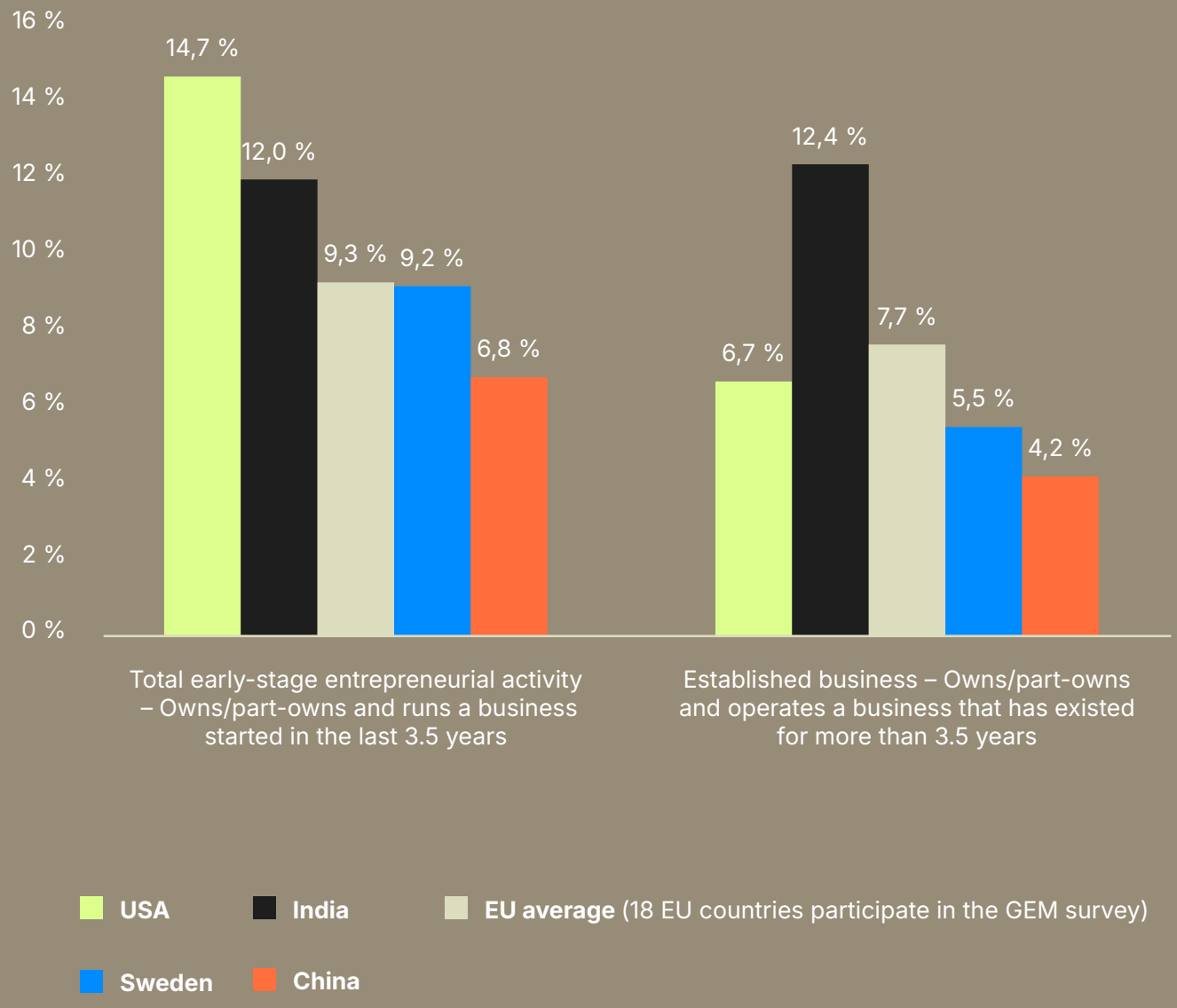
Entrepreneurial activity can be illustrated by the proportion of people of working age who own and run new businesses. Such a measurement has been specially designed within the framework of the international project Global Entrepreneurship Monitor (GEM) which focuses on the involvement in companies that have existed for up to 3.5 years.

Entrepreneurial activity has increased trend-wise in Sweden and the proportion of entrepreneurs more than doubled between 2007 and 2023.[16] This rise partly reflects an increased international interest in entrepreneurship linked to digitisation and globalisation, trends that have lowered the thresholds for starting, running and scaling up businesses. However, there are countries that are otherwise comparable to Sweden where entrepreneurship has not increased at all or only to a small extent. This mainly applies to the larger EU countries and Norway, which shows that there are also country-specific reasons that have built up a strong entrepreneurial culture in Sweden and that explain at least parts of the development.

Although the trend is positive in Sweden, the increase comes from a low level. Early-stage entrepreneurial activity is marginally lower in Sweden than the average for the EU countries included in the GEM survey – corresponding to a share of entrepreneurs of 9.2 percent in Sweden and 9.3 percent for the EU average. The EU average is, in turn, more than five percentage points lower than in the US, where the percentage of entrepreneurs is 14.7 percent. Despite this discrepancy, Sweden has produced world-class start-up companies and export successes such as Klarna, Spotify, Skype and Embracer, which shows that there is great potential in getting even more Swedes to realise good ideas and start companies

[16] Thulin et al., 2024.

Share of entrepreneurs in Sweden and other economies



Source: Thulin et al. (2024)/Global Entrepreneurship Monitor, our own calculations. Refers to the year 2023 and people between 18 and 64 years of age.

"Stockholm boasts the second most uni-corns per capita of the world's start-up hubs, after Silicon Valley."

Unicorns and deep tech are growing from Swedish stock

Technology development is increasingly taking over as the engine for global economic growth, while security policy and trade policy tensions are high on the agenda. This development has contributed to an interest in where in the world tomorrow's technology is being developed, especially in the deep tech sector, a collective term for ground-breaking and research-intensive technology. Deep tech companies develop and commercialise disruptive technology in areas such as artificial intelligence, robotics, quantum technology, nanotechnology and biotechnology. The USA produces the most deep tech companies and around a quarter of leading deep tech companies originate in Silicon Valley in California. In Sweden, the deep tech sector is growing with a strong base in the Stockholm region. However, Europe is far behind the US and China in terms of the number of companies, because the US and China can take advantage of large and uniform domestic markets that attract significantly larger investment volumes.

Another way to compare the innovation power between different entrepreneurial countries is to consider the emergence of unicorns. The term refers to fast-growing and relatively new companies with innovative business models that have reached a valuation of at least one billion US dollars without going public. According to Dealroom, Sweden produced 41 such companies between 1990 and 2023. In 2006, 2009 and 2016 respectively, the most Swedish unicorns were born - four per year. There are possibly signs of a certain saturation in the system as only two of the unicorn companies were founded after 2018. Internationally, the US also dominates this list, with nearly 1,600 unicorns.

If you instead compare the number of companies in relation to the population size, however, the picture changes radically. Israel then ends up top, with around 12 unicorns per million inhabitants, with Sweden in eighth place.[17] Israel also tops the list of the number of leading deep tech companies, in relation to population size. Stockholm boasts the second most unicorns per capita of the world's start-up hubs, after Silicon Valley.[18]

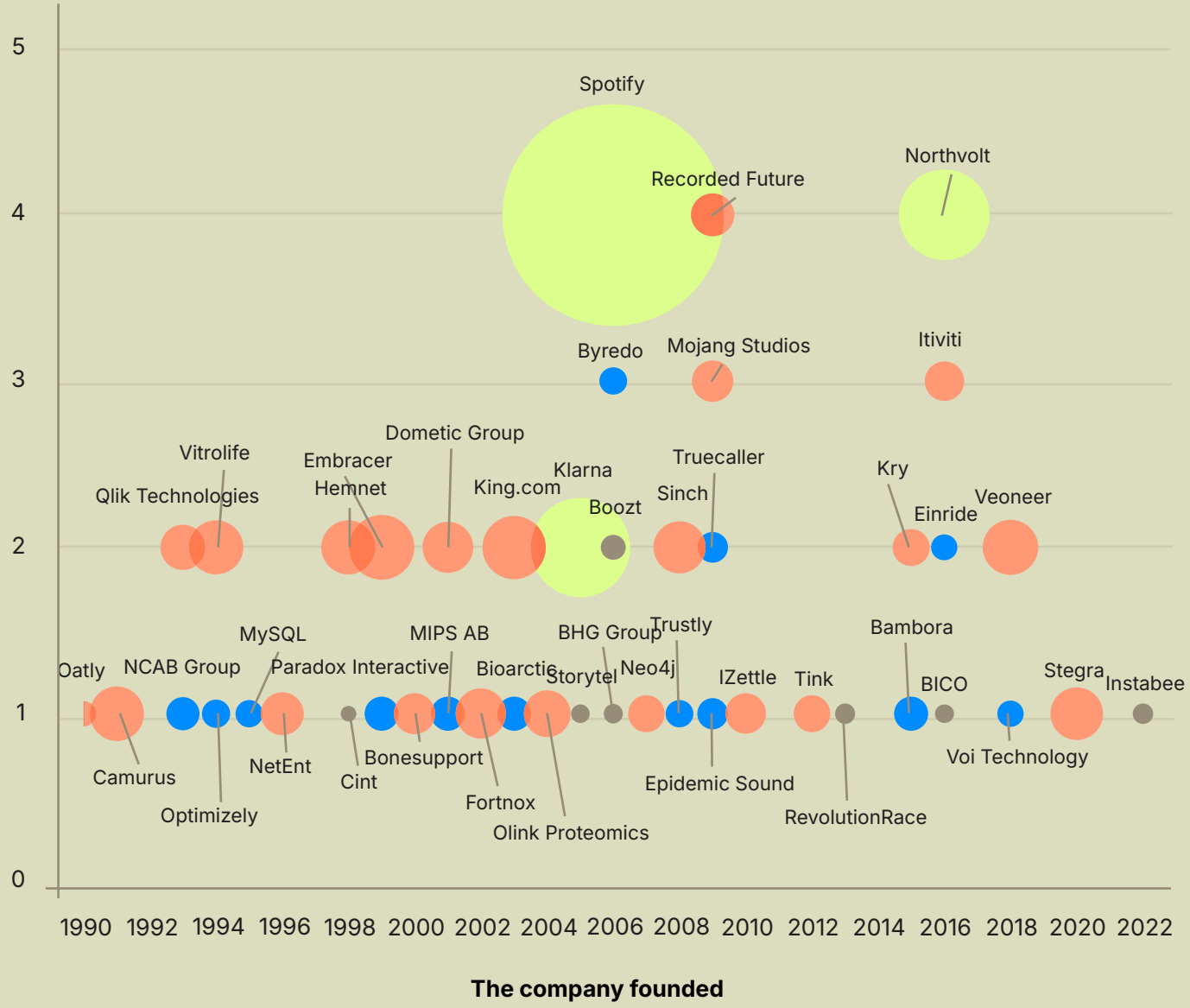
[17] According to Jesse Tinell/Medium. https://jessetinell.medium.com/unicorns-per-capita-2022-82b13edfa104

[18] Björner & Zetterberg, 2019.

Swedish unicorns based on when the companies were founded

Number of unicorns per year

Bubble size = latest available valuation of the company.
The colors divide the unicorn companies into four categories (yellow-red-blue-grey), with yellow indicating the highest valued companies and gray accommodates companies with the lowest valuations.

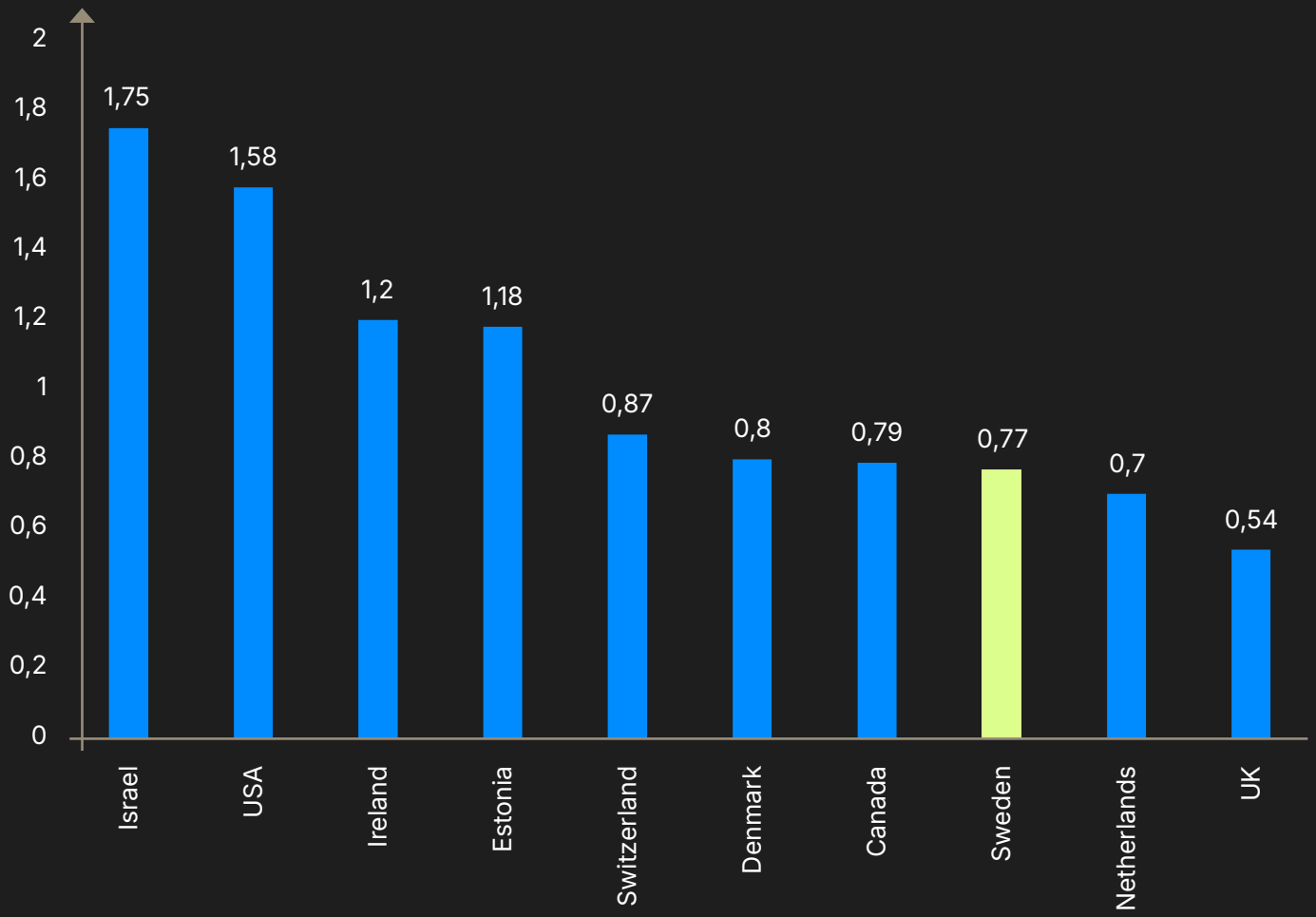


The company founded

Source: Dealroom

"Israel produces both the most leading deep tech companies and the most unicorns per inhabitant."

