A STRONG TECH NATION
Sweden should be world-leading

COMPETITION
is increasing globally

37 PROPOSALS FOR SWEDEN
in 10 different areas

A REPORT FROM TECHSVERIGE

A tech agenda for Sweden

TechSverige


TechSverige

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Summary

Tech has established itself as a new base for the Swedish economy. GDP, employment, and exports – all areas in which companies in the Swedish tech sector are playing an increasingly important role.[1] The economic development of Sweden is becoming more and more intertwined with that of the tech sector. Thus, the need increases for a policy that assumes clear digital leadership, ensuring not only the sector's continued contribution to growth, the green transition, and prosperity, but also Sweden's capability to keep up with global competition. In order to contribute to this, TechSverige here presents 37 policy proposals in ten different areas. The proposals accommodate various perspectives and actors and, together, they lay the foundation for Sweden as a world-leading tech nation that utilises the opportunities offered by digitalisation to promote social economy, employment, innovation, and competitiveness. The proposals should be implemented during the coming term and contain, among other things, measures for increased information and cyber security, improved skills supply, better developed digital infrastructure, clearer leadership, a future-proof welfare system, and a more sustainable society with the help of technology.

The beginning of the report also presents a comparison between Sweden and a large selection of countries, showing, among other things, that:

- **The Swedish tech sector is strong** and accounted for 6.5% of the Swedish GDP in 2019, which puts Sweden in third place in the report's European selection. In the comparison, the Swedish tech sector is also the second most value-adding per capita.
- **In 2019, close to 250,000** people were employed in the Swedish tech sector, corresponding to 4.9% of all people employed in the Swedish labour market. That's the highest proportion in the comparison.
- **While the Swedish tech sector** is strong, we can see how several of our competing countries are growing at a faster rate. Had the Swedish tech sector grown as the selection average, its contribution to GDP could have been half a percentage point higher: 7.1%. And had the sector grown as the fastest growing one, namely Estonia's tech sector, the contribution could have been 2.5 percentage points higher: 9.0%. Such increase corresponds to more than what the entire transport sector contributed to the Swedish GDP in 2020 (2.0%).
- **In both the United States and South Korea, the contribution** of the tech sector to GDP is significantly higher, and the countries' political digital leadership is inspiring. The strong figures for the United States have a clear connection to the nation's dominance in world trade. In 2021, the United States had a market share of nearly 35%, compared to the EU share of 15%.
- **Digital leadership is a key** component for increasing the competitiveness of the tech sector, and as revealed in interviews with representatives from Estonia and Finland, two countries with strong tech growth, their countries prioritise digital leadership at the highest political level. Sweden needs to draw inspiration from these and other countries that are leading the way with reforms in order to ensure a world-class tech nation.

[1] TechSverige. *Tech – Sweden's new basic industry*. 2021.

The need increases by a policy that takes a clear digital leadership and ensures that the sector can continue to contribute to growth, climate change, welfare and for the possibilities for Sweden to be able to keep up with the global competition.

PREFACE

Sweden should be a world-leading tech nation

Industrialisation laid the foundation for Sweden's prosperity and our modern society. It was a time marked, just like ours, by great social transformation. Today, digitalisation is the great force that redefines the conditions for how we live, work, produce, consume, and communicate. Now, just as then, we need a comprehensive political commitment and leadership that navigates with various reforms and initiatives to bolster the emergence of a more future-oriented Sweden. Now, just as then, we need political visions that instil hope and faith in the future.

Sweden has so much to gain from being a world leader in digital development. Digitalisation is absolutely vital to Sweden's economic growth, to productivity and innovation throughout the business community and public services, and to sustainable societal development. Tech is a new Swedish basic industry that accounts for many of the new jobs. Its contribution to GDP is almost as large as that of the traditional basic industries combined.

The importance of digitalisation for society became apparent not least during the corona pandemic. Using stable connections and smart digital solutions, companies, workplaces, shops, and public services were able to continue to function and deliver. In this and many other ways, the tech industry wants to contribute to a strong and sustainable society going forward. This is especially true as our security situation in Europe has greatly deteriorated.

It would be presumptuous to say that digitalisation and tech are the answer to all societal challenges. They're not. They are, however, extremely strong factors in society that we all need to relate to, and which therefore require extensive political commitment and knowledge.

As a country, we have great and unique conditions for spearheading digital transformation and thereby add great value to individuals, companies, and society. We are a connected nation with a digitally mature population, and we are quick to embrace new technology and adopt digital tools. In addition, we have a tech entrepreneurship and a tech sector that are at the absolute forefront internationally.