Number of leading global deep Tech companies per million adult population



Source: Nordic Capital/ECEPR

What drives a successful entrepreneurial ecosystem?

Research has identified a number of system factors that are significant over time for stimulating entrepreneurial creativity in an economy. Five particularly important ones are (1) access to finance, (2) access to human capital, (3) well-aligned regulations and bureaucracy, (4) good technical infrastructure, and (5) supportive social or cultural values. These factors affect all new companies and entrepreneurs, even if, for example, a company's maturity phase, industry affiliation, etc. affect exactly how and to what extent.

A central aspect is that the various system factors often interact in self-reinforcing ways, which can create ripples in the water and enable ecosystems of entrepreneurship and innovation clusters to grow rapidly once established. Likewise, deficiencies in one part of the ecosystem can lead to problems in other parts of the ecosystem.

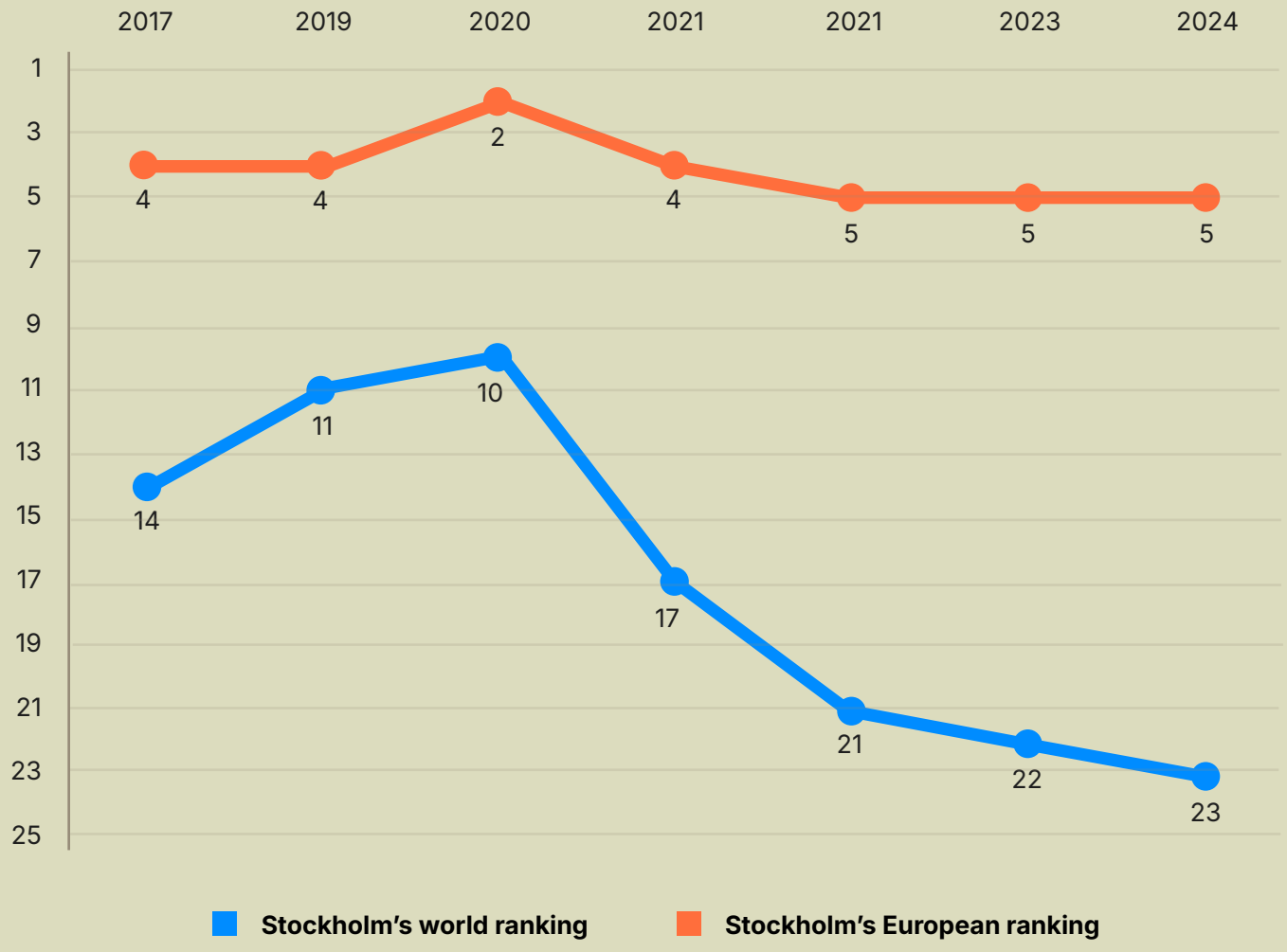
An example of self-reinforcing effects is that a positive cultural view of entrepreneurship can support regulatory simplification, which increases productivity and paves the way for more successful companies. This, in turn, can lead to even more positive norms and values around the possibilities of entrepreneurship. In the same way, good access to financing often increases the conditions for attracting and retaining human capital within the ecosystem, such as special talents and key competences. This in turn enables new innovations that enhance capital inflows and create further growth opportunities.

Stockholm's development in recent years partly illustrates this point. According to Startup Genome, which ranks the world's various start-up ecosystems, Stockholm lost thirteen positions in the world ranking between 2020 and 2024, from tenth to 23rd place. The city also dropped from second to fifth place in the European ranking and thus saw itself overtaken by Amsterdam, Berlin and Paris. A contributing factor is that access to risk capital decreased rapidly when interest rates rose during the period, which hit the interest-sensitive Swedish economy hard. In the face of fierce competition, the recession has meant that more investment and skills have been concentrated in major start-up destinations – such as London and Silicon Valley – where funding opportunities have been more stable.


Financing
Access to risk capital
Access to bank financing
Public support programs
Social and cultural values
Attitudes to success
Fear of failure
View of entrepreneurs
Legislation and bureaucracy
Regulatory burden
Tax regulations and financial incentives
Labour market regulation
Ecosystem for entrepreneurship
(basic factors with examples of subcategories)
Technical infrastructure
Broadband och connectivity
Payment system
Access to AI tools and cloud services
Human capital
Research and development
Quality of education
Attractiveness to international competence

"According to Startup Genome, which ranks the world's various start-up ecosystems, Stockholm lost thirteen positions in the world ranking between 2020 and 2024, from tenth to 23rd place"

Stockholm's ranking as a startup ecosystem



Source: Startup Genome. From the Global Startup Ecosystem Ranking. The dimensions that are evaluated are: results, financing, talent and experience, market reach and knowledge. No ranking occurred in 2018.

Interview

"We must join forces and create platforms to build innovations together"

ANNIKA RICKNE, INNOVATION RESEARCHER

Annika Rickne has a PhD in Technology Management and is Professor of innovation, entrepreneurship and industrial dynamics at Linköping University. She is one of Sweden's foremost experts on entrepreneurship within technology-based organisations and analyses innovation processes at different levels to draw conclusions for strategy and policy.

Entrepreneurship – process, ability and power to change

Annika Rickne describes entrepreneurship as a phenomenon with three dimensions: a process, an ability and a force for change in society. Entrepreneurs identify opportunities, create products and lead growth (process). Entrepreneurs also possess abilities that contribute to success – for example, action and the management of risk – often with the help of skills that are spread across a team with a clear division of roles. Finally, entrepreneurship is a force for change that enables innovations and technological development, linking players with resources and solving societal challenges.

Knowledge transfer and learning a success factor

According to Rickne, successful ecosystems for entrepreneurship are characterised by strong networks and open knowledge flows between different types of players, which creates a dynamic environment where resources and competence work together. She uses the example of Astra's development of the stomach ulcer drug, Losec, which she believes was partly made possible by informal collaborations and spontaneous discussions between the company and co-located researchers. In their own research, the same type of network phenomenon has been identified as a critical success factor:

"In my early research, I compared two regions in the US, Massachusetts and Ohio, both of which had similar conditions in terms of research level, companies and surrounding business structure. What differed was how innovations and companies developed. In Massachusetts, companies grew faster and innovations were more numerous. The explanation lay, for example, in a strong culture of knowledge exchange and cooperation between the players. In Massachusetts, companies and researchers were co-located, they had full exposure to each other, went to the same breakfast meetings and seminars and there was an openness to recruit from each other. In Ohio, on the other hand, the players had

less exposure to each other and did not always see themselves as parts of the same industry or technology area.”

Rickne believes that this type of cooperation in certain situations has become more difficult to achieve in Sweden. Research funding has become more erratic and project-based and is thus vulnerable to funding fluctuations. At the same time, innovation processes between companies and their partners, even collaborations at a regional level, are sometimes slowed down by the increased degree of international ownership in the companies, for example, or by bureaucratic obstacles around increasingly complex agreements.

Sweden’s growth journey is threatened by a skills and capital shortage

Annika Rickne emphasises that Sweden has fundamentally good conditions and a strong culture of business building. The country ranks high in global innovation indexes and Stockholm is an important tech hub. However, certain challenges must be addressed in order for Sweden to reach higher levels amid the intensifying competition. It is largely about increasing the flow of the right skills and capital to manage innovations and entrepreneurs’ good ideas.

“We are not as good at scaling up our companies as we are at creating them, partly due to a lack of skilled labour and difficulties in accessing growth capital, not least in the intermediate phases of innovation and early commercialisation. Many small businesses fail to grow into medium or large businesses. Other companies are forced to look for capital and opportunities internationally, which sometimes leads to them moving abroad,” notes Rickne.

There are several strategies that can counteract the lack of competence in the tech and entrepreneurial nation of Sweden. Rickne highlights that the education system needs to be better adapted to the needs of the labour market, especially in technology-intensive areas. She also emphasises that mobility between academia and business needs to be greater and that existing skills can be used more effectively, for example the investment in female entrepreneurs in Sweden can be improved.

The importance of international profiling

Annika Rickne thinks that Sweden should have high ambitions. High on the wish list is that entrepreneurship should pervade the educational system and universities in order to promote innovation on a broad front - the emergence of ”entrepreneur-driven universities”.

On a strategic level, she emphasises the importance of international profiling, visibility and communication to attract long-term investments and maintain the base for innovation and entrepreneurship within the country. This can be particularly significant within niche technology clusters where an international influx of specific and/or technologically advanced skills is required for the companies to flourish. Rickne gives the example of how Sweden created a cluster in visualisation and image analysis as a result of purposeful collaborative work, which was one of the pieces of the puzzle in the American space technology company, Maxar Technologies, known for its high-resolution satellite images for 3D maps, establishing itself in Sweden. The gaming sector is another success story. Sweden has organically become an important international hub for international talent, drawn to a business cluster around companies such as King, Mojang, Paradox, DICE and Embracer. Annika Rickne’s call is clear:

”We must join forces in certain areas and create platforms where we can build innovations together. It’s about profiling ourselves internationally in the areas where we have strong competence, and thereby attracting both capital and talent to Sweden”

Venture capital – the cornerstone of entrepreneurs' financing

Financing means that someone, either the owner or an external party, provides savings capital to invest in a business. Companies need financing in different phases of their development. These phases can be roughly divided into start-up phase , growth phase and maturity phase .

In the start-up phase, it is usually the owner's own savings that enable the share capital, initial investments such as inventory as well as that the owner can spend time working on the company before it has produced any income. Start-up capital can also come from "informal venture capital" from friends and acquaintances, angel investments from an external venture capitalist, crowdfunding or public support programs through, for example, Almi or Vinnova. The basic purpose of the funding is to transform ideas into concrete products.

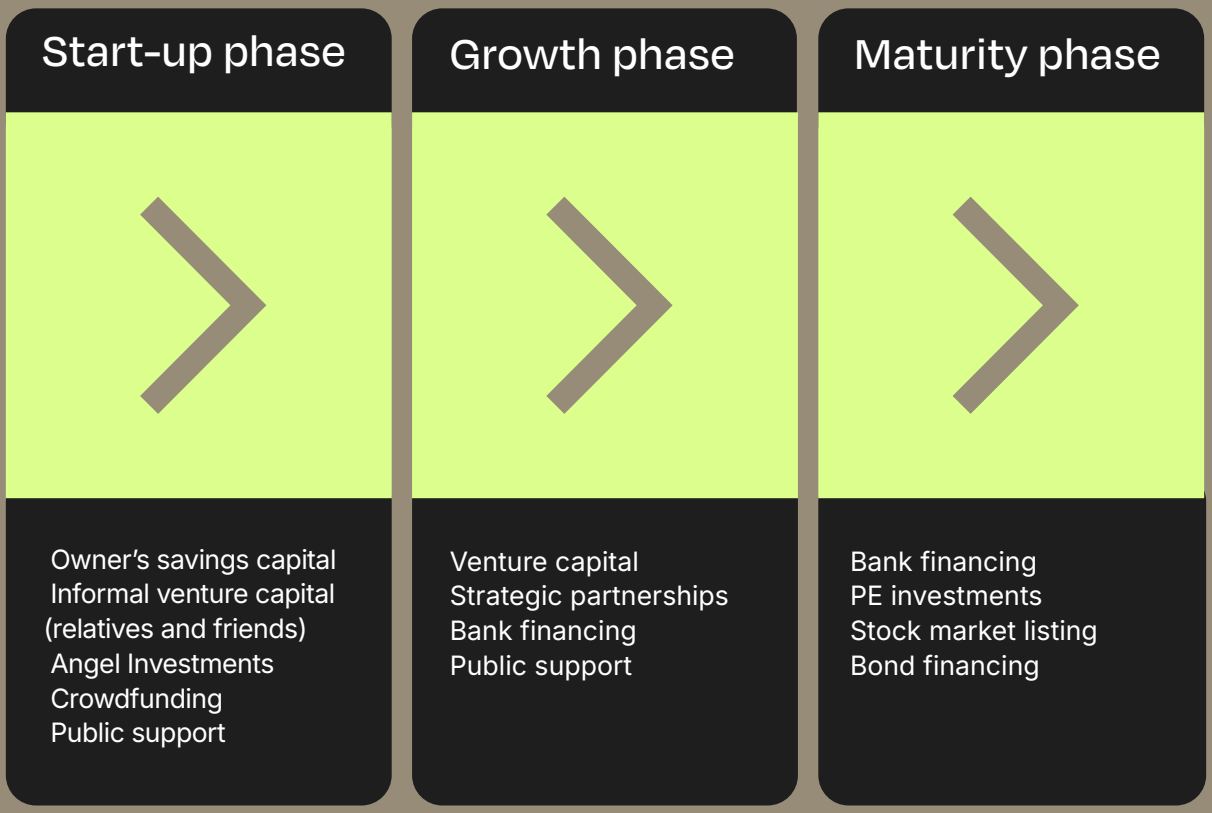
Once the company has a developed product and has proven its business model, a growth phase begins. Then new risk capital is often needed - venture capital ("VC capital") – to scale up and commercialise the business. Another common way to finance the growth phase is strategic partnerships, where the young company shares resources with another, often more established, company. It can be about capital, technology, distribution or collaborations in research and development. In the growth phase, the company has generally started to generate income, which means that it may also be able to seek traditional bank financing.

A company that succeeds in its growth journey eventually enters a maturity phase . At this stage, the company often produces reliable income, which creates the conditions for sustained profitability. In the maturity phase, bank financing usually becomes an increasingly important component, but also private equity capital ("PE capital") is relatively common, which means that a venture capital company invests, often in combination with efforts that contribute to streamlining the operation of the company. Additional forms of financing that occur in the maturity phase are stock market listings or borrowing on the capital market, via the issue of bonds, for example.

Access to risk capital in Sweden increased strongly until 2021 when fast-growing Swedish companies took in EUR 8.3 billion in venture capital, a figure that had decreased to EUR 4.7 billion by 2023.[19] In addition to the rise in interest rates and the fact that the boom has turned into a recession, there are also signs that Sweden has gradually lost ground among venture capital investors. According to an attractiveness index from the IESE Business School, Sweden has dropped from ninth to 28th place in this regard over the past ten-year period. The gap to both the world number one, the USA, and the European number one, Great Britain, has widened considerably. It is considered relatively difficult to obtain growth capital in Sweden to scale up and internationalise relatively mature companies. In addition, the recession that began in 2022 has weakened Sweden's attractiveness. Rising interest rates and interest-sensitive households and companies in Sweden led to worse growth conditions in Sweden than in large parts of the rest of the world. This, in combination with the limited size and liquidity of the Swedish market, has led to capital moving to other countries.

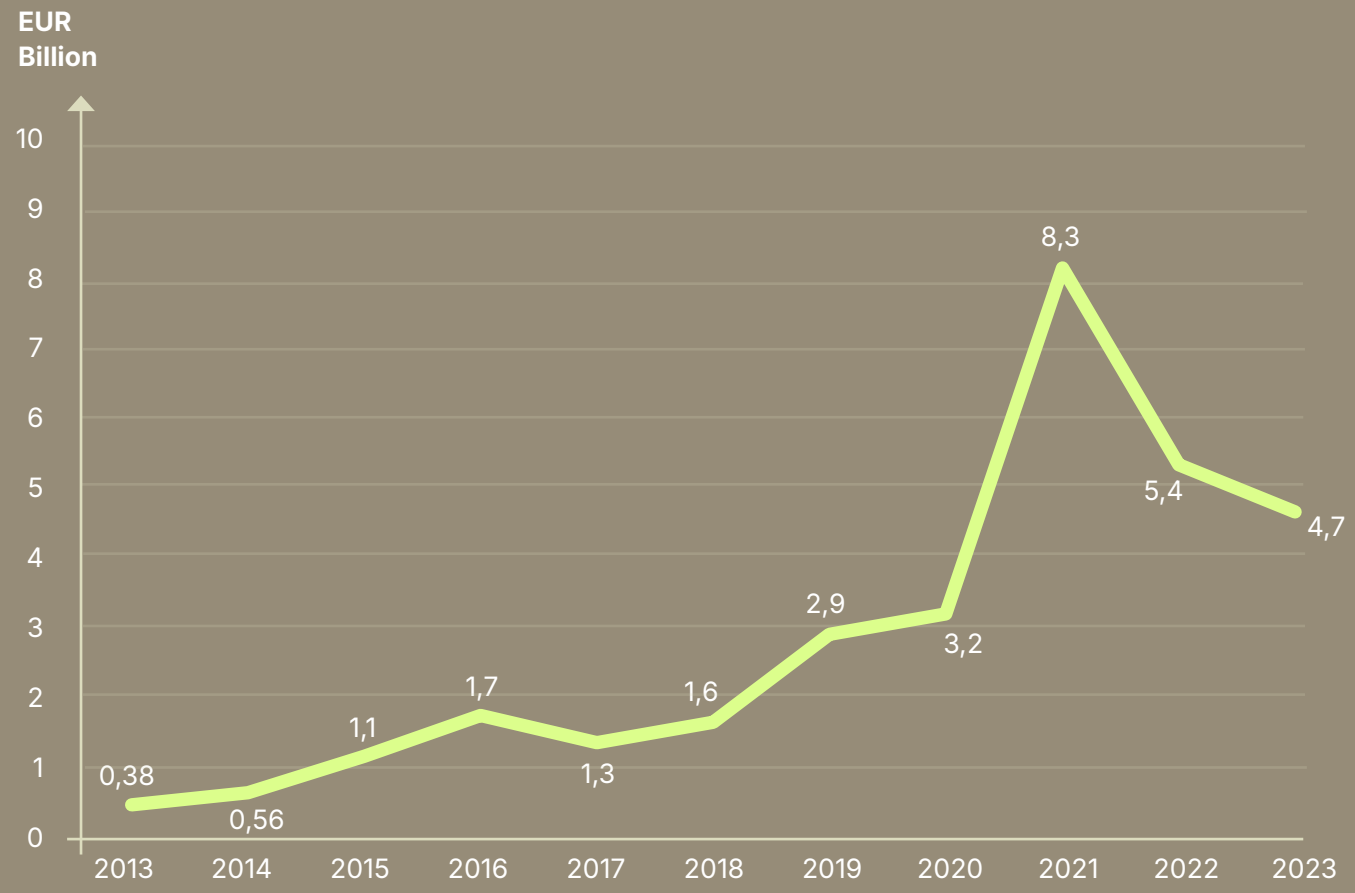
[19] Dealroom, 2024.

Some of the most relevant forms of financing in a company's different phases



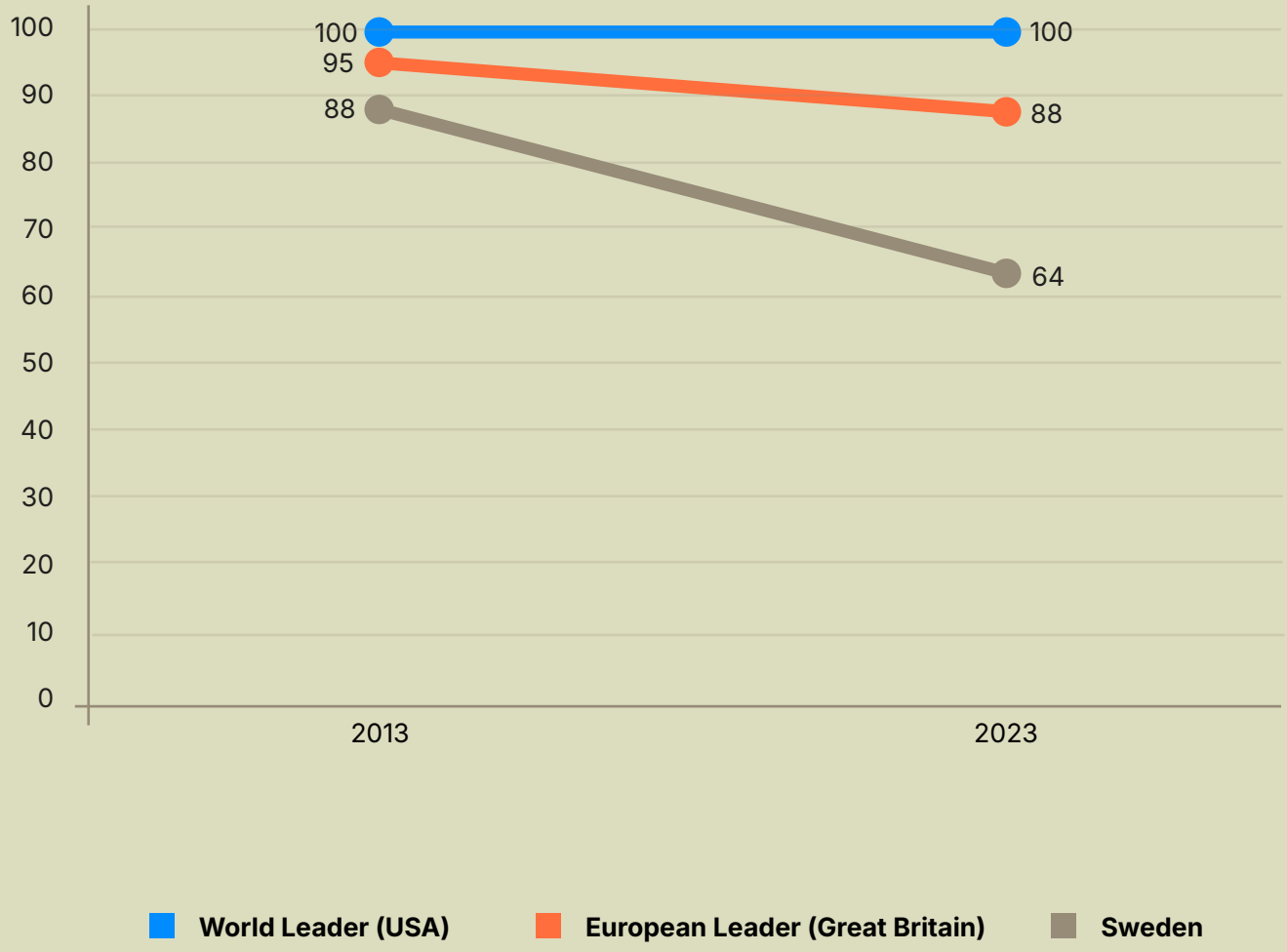
"According to the IESE Business School's attractiveness index for risk capital, Sweden has fallen from 9th to 28th place during the last ten-year period."

Venture capital investments in young Swedish companies 2013–2023



Source: Dealroom. Refers to investments in companies with headquarters in Sweden.

Attractiveness index for venture capital investors in 2013 and 2023



Source: The Venture Capital and Private Equity Country Attractiveness Index. Index scale 1–100, where 100 indicates the world leader's attractiveness.

Human capital – raising ambition is required in order to be a competitive knowledge nation

The concept of human capital refers to knowledge, education and skills that people possess and that can contribute to value creation in the economy. This capital is refined through research and development, the population's education and know-how, as well as the attractiveness of the ecosystem to international competence.

The World Bank combines the population's education and health into a "human capital index" that predicts the future productivity of young citizens. Sweden's latest index value of 0.8 means that children born in Sweden are expected to achieve 80 percent of the theoretical productive potential in the labour market that would be achieved if the entire population had complete high-quality schooling and intact health. Looking at the development between 2010 and 2020[20] advanced Sweden from thirteenth to eighth place in the world according to this index. The gap to the world number one, Singapore, narrowed and the gap to the European number one, Finland, was almost completely eliminated.

It is no coincidence that research nations such as the USA, South Korea, Israel and Sweden are also strong start-up countries . Sweden ranks fourth among the OECD countries in terms of the size of investments in research and development, including both private and public funds and seen as a share of GDP. Sweden's high position is largely due to private investments. The public grants correspond to a quarter of the total, or just under 0.8 percent of GDP. An increase in ambition is required so that Sweden does not fall behind. For example, Finland's goal for 2030 is for investment to amount to four percent, of which a third - that is, 1.33 percent of GDP - must be matched by public grants.

The relevance of the research is crucial. Research policy in Sweden has long been characterised by breadth rather than excellence. In addition to the size and quality of investment, it is crucial that companies collaborate with academic institutions to create an environment where skills are nurtured and innovations are enabled. Relevant research and education programs not only attract domestic talent but also international talent. For a country like Sweden, it is important to create the conditions for talent to remain in the country after doing research. However, there is potential for improvement on this point in Sweden, because only 42 percent of foreign doctoral students remain in the country in the third year after completing their doctorate.[21] Measures are needed to attract and retain this competence in Sweden, which could enable many future entrepreneurial projects that would otherwise not come to fruition.

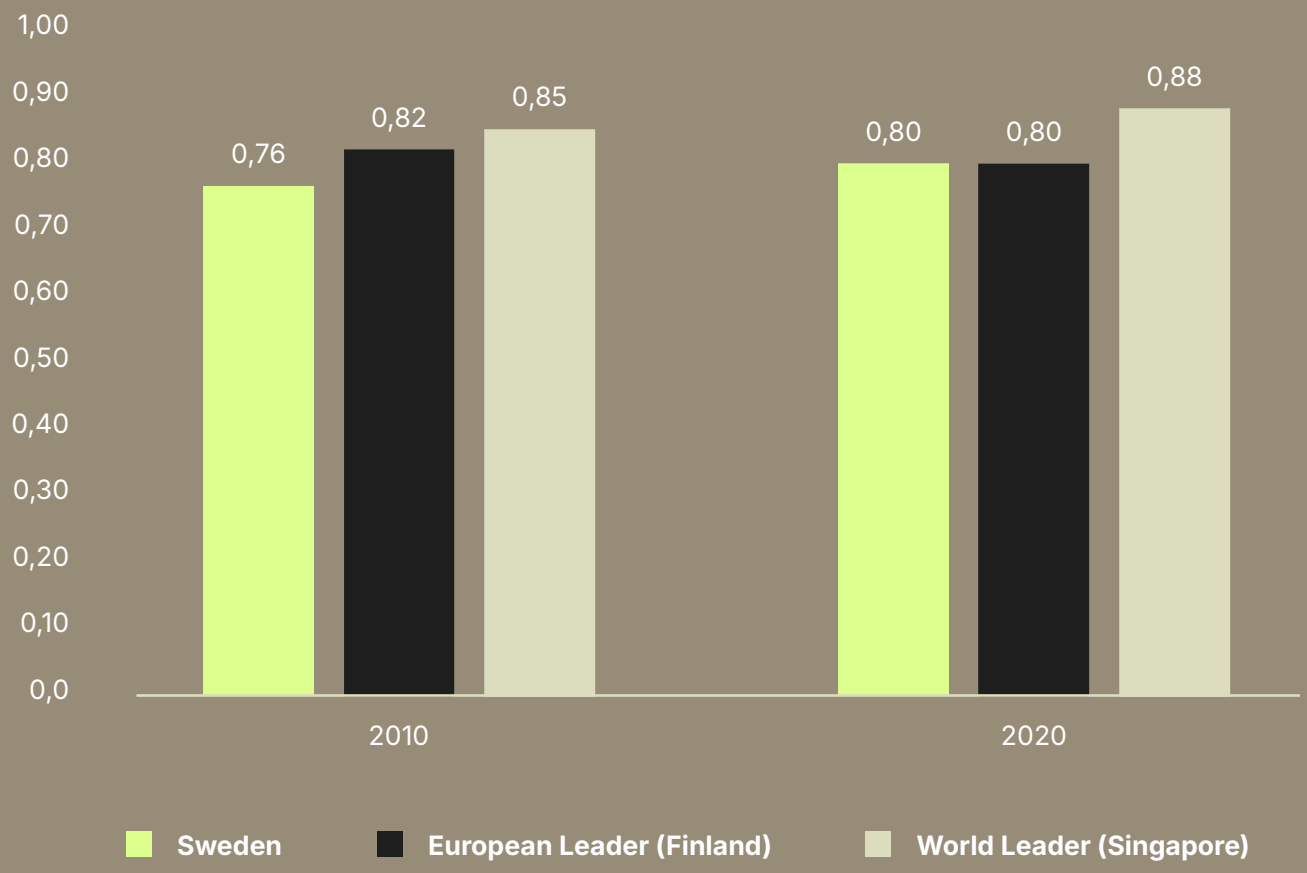
Even if the education system does not always manage to adapt to technological development and the fast-changing reality of companies, entrepreneurship is on the academic institutions' radar. Close to three-quarters of Swedish universities offer some form of education in specific entrepreneurship. The only ones that do not offer such training are specialised higher education institutions such as the Swedish Defence University.[22]

The bottlenecks on the competence side do not seem to be so much about a general lack of human capital or knowledge about entrepreneurship. For tech companies, it is rather about access to the right specialist skills, through, among other things, the education system, quality and relevance in research, sharpened collaboration with research and an increase in knowledge specifically linked to technology and digitisation. It is also about international attractiveness. In many cases, Sweden's good reputation, high standard of living and strong social safety net are not enough to attract the greatest international talents. Financial parameters often weigh in, for example lower marginal taxes, attractive options programs and higher specialist salaries in the US, UK and Asia.