However, we cannot rest on our laurels and live on yesterday's investments and victories. While well positioned when comparing Sweden to other countries with similar conditions, we are losing momentum. Our previous edge and digital competitiveness are diminishing as other countries are progressing much faster than we do.

Sweden therefore needs an even stronger political commitment and leadership in order to be a world leader. The ambition level needs to be raised, as does the courage to make the decisions necessary to lay the foundation for a sustainable, future-oriented, and competitive Sweden. We need visionary digital leadership that takes responsibility for the long-term development and success of our country. It's time for a new policy, an ambitious digitalisation and tech policy that affects all areas of society and that places Sweden at the forefront of digital transformation and the global data economy.

In order to strengthen Sweden as a world-leading tech nation, we hereby present a tech agenda for Sweden with 37 policy proposals in ten different areas. With this report, TechSverige hopes to contribute to creating greater political commitment, which in itself results in a more ambitious tech policy, for the 2022 election and the term that follows. This is necessary if Sweden is to maintain its competitiveness, employment, and welfare system – in a sustainable society. My message to all politicians and decision-makers is clear: You are not alone; the tech industry is ready and wants to contribute to enable Sweden to reach its full potential.

Åsa Zetterberg
Managing Director
TechSverige

May 2022

“It’s time for a new policy, an ambitious digitalisation and tech policy.”

Åsa Zetterberg

INTRODUCTION

The Swedish tech sector is strong, but competition is increasing

The digital transformation of society is happening at an ever faster pace. The need for the tech industry and its products and services is markedly increasing, and the industry is now an integral part of our economy. A competitive tech sector provides the conditions for a competitive Sweden.

This report clarifies how the tech sector contributes to Sweden's prosperity by adding value and creating jobs. TechSverige has also looked into how the Swedish tech sector compares to a selection of countries in terms of contribution to GDP and employment. We found that while the Swedish tech sector is currently strong, competition from the rest of the world is increasing.

From an international perspective, zooming in on Estonia and Finland, among others, we see that many countries have taken ambitious steps to strengthen their digitalisation policy with strong political leadership with clear visions and concrete initiatives. Aggressive reforms have been implemented to utilise the opportunities offered by digitalisation to further competitiveness and innovation.

In order for Sweden to grow on par with other comparable countries, and for the tech sector to continue to grow and contribute to the Swedish economy, it is essential that we, as a country, do not pat ourselves on the back and be content with what we have accomplished. We need to keep going and utilise the power and the opportunities of technology to strengthen the Swedish economy and Swedish society. We conclude this report by presenting 37 policy proposals in ten different areas aimed at strengthening Sweden as a world-leading tech nation.

Sweden is one of the world's most export dependent countries. Nearly 50 percent off Sweden's GDP comes from the export industry.

DEVELOPMENT TRENDS

The Swedish tech industry in international comparison

Sweden is an outstanding country when it comes to digitalisation and technological development. Our prosperity is based on a strong culture of innovation in the business community in combination with extensive trade with the rest of the world. In the "Tech – Sweden's new basic industry" report, TechSverige shows that the industry's contribution to GDP has grown by as much as 1,300% since 1981. In 2020, it totalled SEK 281 billion, almost as much as the total contribution from the traditional Swedish basic industries combined.[2]

Between 2010 and 2018, industry sales increased by more than SEK 244 billion to SEK 771 billion – a 46% increase. The Software and IT Services subindustry drives the development, accounting for nearly 55% of total industry sales.

The tech industry is also a job-creating industry. Over 60% of new jobs created in Sweden from 2006 to 2016 were generated in IT-intensive sectors. In 2019, the industry employed a total of nearly 250,000 people.

In addition to creating jobs, growth, and tax revenue in the country, the tech industry contributes to Swedish competitiveness and exports. Since 1998, the industry's contribution to Swedish exports has increased significantly – by nearly 1,200% – to SEK 140 billion in 2020. This corresponds to over 6% of Sweden's total exports, more than the contribution from traditional basic industries like Paper, Pulp, and Wastepaper, Metals, and Plastics and Rubber.