[20] 2020 constituted the latest available data year at the time of production of this report.
[21] University Chancellor's Office (2021).
[22] McKelvey & Zhang (2016).

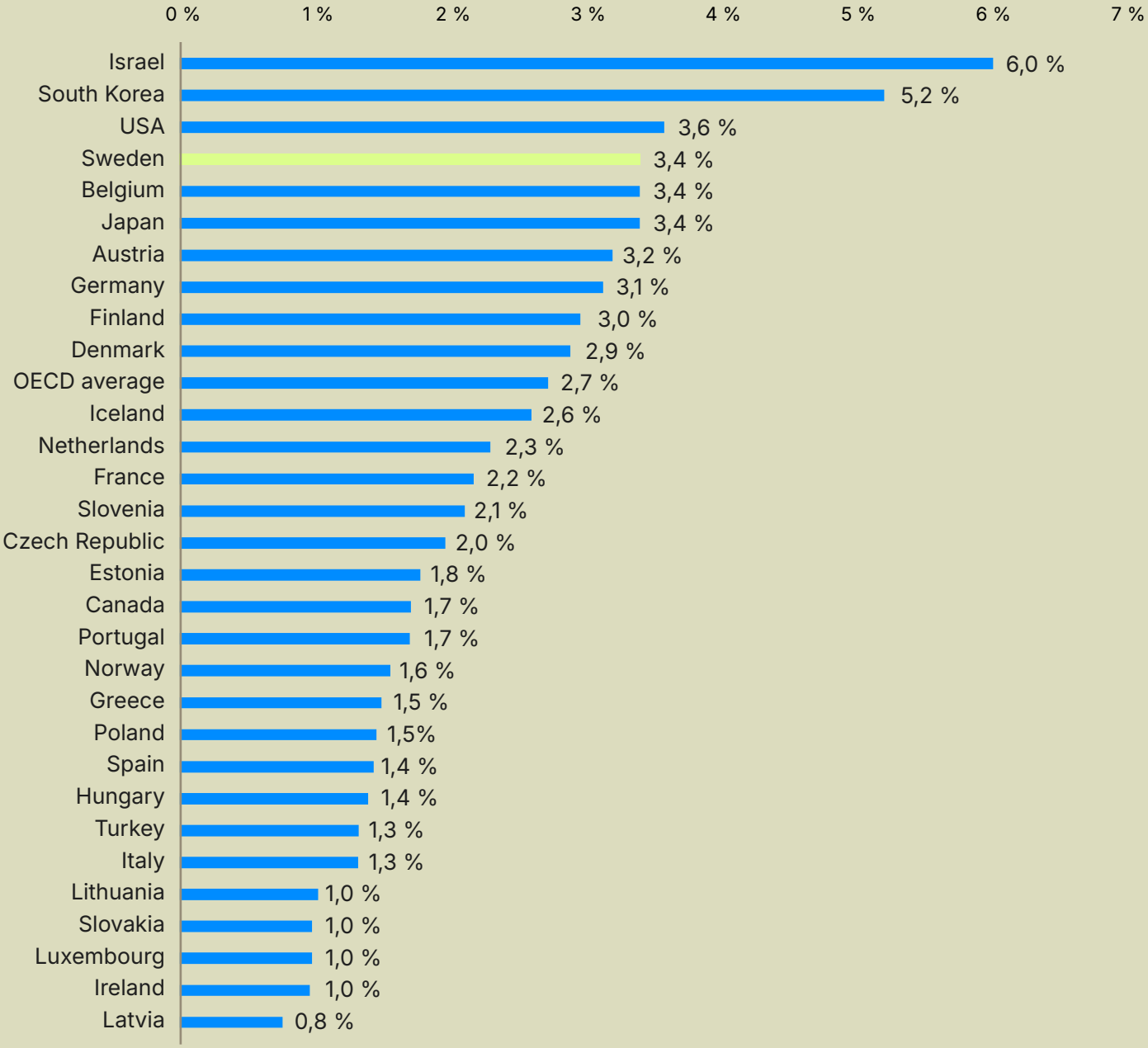
"Looking at the development between 2010 and 2020, Sweden advanced from thirteenth to eighth place according to the World Bank's human capital index"

The World Bank's Human Capital Index 2010 and 2020



Source: The World Bank. The World Bank's Human Capital Index 2010 and 2020. An index value of 1 means that all newborn citizens are expected to reach 100 percent of the productivity they would achieve in working life with full, good-quality schooling and intact health.

Gross investment in research and development, as share of GDP



Source: OECD. Refers to both privately and publicly funded research, in 2022.

Tension between regulations and opportunities

Entrepreneurship aims to break new ground and explore new courses of action to create economic value. At the same time, regulations exist almost by definition to limit the course of action of citizens and businesses. Therefore, there is a certain tension between entrepreneurship and regulations, which can inhibit entrepreneurial creativity and – by extension – the development and introduction of new technologies. This is especially true if the entrepreneurs perceive the regulations as cumbersome, inconsistent or arbitrary.

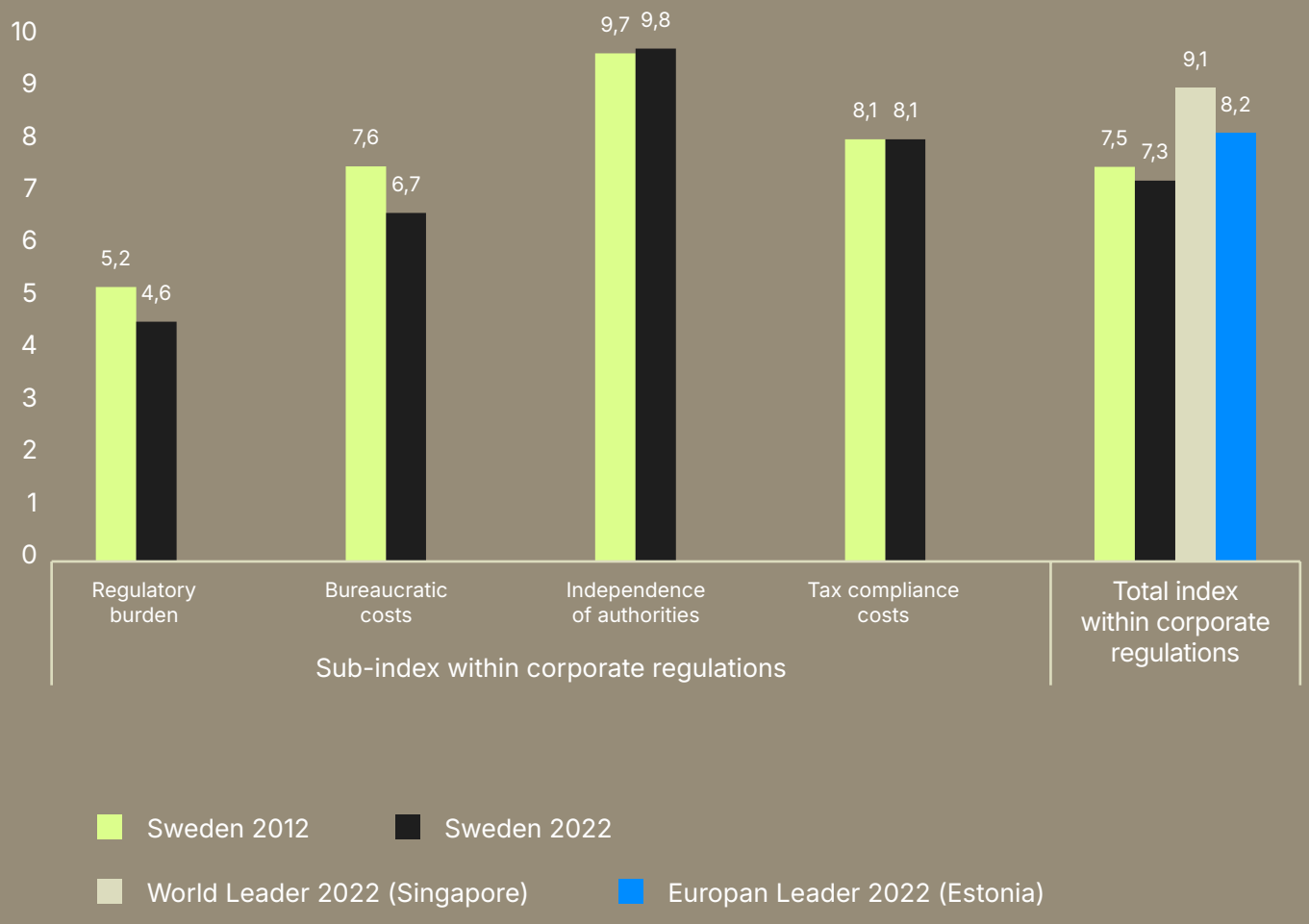
The Swedish Agency for Economic and Regional Growth estimates Swedish companies' regulatory costs in 2022 at SEK 378 billion.[23] Swedish Business and Industry gives an estimate for the regulatory burden of at least SEK 200 billion[24]. Taken together, these estimates point to a cost corresponding to between three and seven percent of GDP. There is thus great potential to stimulate entrepreneurship and growth by simplifying the bureaucracy surrounding business. Measures that can help include shortened processing times for business start-ups and permit examinations, improved regulations for limited liability companies, promotion of labour market mobility and protection of ownership rights for minority owners. In 2024, the Swedish government appointed a "simplification council" at the Swedish Agency for Economic and Regional Growth with the task of identifying and proposing regulatory simplifications in order to reduce companies' regulatory burden and costs.

There are several international ranking lists for how well different countries stand in the area of regulation in relation to supporting entrepreneurship and innovation. The Fraser Institute produces an index that specifically captures corporate regulations. The index takes into account the regulatory burden, the costs of bureaucracy and the costs of tax compliance, among other things. Sweden has regressed slightly over the last ten-year period recorded by the index (2012–2022), from 12th to 16th place in the world. For 2022, Sweden is assigned a score of 7.3 on a ten-point scale, where 10 indicates maximum economic freedom. Singapore tops the list and is the only country with a score above 9. A country in Sweden's immediate vicinity, Estonia, has sailed up to second place through aggressive investment in digitisation and elimination of bureaucracy. Sweden's development between 2012 and 2022 confirms that there is great potential to ease the regulatory burden on companies and reduce the costs of bureaucracy, a problem that weighs heavily on Swedish companies and which has also grown in scope during the comparison period.

[23] Swedish Agency for Economic and Regional Growth, 2024.
[24] Swedish Business, 2022.

"The Swedish Agency for Economic and Regional Growth estimates regulatory costs to Swedish companies at SEK 378 billion."

The Swedish business climate regarding business regulations



Source: Fraser Institute. Index values, where 0 indicates a restricted business climate and 10 indicates a free business climate.

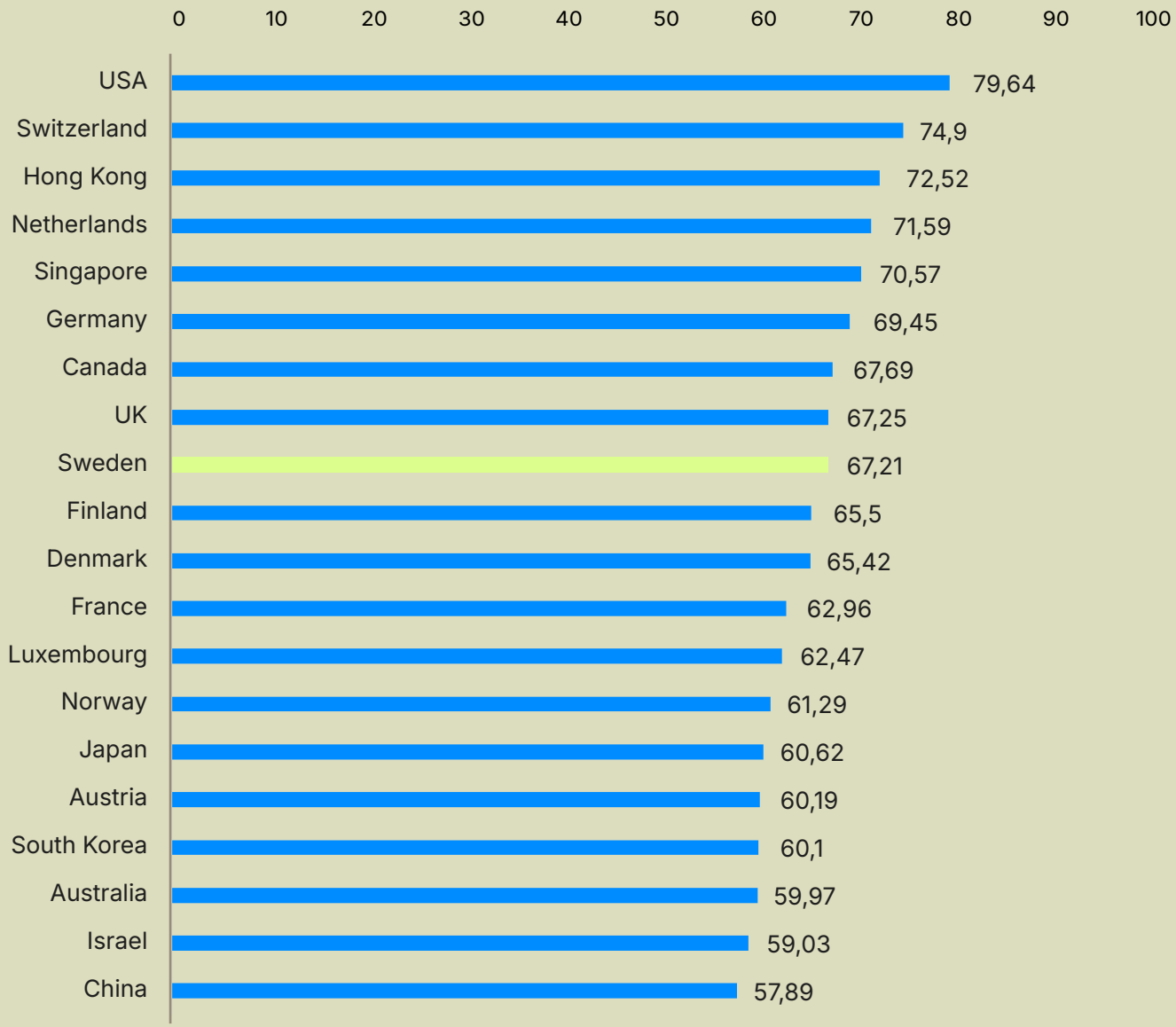
Modern technology infrastructure essential for scalable growth

The technological infrastructure includes basic services that are essential for innovation and commercialisation in an entrepreneurial ecosystem. Among other things, it is about connectivity through fast, affordable and secure network connections, access to emerging key technology such as cloud services and AI tools, but also a functioning traditional infrastructure, with reliable electricity grids, reliable payment systems and efficient communications.