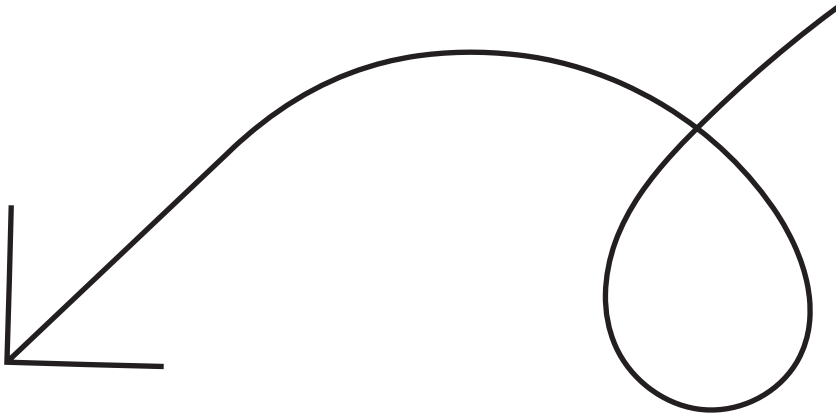
Sweden's position as a tech nation as well as Sweden's digitalisation can be measured in several ways. There are many indexes at both European and global levels comparing countries and, overall, Sweden is doing well. But while the tech industry holds a strong position in Sweden, there are other countries that are introducing extensive reforms in order to better take advantage of the potential of digitalisation – and where technology is growing at a faster pace.

In this section, TechSverige has analysed how the Swedish tech sector compares to a selection of European countries in terms of contribution to GDP and employment in order to nuance the picture of the international indexes and add a different perspective. In order to compare Sweden to the rest of the world, the tech sector as a whole has been analysed.[3] The basic selection includes the EU and the EEA countries as well as Great Britain. In each table, the countries close to us and the countries with strong development have then been selected. Comparisons of GDP and employment are based on statistics from Eurostat. Several strong European tech nations, including Ireland, Malta, the Netherlands, and Great Britain, are completely or partially missing from certain categories in the Eurostat database. Therefore, the comparison does not claim to be exhaustive.

The analysis of tech sector share of GDP also includes the United States and South Korea in order to provide an illustration of two non-European countries. The United States is also included in the analysis of employment. The U.S. definition of the sector is broader than Eurostat's, and comparisons should therefore be made with caution.[4] [5]

[2] TechSverige. *Tech – Sweden's new basic industry.* 2021.
[3] The tech sector is a broader definition than the tech industry, and companies that are included in the tech sector operate within the same segment of the economy. In the tech industry, business activities and models are much more alike than among the companies in the tech sector.
[4] The definition of the U.S. tech sector is based on [50] NAICS Codes. These can generally be divided into two categories: technology manufacturing and technology services. This definition is broader than that of Eurostat.
[5] Employment in the U.S. tech sector is based on two components and is a broader term than Eurostat's. One component consists of a set of technical occupations and the other of professionals who support the development and supply of technology products and services used throughout the economy.

The tech industry contribution to GDP has grown by as much as 1,300% since 1981.



Tech sector contribution to national economy

The European Commission predicts that the data economy, the market for digital information, can grow to EUR 829 billion in the EU by 2025, compared to EUR 301 billion in 2018, and that the number of employees in the sector can increase from 5.7 million to 10.9 million.[6]The strong growth can be seen in the tech sectors in several European countries, including Sweden.

The contribution of the Swedish tech sector to Sweden's economy was 6.5% in 2019, defined as the sector's share of GDP. This puts Sweden in third place among the European countries compared, after Malta and Bulgaria. There are no statistics for Great Britain for 2019, but during the 2014–2018 period, the country's tech sector grew by 8.5%.[7]

Malta's high ranking may partly be due to the fact that the country has long been attractive for tech companies to establish thanks to its aggressive digitalisation policy[8], low corporate taxes, low payroll tax, and English as its national language.[9] In the Bulgarian tech sector, software development is showing the strongest growth. Many companies locate in this country as a result of low corporate taxes and lower wage levels. However, a highly qualified IT specialist in Bulgaria can make the equivalent of two to three times more than the average Bulgarian salary, which facilitates skills supply to the industry.[10] It can be noted that the contribution of the tech sector to GDP in both South Korea and the United States is significantly higher than in the selected countries, 10.8% and 10.0% respectively in 2019.[11] [12]

The advanced ranking of South Korea is due to several things, including the fact that the country has the world's highest mobile phone penetration of more than 100% and was the first in the world to introduce a nationwide 5G network and commercialise 5G services.[13] This enabled the country to quickly build strong e-commerce and IoT-related companies and industries that are increasingly competing in the global market. The country is also a leader in the development of 5G technology. The U.S. market share of the global IT market is close to 35%, and many of the international giants have located both their research and development there, and to some extent, their manufacturing.[14]

The countries in which the tech sector increased its share of GDP the most from 2014 to 2019 are Latvia, Bulgaria, and Estonia, with increases between 25 and 46 percent. However, it should be noted that the respective economy of these three countries corresponded to between 6 and 13 percent of Sweden's economy in 2019, which means that growth is occurring from low levels. Sweden's increase of 3.2% during the 2014–2019 period was the lowest among the selected countries.

[6] European Parliament. *Europeiska datastrategi: Det vill Europaparlamentet. [European data strategy: What the European Parliament wants.]* 24 February 2021.
[7] Due to lack of comparable data, Great Britain has been excluded from other tables.
[8] For example, the public-private partnership Tech.mt, which was established in 2019 by the Government of Malta and the Malta Chamber of Commerce to promote Malta as a technological centre for innovative technology, as well as policy, such as the introduction of a digital nomad visa.
[9] Sovereign Group, "Why Digital businesses choose Malta". 13 April 2022.
[10] International Trade Administration. *Bulgaria – Country Commercial Guide.*
[11] Ahn, Gil-Hyun, "Trends and Outlook of South Koreas's ICT Industry", *Invest Korea*. 19 February 2021.
[12] CompTIA Cyberstates 2020: *The definitive guide to the U.S. tech industry and tech workforce.*
[13] More about South Korea's reforms can be found in Chapter 4.
[14] See more under 3.3 and in Chapter 4.
[15] Eurostat. National accounts aggregates by industry (up to NCAE A*64). Data for several European countries, including Ireland, the Netherlands, and Denmark, are missing from Eurostat's compilation.

Table 1

The techsector´s share of GDP[15]

	2014	2019	2014–2019
Malta	6.9%	7.7%	11.6%
Bulgaria	4.9%	6.6%	34.7%
Sweden	6.3%	6.5%	3.2%
Great Britain	5.7%	6.2%*	8.5%*
Hungary	5.6%	6.1%	8.9%
Estonia	4.8%	6.0%	25.0%
Latvia	3.7%	5.4%	46.0%
Finland	4.5%*	4.9%	8.9%*
Czech Republic	4.3%	4.7%	9.3%
Croatia	4.0%	4.5%	12.5%
France	3.8%	4.4%	15.8%
Germany	4.2%	4.4%	4.8%
Norway	3.3%	3.8%	15.2%

*Finland data for 2015, Great Britain data for 2018.