That the infrastructure is not only robust but also digitally developed is becoming increasingly important for the business climate. Digitisation enables entrepreneurs to keep operating costs down through, among other things, the automation of administration and the use of digital collaboration tools. At least as important, however, is that the business opportunities increase through digital platforms and digital marketing, for example, and through the fact that the business can be quickly scaled up without compromising on product quality.

According to the Network Readiness Index from the Portulans Institute, Sweden ranks ninth in the world in terms of technology infrastructure, which includes access, adoption rate, quality and affordability of the digital infrastructure. The US tops the list, ahead of Switzerland and Hong Kong. Sweden ends up in bronze place in the world in terms of the country's opportunities to make use of future technology, measured as a balance of adoption rate of, and investments in, emerging technologies, robot density and software investments. On the other hand, Sweden has potential for improvement in terms of access to digital technology and connectivity. In this area, the availability of fast fibre networks, the international bandwidth capacity and the domestic price level of smartphones are considered less competitive.

Network readiness index



Källa: Portulans Institute. Subcomponent ”technology pillar”, which measures the accessibility, adoption rate, quality, affordability and security of the digital and technical infrastructure. Index scale 1-100. Refers to the year 2023.

Supporting social and cultural values

Starting a business is a personal decision, but the social and cultural values that characterise a society can either encourage the individual or put a damper on the wheels. Different cultural approaches to entrepreneurs, the availability of role models and attitudes to risk and success are some of the parameters that differ between different societies and affect the number of entrepreneurs who emerge and succeed. Surveys show that Swedes generally experience good opportunities to start a business, partly as a result of a favourable culture and good institutions. In 2013, Sweden was European champion in this respect, but in 2023 the throne had been taken over by Poland, where the opportunities for entrepreneurship were perceived to be even greater.

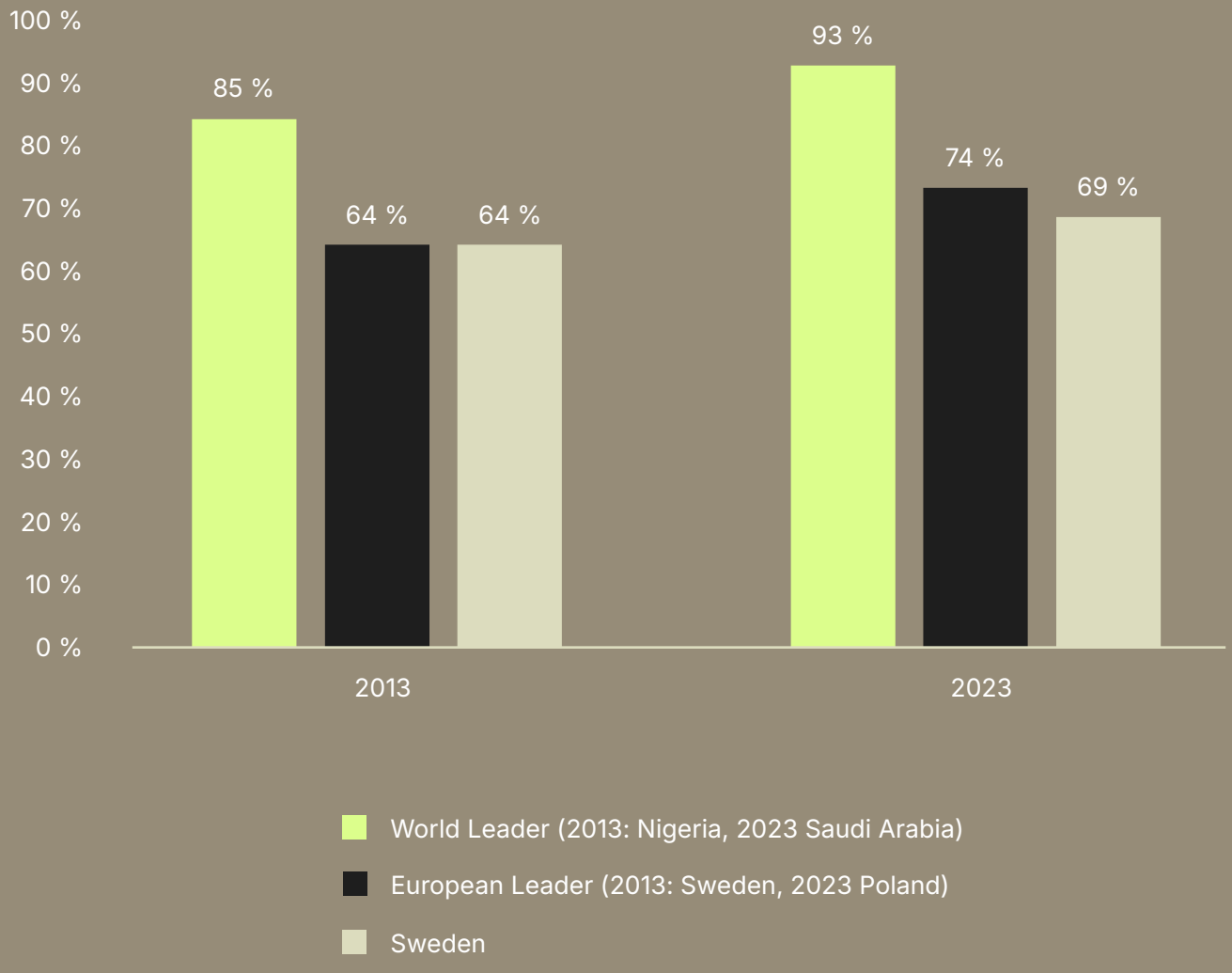
In Sweden's case, there was a clear increase in the population's perceived opportunities to start a business between 2003 and 2011, when the number of actual business start-ups also increased.[25] This is probably due to both digitisation and a number of reforms that were aimed at companies during these years. For example, online company declarations became possible in 2002 and the Swedish Companies Registration Office launched a digital service to facilitate company registration in 2004. Politically speaking, employer contributions were reduced during the period – including through sharp reductions for young people in 2007 and 2009 – and in 2010 the capital requirement for limited companies was lowered and the audit duty for the smallest companies was abolished.

According to the Global Entrepreneurship Monitor, the fear of failure is a obstacle to starting a new business, especially among women. This type of fear has slowly but surely increased in Sweden and in many other countries during the 21st century, which is a worrying sign that should raise questions. Fostering a culture that tolerates failure and reducing the social and economic costs of failure can therefore form an important piece of the puzzle to reverse the trend and pave the way for even more success stories.

[25] According to the Global Entrepreneurship Monitor (GEM).

Perceived opportunities to start a business

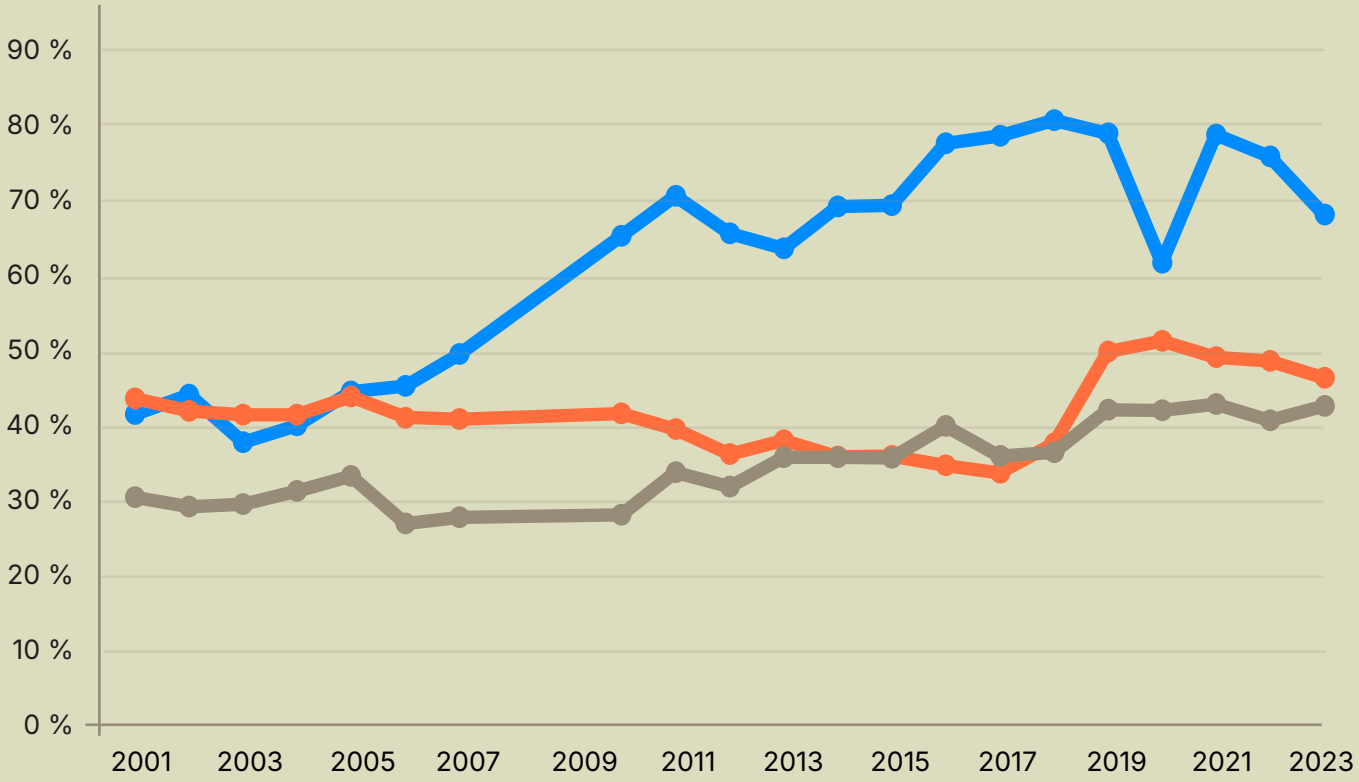
Refers to the proportion of people between the ages of 18 and 64 (excluding active entrepreneurs) who experience good opportunities to start a business.



Source: Global Entrepreneurship Monitor. Refers to the proportion of people between the ages of 18 and 64 (excluding active entrepreneurs) who experience good opportunities to start a business.

"Fear of failure is a major obstacle to starting a new business, especially among women. This type of fear has slowly but surely increased in Sweden and in many other countries during the 21st century, which is a worrying sign that should raise questions."

Attitudes towards entrepreneurship in Sweden 2001–2023



- Perceived opportunities (see good opportunities to start a business)
- Perceived ability (considers to have sufficient skills and knowledge to start a business)
- Fear of failure (indicates that a fear of failure would prevent them from starting a business)

Source: Global Entrepreneurship Monitor. Refers to the proportion of people aged between 18 and 64, excluding active entrepreneurs. Data for 2008 and 2009 respectively are missing because Sweden did not participate in the survey.

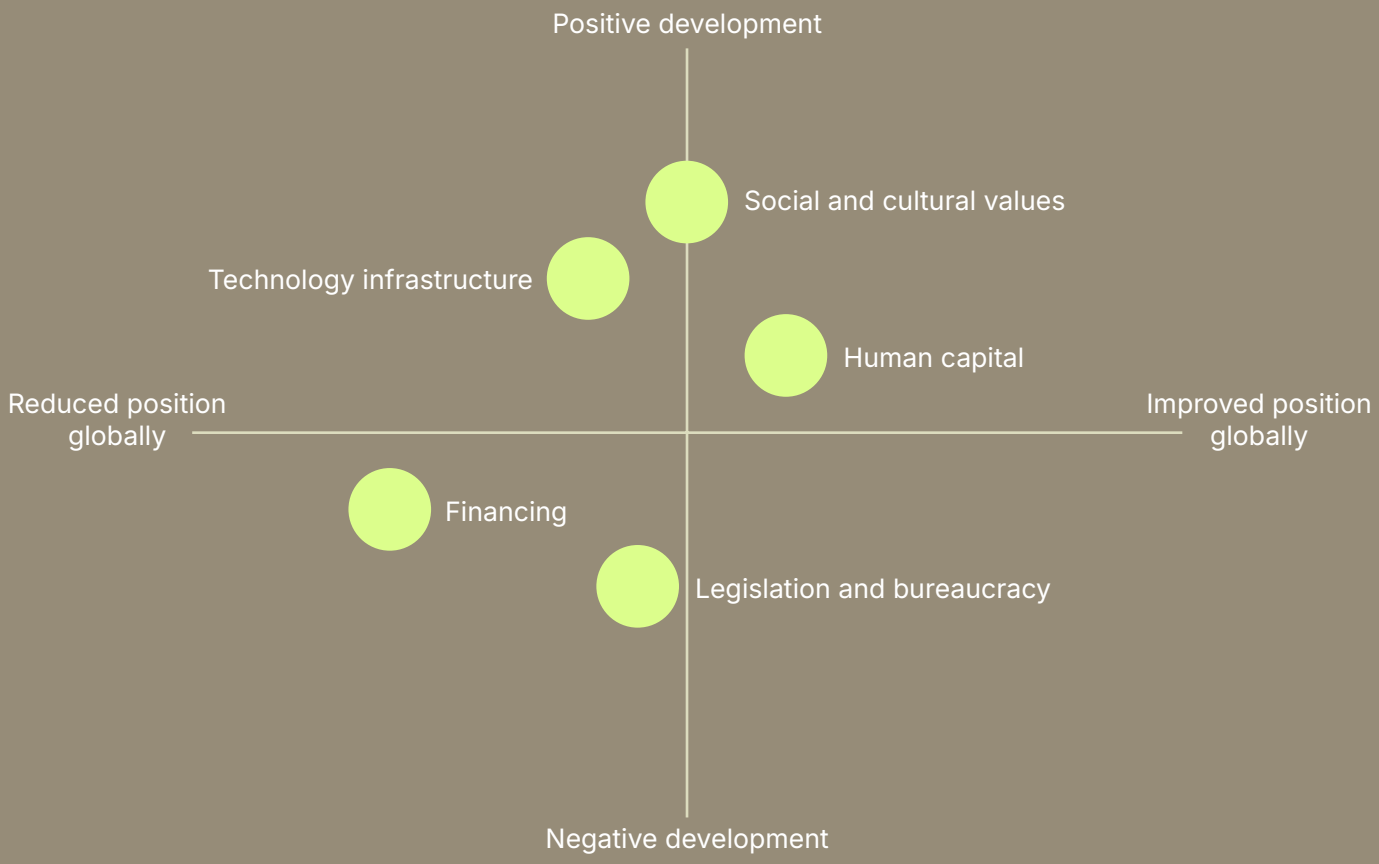
Sweden is fighting at the top level but has to roll up its sleeves