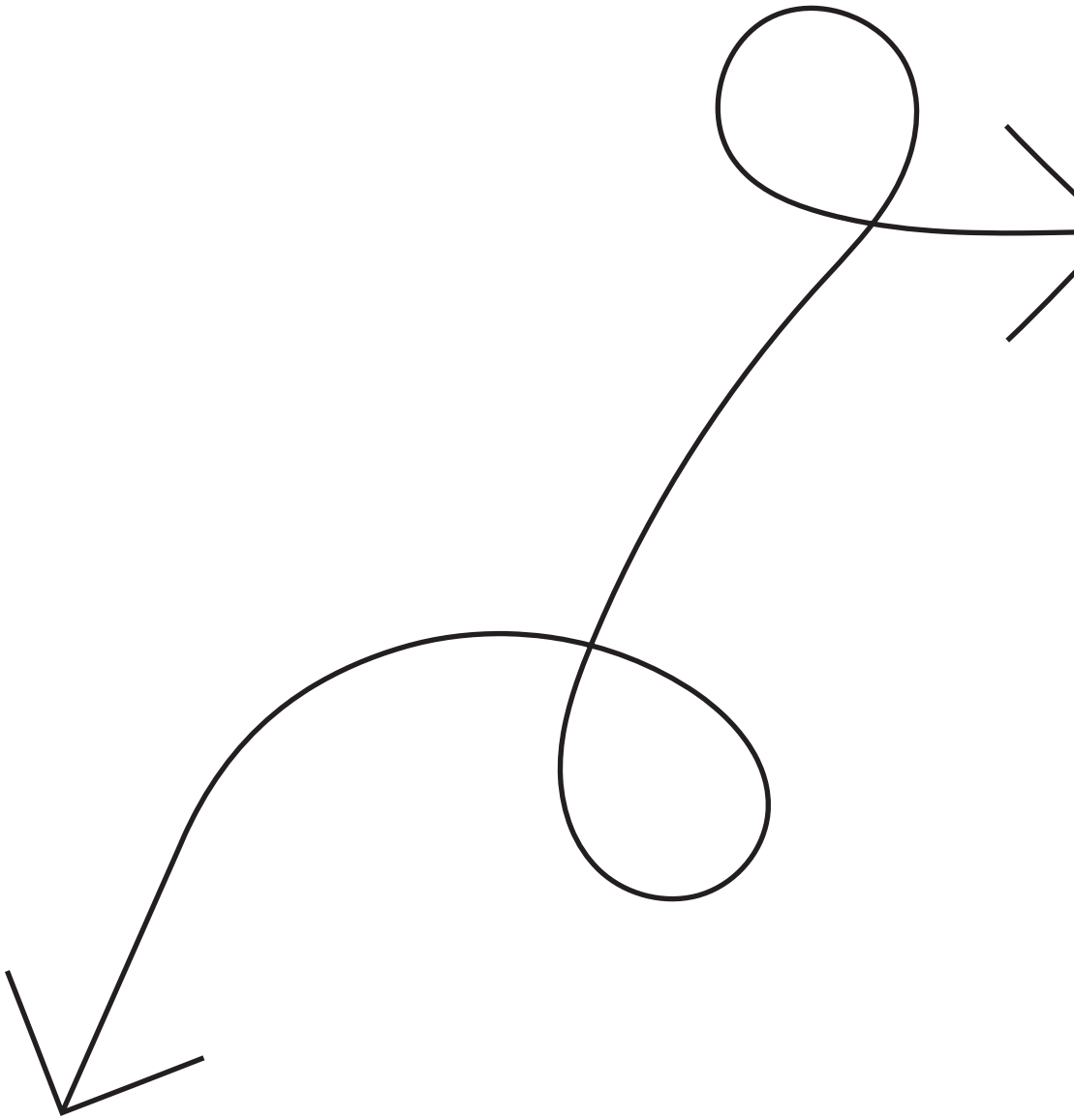


Table 2 shows the tech sector's contribution to the economy in EUR million for 2019, the percentage development from 2015–2019, as well as the gross value added in relation to population in 2019 for the selected European countries with the highest contribution per capita.[16] Among the countries compared, the Swedish tech industry is the second most value-adding, defined as gross value added per capita in 2019. Switzerland, which tops the list, has many unique value-adding tech R&D environments, including IBM's research laboratory, Google's European research unit (the company's largest research facility outside the United States), and Meta's Reality Lab.[17]

While the Swedish tech sector is very important for the Swedish economy, it is growing at a lower rate than tech sectors in other countries in the comparison and had the second weakest growth during the 2015–2019 period. Data for Malta, Ireland, and Great Britain are either missing or incomplete, which means comparisons cannot be made.

[16] The European selection is described on the previous page.
[17] Switzerland Global Enterprise, *Enabling new business.* January 2022.
[18] Eurostat. *National accounts aggregates by industry.* Based on categories C26 and J61–63 due to the limitations in the statistical data. The real contribution of the tech sector is thus underestimated.
[19] Eurostat. *Population on 1 January by age and sex.*

Table 2

The tech sector's gross value added in the years 2015–2019 and per capita in 2019

In EUR million [18] [19]

	2019	2015-2019	Euro per capita
Switzerland	**46,472**	**2.9%**	**5,439**
Sweden	**27,351**	**15.0%**	**2,674**
Iceland	**891**	**58.5%**	**2,496**
Finland	**12,886**	**18.2%**	**2,335**
Norway	**12,374**	**21.3%**	**2,322**
The Netherlands	**35,539**	**21.3%**	**2,056**
Germany	**165,151**	**22.4%**	**1989**
Denmark	**11,401**	**19.7%**	**1,964**
Austria	**15,221**	**35.7%**	**1,718**
France	**102,014**	**19.1%**	**1,519**
Belgium	**17,346**	**26.8%**	**1,514**
Estonia	**1,647**	**64.7%**	**1,243**

Had the Swedish tech sector grown at the same rate as Estonia's, the sector's contribution could have been 9.0 of GDP.