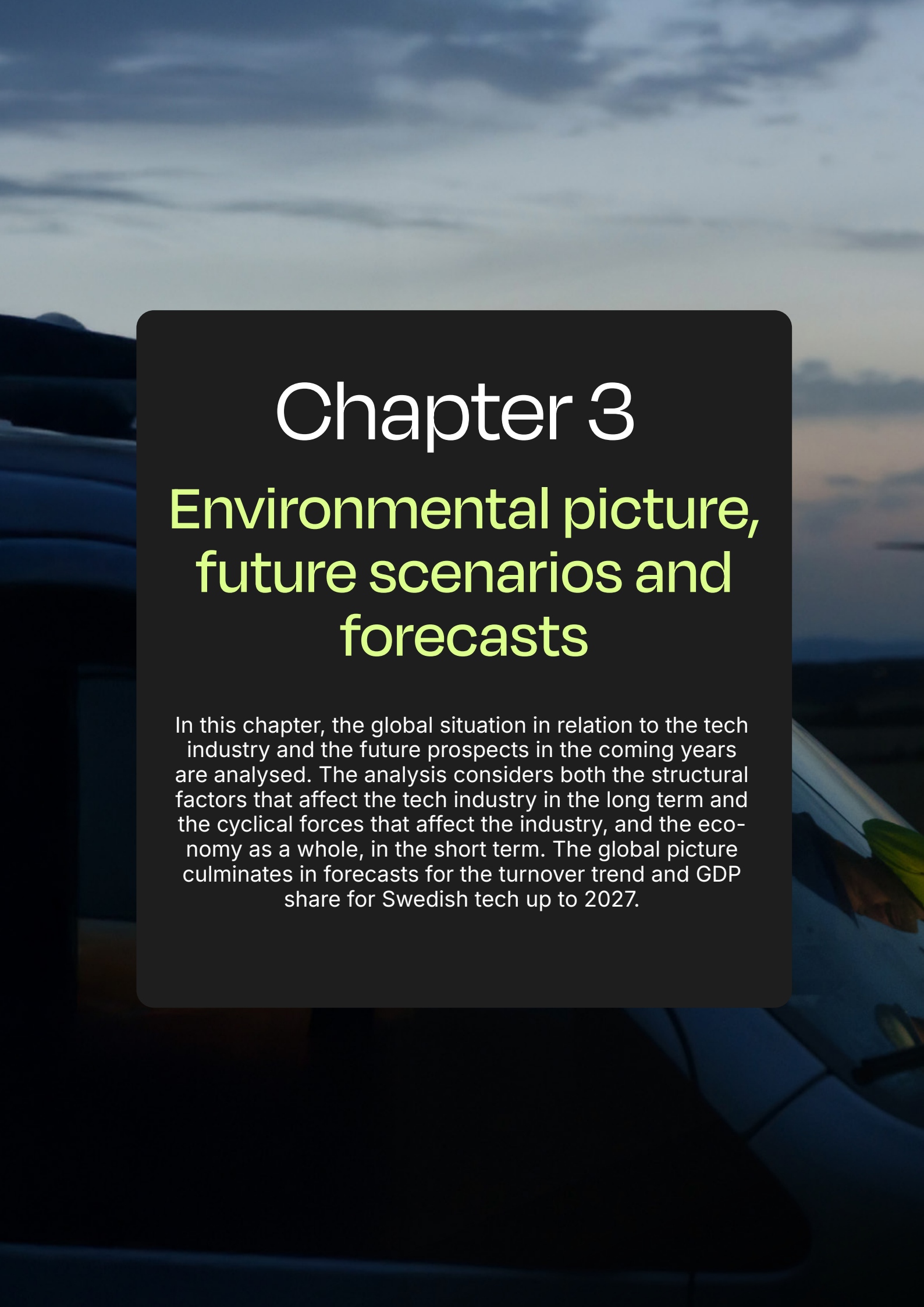
All in all, our deep dive into the conditions for entrepreneurship shows that Sweden has good conditions. There are good institutions, strong human capital and a well-developed technology infrastructure that has increased the opportunities for entrepreneurship over time, not least in tech. However, global competition has intensified and both Sweden and Europe have lost ground in recent years, with the clear obstacles being funding problems, lack of skills and an inhibitive regulatory environment. The diagram below summarises Sweden's direction over time, based on the five critical system factors for entrepreneurship presented earlier in the theme chapter.

In order for Sweden to be able to raise its competitiveness, the financing opportunities for entrepreneurs need to increase - especially in the growth phase - and the growing regulatory burden must be rolled back. There must also be an ambition to develop the technology infrastructure, including paving the way for advanced connectivity and applications of 5G and 6G. On the human capital side, Sweden is doing well, but a series of targeted efforts are required to produce more technical specialists, to increase general IT competence, to attract and retain research talent in Sweden and to make it easier for business to collaborate with academia in order to drive innovation and entrepreneurship. Finally, Sweden needs to take advantage of the positive values and social forces that encourage diligence and entrepreneurship and reduce fear of failure.

Sweden’s development as a country of entrepreneurship

Indicative development of the five system factors over time





Chapter 3

Environmental picture, future scenarios and forecasts

In this chapter, the global situation in relation to the tech industry and the future prospects in the coming years are analysed. The analysis considers both the structural factors that affect the tech industry in the long term and the cyclical forces that affect the industry, and the economy as a whole, in the short term. The global picture culminates in forecasts for the turnover trend and GDP share for Swedish tech up to 2027.

"Today, we are facing new technological shifts, including generative AI, electrification and investments in cyber security."

The pathway here – a brief tech-economic history

Over the last four to five decades, the changing macroeconomic climate has collaborated with technology development to make the Swedish tech industry what it is today. When the modern tech industry was born in the 1980s, the sector grew at a relatively high rate from low levels. Personal computers from IBM and Apple were a breakthrough, local networks began to be installed in companies and an analogue form of mobile telephony was developed in the Nordics. The young IT economy was made possible, not least by the deregulation of the telecommunications market and large, early Swedish investment in computerisation, research and education.

During the 1990s, the Internet broke through on a broad front and revolutionised everyday life. Microsoft emerged as a giant with the Windows operating system and MS Office. Sweden was hit by a severe economic crisis, which accelerated a series of political shifts, including EU entry, deregulation, tax reforms and new fiscal and monetary policy frameworks. Ericsson became the world leader in mobile telephony and optimism flourished during the second half of the decade's IT frenzy. Tech companies grew at a double-digit growth rate until the IT bubble burst in 2000.

Growth slowed in the decade following the year 2000. The period was the starting point for "Web 2.0" and social media with user-generated content, mainly via Facebook and Youtube. Apple's iPhone and other smartphones took off. Google grew strongly in search engine technology, Amazon became a leader in e-commerce and Swedish stars such as Spotify, Klarna and Skype saw the light of day. Sweden digitised authorities, founded Vinnova, reformed university technology programs and was the first in the world to launch a commercial 4G network. Globalisation increased and interest rates fell, which stimulated new IT investments. Credit expansion in the banking system led to a global financial crisis in 2007–2009.

During the 2010s, the digital economy matured. The financial crisis was replaced by the Euro crisis, which held back investments. However, the innovations replaced each other, for example cloud services and software as a service (SaaS) made it easier to run a business. The opportunities to harness data increased through machine learning and early forms of AI. The Swedish government adopted a broadband strategy and established the Broadband Forum to enable fast broadband connections throughout the country. During that period growth in tech stabilised at a level that was almost twice that of the rest of business. During the pandemic, starting in 2020, the digitisation of working life was fast-tracked. Today, we are facing new technological shifts, including generative AI, electrification and investments in cyber security.

1980-1990

The personal computer breaks through

Network technology

Deregulation of the tele-communications market

1990-2000

The internet revolution

Mobile telephony

The IT bubble bursts in the second of the decade

2000-2010

Social media and ”web 2.0”

Smartphones and apps

The financial crisis of 2007-2009 reduces investment

2010-2020

Cloud services and SaaS

Machine learning and applied AI

The pandemic digitises working life

2020-2030

Generative AI breaks through

Security policy deterioration: investments in cyber security

Electrification, IoT and advanced connectivity

The 2022–2024 recession and its impact on the tech industry

In recent years, crises have followed on from each other. The pandemic was followed by an inflationary crisis and the outbreak of conflicts in Ukraine and the Middle East. Inflation, and the inflated interest rates that followed in response to it, put great pressure on consumers and highly leveraged households, who tightened their belts from the second half of 2022. Retail sales volumes declined for 19 months in a row, which, among other things, has had major knock-on effects on the tech industry's retail chain. In the second half of 2023, a broader downturn came, affecting the entire industry through falling investment and weakened employment.

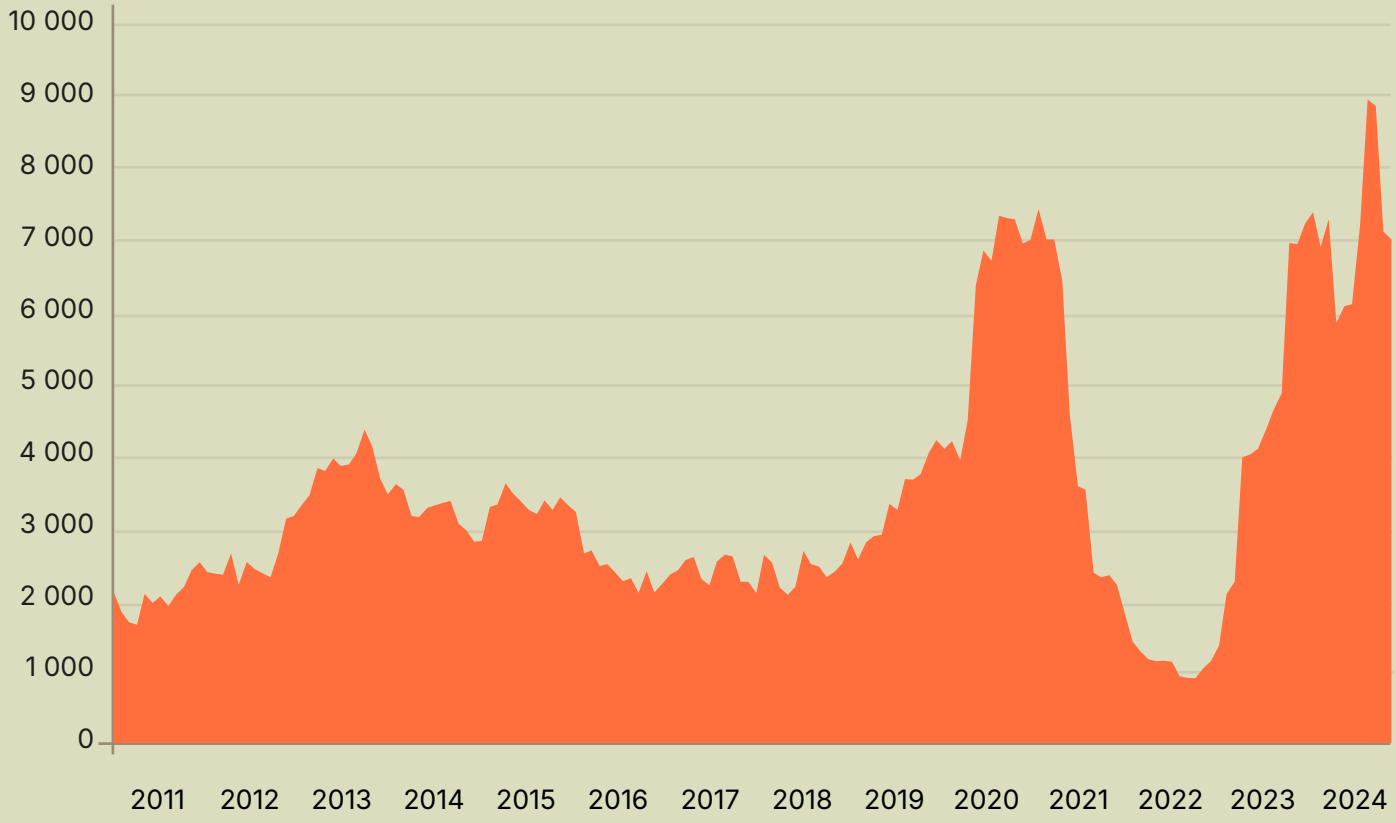
As inflation moderated in 2023 and 2024, macroeconomic focus shifted from inflation control to growth and employment. A cycle of interest rate cuts began in May 2024, which will gradually reduce the cost burden for households and businesses. Early-stage venture capital investment nearly halved between the peak year of 2021 and 2023. A shift in focus among both investors and companies has taken place from growth to profitability.

The labour market is about to stabilise

During the autumn of 2024, the number of vacant jobs in the economy will significantly decrease. In the twelve months between October 2023 and September 2024, approximately 7,000 people were laid off in tech, which is a higher level than during the pandemic and follows a larger global trend. It should be pointed out that the tech industry performed very strongly after the initial stage of the pandemic, which likely led to over-optimism and some overcapacity that has since had to be corrected. Hibernation of labour - labour hoarding - often occurs in the industry, however, as a result of fierce competition for specialist skills. This means that a lot of companies retain their staff despite falling demand, hoping that the downturn will be short-lived, so that they can quickly scale up when the economy turns.

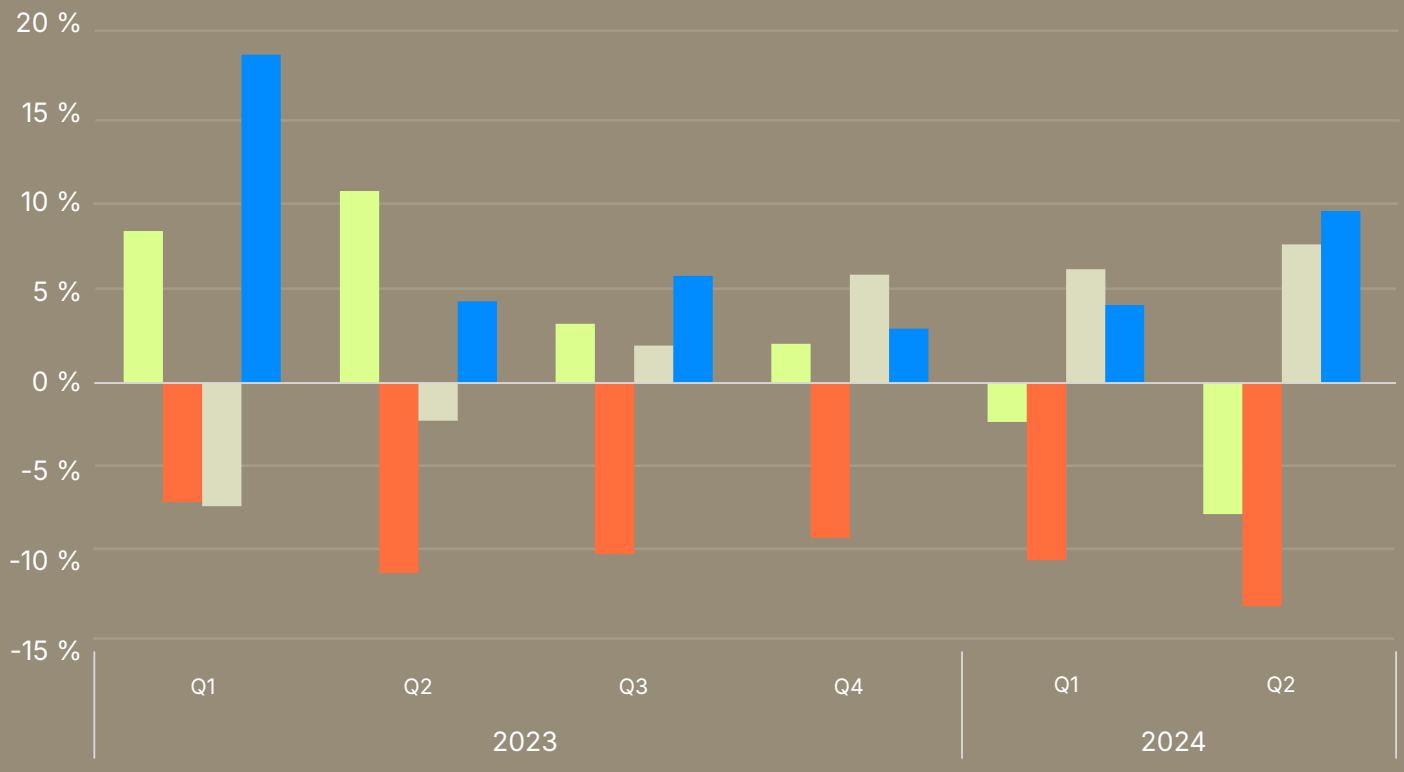
In tech, the economic climate is currently the toughest in the retail and service segments, as both households and businesses postpone purchases of electronics and hardware. This is partly due to strained budgets but also because of the large investments made during the pandemic years. Production for hardware manufacturers fell in the first half of 2024, but companies remained relatively optimistic during the fall. In software and IT services and telecommunications, a turnaround seems to have taken place, following a few weak quarters towards the end of 2023.

Number of people affected by notice of dismissal within Tech



Source: The Swedish Public Employment Service. Refers to SNI 58-63, rolling 12 months.

Production development 2023–2024



- Hardware manufacturers (SNI 26)
- Retail and service (SNI 46.5)
- Telecommunikations (SNI 61)
- Software and IT services (SNI 62-63)

Source: Statistics Sweden - Production value index, Turnover in the service sector. Fixed prices on an annual basis.

Tech investments future-proof businesses

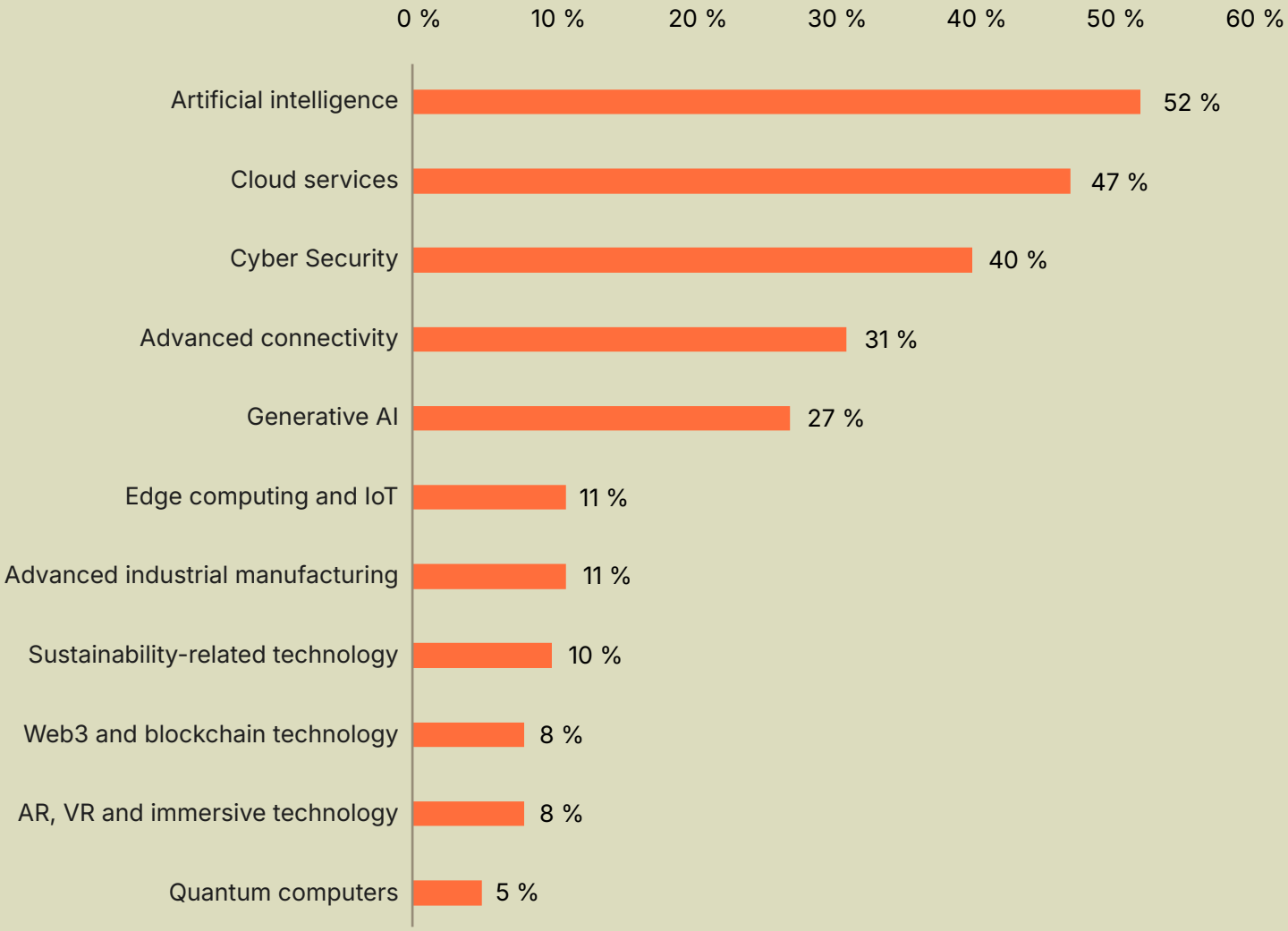
Both the OECD and the IMF expect global GDP growth to amount to just over three percent in 2025.[26] The Swedish National Institute of Economic Research forecast in September 2024 that Swedish GDP would grow by 1.8 percent in 2025 and by three percent in 2026.[27] Despite the turmoil in the outside world – the geopolitical conflicts, major export markets slowing down and protectionist currents – technology continues to create great growth opportunities. A survey by Deloitte shows that US business leaders regard AI as the most growth-driving technology area in the coming years, closely followed by cloud services and cybersecurity.[28] What these technology areas have in common is that investments are often made in order to ensure the cost-effectiveness or operational reliability of various businesses, which means that growth can be double-digit in these areas for many years, even if the economy is weak.

The historical development in the tech industry, combined with the brief analysis of the economic situation outlined above, constitute pieces of the puzzle that enable a better understanding of where we are headed in the coming years. The role of the tech industry in society and the analysis of the prerequisites for entrepreneurship according to previous chapters also provide valuable background knowledge that has been factored into the scenario analyses and forecasts that follow.

Appendix 1 describes a number of path choices and assumptions for the forecasts. The forecasts refer to the tech industry as a whole . The various industry segments (software and IT services, telecommunications and infrastructure, hardware manufacturing and retail and service) are likely to develop very differently over the forecast horizon. In other words, the forecasts are designed to explore the direction of the tech sector in a broad sense, but less well suited as benchmarking for individual players.

[26] OECD, 2024; IMF, 2024.
[27] The Swedish National Institute of Economic Research, 2024.
[28] Deloitte, 2023.

Technology areas expected to drive the most growth in the coming year



Source: Deloitte Center for Technology. Percentage of Tech leaders in the US who emphasise the relevant technology area (up to three choices per respondent).

Opportunities

for the tech industry during the forecast period 2023–2027

1. New technology areas such as generative AI increases productivity
2. Increased risk appetite as a result of falling interest rates and inflation
3. Investing in cyber security ensures a robust infrastructure
4. Simplification of rules for entrepreneurs can promote more innovation and creativity
5. Stronger profitability focus leads to more sustainable growth

Threats

for the tech industry during the forecast period 2023–2027

1
Geopolitical conflicts hit growth

2
Economic slowdown in major export markets

3
Increased cyber security threats and attacks on digital infrastructure

4
Over-regulation and lack of policy framework in Europe lead to subdued growth potential

5
Risk of more trade barriers and increased protectionist tendencies

Future scenario 1

Countercyclical tech growth in a sluggish economy

Tech grows by SEK 194 billion by 2027

In the first forecast scenario – which is referred to as a base scenario – the tech industry as a whole grows by 18 percent up to 2027. This means that the tech industry will reach SEK 1,300 billion in turnover in 2027, an increase of SEK 194 billion. Thus the average turnover growth becomes 4.1 percent per year between 2023 and 2027.

Despite the tech industry's relative cyclical sensitivity, industry growth remains robust and higher than other sectors of the economy across the entire forecast horizon. The growth of 18 percent is twice that of business in general. This is as a result of good structural growth in tech, supported by significant innovations and continued gradual adoption of new technology among both consumers and businesses.

Tech is establishing itself even more as a kind of base industry and constitutes a growth prerequisite for other industries. This gradual shift brings significant productivity gains in a number of important sectors of the economy, primarily in the private sector.

Despite the above, technological progress in the base scenario can be described as incremental for the greater bulk of companies. This is because subdued demand in the economy means that growth will be moderate in 2024. Many players therefore also hold back on major investment and new recruitment. Certain bottlenecks arise, where higher growth would have required a greater inflow of competence and capital. The focus of many companies is on cost control and consolidation, preventing technology shifts such as generative AI, 5G-enabled manufacturing, IoT and electrification from blossoming to their full potential.

The global situation is assumed to be unstable during the forecast horizon. The recession, geopolitical conflicts and protectionist tendencies limit the risk appetite among investors. Short-term shocks to the economy can also disrupt stable development, for example via rising raw material prices or interruptions in logistics flows. The economic situation and geopolitical risks will also reduce the growth rate in tech to moderate numbers in 2025.

The economic recovery is only expected to give growth a boost towards the end of 2025 or the beginning of 2026. Once the recovery comes, it is assumed it will be robust. This means that structural and cyclical factors will reinforce each other during the second half of the forecast period so that the growth of the tech industry will still be good. The GDP share will increase as a result from 8.0 percent in 2023 to 8.6 percent in 2027.

Future scenario 2

Disruptive tech growth reinforces broad recovery

Tech grows by SEK 277 billion by 2027

In the second forecast scenario – which constitutes an alternative scenario – the tech industry as a whole grows by 25 percent up to 2027. This means that the tech industry will reach SEK 1,383 billion in turnover in 2027, an increase of SEK 277 billion. The increase corresponds to an average annual growth of 5.8 percent between 2023 and 2027.

The above means that tech companies will grow more than twice as much as the total business sector during the forecast period. Industry growth accelerates rapidly from the second half of 2025. High and growing structural growth in 2026 and 2027 is supported by new innovations, expanded applications and increased receptivity to new technologies. This presupposes an active digitisation policy with the ambition that Sweden should be at the forefront and which supports innovation and promotes the use of new technology.

In the alternative scenario, tech further consolidates its role as a new base industry and also enables other industries to recover quickly from the recession and create new high-skilled jobs. Large productivity gains are made in a number of important sectors of the economy, including in the public sector and, for example, healthcare and law enforcement.

In the alternative scenario, the technological advances can be described as disruptive – that is, ground-breaking or transformative – for the broad bulk of companies. Technological shifts such as generative AI, 5G, IoT and electrification lead the way towards a new golden age.

McKinsey predicts that generative AI could lift labour productivity by between 0.1 and 0.6 percent annually until 2040, indicating the potentially very broad effects of technology.[29] A survey by Bain shows that the majority of software engineers expect productivity gains of at least 20 percent from generative AI in the next two years, which would be a game-changer in programming.

In the alternative scenario, the economic downturn will be somewhat more protracted in industries other than tech. Employment in tech increases strongly during the second half of the forecast period. The lack of specialist competence in the industry is alleviated through the winterisation of labour, skills development and by labour moving from other industries where demand has fallen. The global talent pool for businesses can also expand rapidly through hybrid models and remote working, which in itself drives increased demand for skills in collaboration platforms, IT security and communication tools.

The global situation in the alternative scenario is also assumed to be characterised by high uncertainty, dominated by the conflicts in Ukraine and the Middle East. However, these conflicts are not expected to worsen, which means that large-scale effects on commodity prices or value chains can be avoided. An upturn in technology investment is expected as early as 2025 and is supported by public investment in digitalisation, cyber security and electrification. The major economies' domestic problems, geopolitical concerns and protectionist tendencies will certainly limit the economy's development potential, but the strong technological development leads the way to increased optimism and growth will pick up considerably in 2026 and 2027.

In the alternative scenario, a clear turnaround in the macroeconomic development begins to be discerned towards the middle of 2025. This means that structural and cyclical factors reinforce each other during most of the forecast horizon so that growth in tech will be very strong over the entire period.

[29] McKinsey (2023). The Economic Potential of Generative AI: The Next Productivity Frontier.

Sammanfattning: tillväxtresan fortsätter i lågkonjunktur

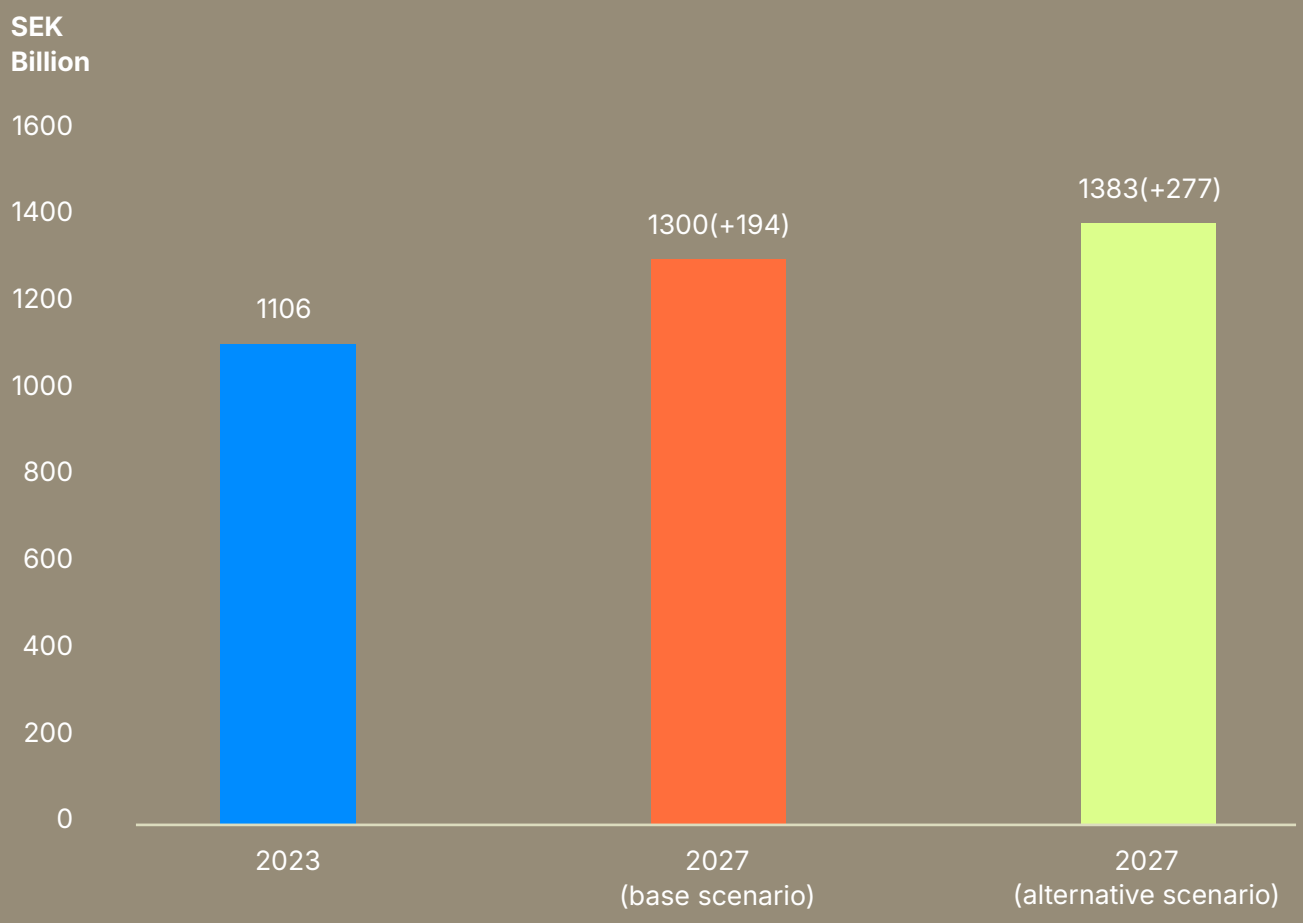
Prognoserna på de föregående sidorna för perioden 2023 till 2027 sammanfattas i diagrammen med prognosjämförelser nedan, samt i prognossammanfattningen i appendix 2. Som synes innebär båda framtidsscenarierna att techbranschen under de kommande åren flyttar fram positionerna som ett ankare i ekonomin, både sett till företagens omsättning och till BNP-andelen.

I basscenariot når techbranschen således en ny milstolpe 2027 med en omsättning på 1300 miljarder kronor. Alternativscenariot innebär att techbranschens omsättning ökar med ytterligare 83 miljarder, vilket innebär en omsättning 2027 på 1 383 miljarder kronor. I så fall når branschen en BNP-andel på 9,2 procent, i stället för 8,6 procent som i basscenariot.

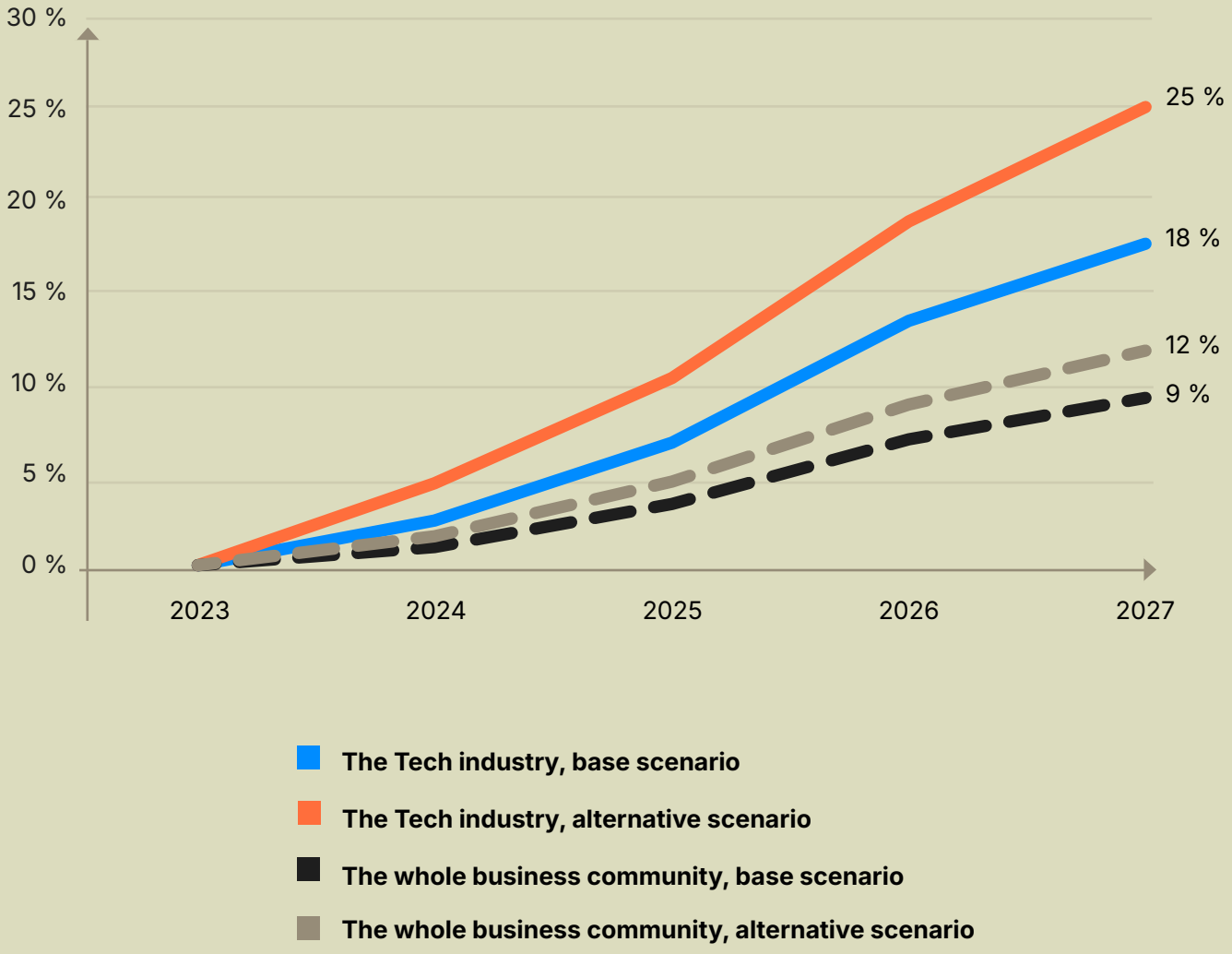
Prognoserna visar alltså att tillväxtresan fortsätter trots lågkonjunktur och oroligheter i omvärlden. Techlandet Sverige behöver dock kraftsamla och göra stora reformer om vi inte ska tappa mark mot andra länder och regioner. Företagens regelbörda måste lättas och entreprenörskap samt kreativitet bör belönas mer, techkompetens och kapital måste säkras och satsningar på digitalisering intensifieras.

Om vi ger Sveriges duktiga techentreprenörer och företag rätt förutsättningar kan de visa vägen i dessa oroliga tider. Det är därför hög tid att kavla upp ärmarna och agera för att Sverige inte bara ska behålla, utan även utveckla och förädla, sitt goda varumärke som technation.

Scenario comparison: the turnover of the Tech industry in 2027



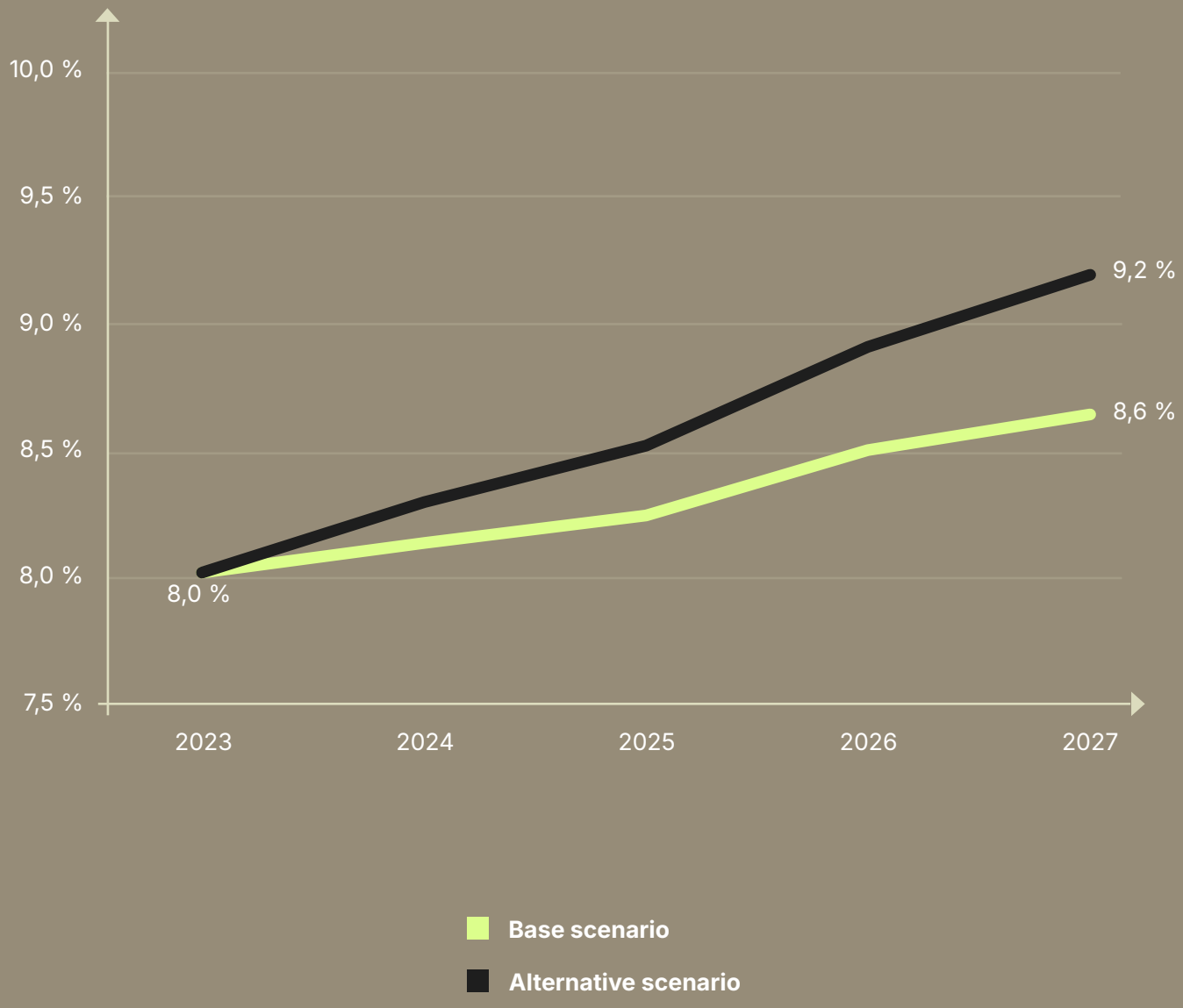
Scenario comparison: revenue growth in the Tech industry vs. the whole business community 2023–2027[30]



[30] The forecasts for the entire business sector have been based on the Swedish National Institute of Economic Research's forecasts for the production value of the business sector, where the growth forecast has been lowered by 0.3 percentage points per year in the base scenario and raised by 0.3 percentage points per year in the alternative scenario.

Refers to development in fixed prices.

Scenario comparison: Tech industry's share of GDP 2023-2027



Refers to the Tech industry's added value (SNI 26 and 61-63) relative to GDP at base price, in 2015 prices.

Appendix 1
Forecast conditions and related in-depth information

To understand and forecast the future development of the tech industry, revenue growth can be viewed as a result consisting of three growth components:

• The structural growth that consists of an underlying trend growth rate.

• The cyclical growth, a growth rate that depends on the general economic situation in the economy and the co-variation of the tect industry with the economic cycle.

• Economic shocks , events or phenomena of a one-off nature that can either increase or decrease the rate of growth.

The forecast scenarios in the report are based on structural growth in tech that is on par with the development over the past two decades. The long reference period means that any variations over the business cycle largely even themselves out. In order to estimate the impact of the economic situation on the industry development, the forecasts have taken into account existing macro forecasts from the Institute of Economic Research and other assessors (published in the third quarter of 2024), and partly the normal covariation between the general economic situation and the tech industry's production value on a historical basis.

In the forecasts' alternative scenario, an economic development is assumed during the forecast horizon that is somewhat stronger than in the base scenario. In the alternative scenario, it is also assumed that new technologies such as AI and 5G are gradually phased in and increase structural growth. As disruptive technologies, these are assumed to bring about significant productivity gains in the economy, increasing turnover per employed worker and therefore the structural growth rate.

A possible source of error for the industry turnover during the forecast period, in addition to the forecast growth rate, is the data on which the forecast work was based regarding industry growth in 2023. The information is a preliminary outcome from calculations based on the Swedish Tax Agency's VAT statistics. If growth turns out to have been significantly lower or higher than the preliminary figure shown, the level in 2027 will also be affected.

In the forecasts, an assumption of zero development is also made for the price development for tech products seen over the entire forecast period. This means that the growth seen over the entire forecast period refers to both the growth in SEK (current prices) and to the price-adjusted growth (in volumes). The assumption is on par with the long-term development over the past 10 to 15 years, but constitutes a possible source of error. This applies not least if the economic trend turns out to be different compared to what was assumed in the forecasts, because the economic trend is usually significant for the general price development.

Appendix 2
Forecast summary

Summary table: forecasts and future scenarios for the tech industry

	Scenario 1 – base scenario "Countercyclical tech growth in a sluggish economy"	**Scenario 2 – alternative scenario "Disruptive growth reinforces broad recovery"**
Basic assumptions:		
Economic development Technological progress	Slow recovery Limited and incremental	Faster recovery Broad and disruptive
Possible additional factors that can influence the outcome in each direction:		
Investment climate Geopolitical development Policy changes	Prolonged risk aversion Unstable, minor shocks "Business as usual"	Rapidly rising risk appetite Unstable, controlled development Broad and clear reforms
Forecasts for the tech industry:		
Growth 2023–2027 Compound annual growth rate (CAGR) Increase in Turnover (SEK billion) Turnover in 2027 (SEK billion) GDP share in 2027[31]	18 % 4,1 % 194 1 300 8,6 %	25 % 5,8 % 277 1 383 9,2 %

[31] In fixed prices with 2015 as reference year.

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TechSverige

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