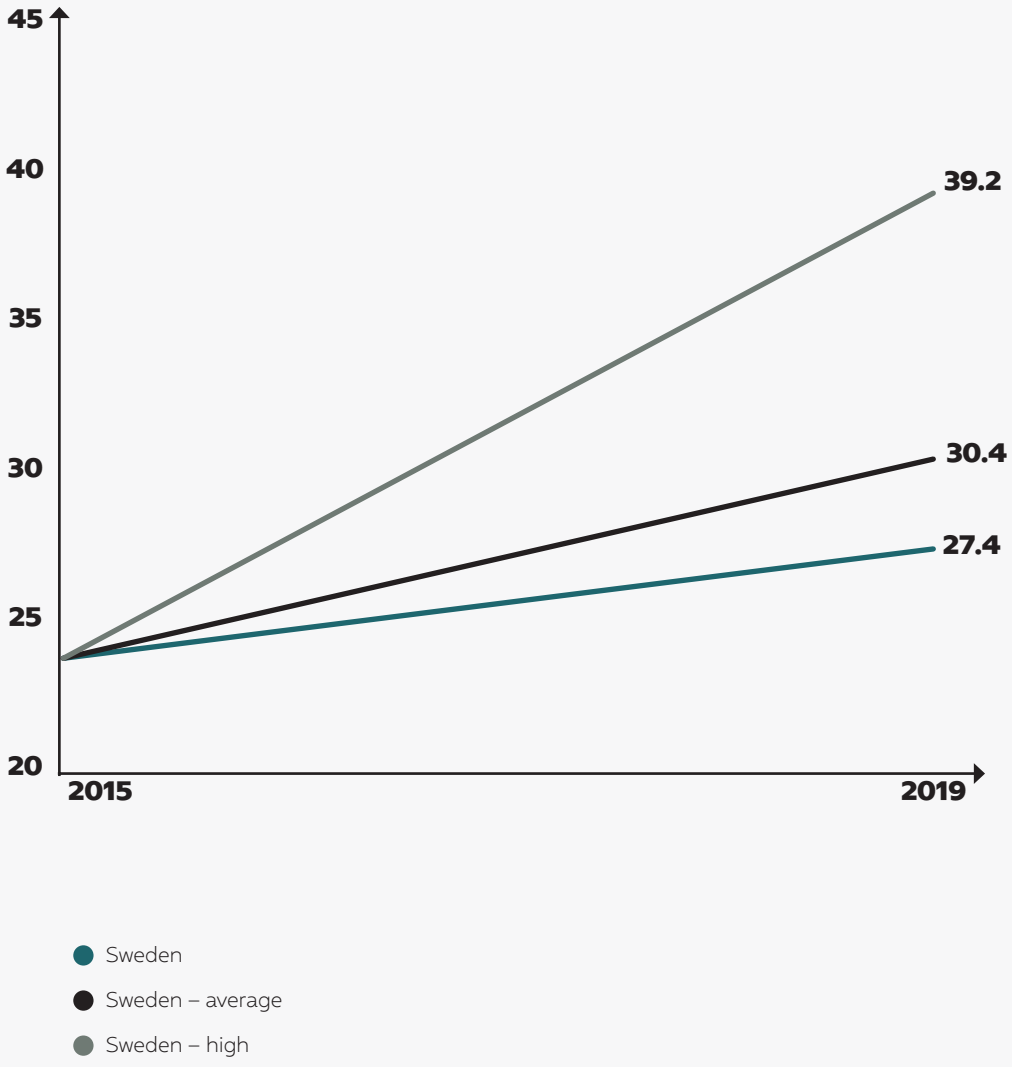
The chart below shows what the contribution of the tech sector to Sweden's economy could have been had it grown at the same rate as the fastest growing tech sector or as the selection average. Had the Swedish tech sector grown at the same rate as Estonia's, the sector's contribution could have amounted to EUR 39.2 billion in 2019, corresponding to 9.0% of GDP (below scenario Sweden – high). This would have meant a 2.5% increase in contribution to GDP, which corresponds to more than what the entire transport sector contributed to the Swedish GDP in 2020 (2.0%).

Sweden's and Estonia's economies differ from each other, and such rapid growth is not probable. If, instead, the tech sector had grown as the selection average during the period, 27.7%, the sector's contribution could have amounted to EUR 30.4 billion in 2019, and the contribution to GDP could have been half a percentage point higher than today, 7.1% (below scenario Sweden – average).

Chart 1

The tech sector's gross value added in 2019 based on two alternative scenarios

In EUR billion.



Employed in the tech sector

The tech sector comprises a wide range of occupational groups, such as system developers, IT security experts, and programmers. Programmer is now one of the most common jobs in several regions.[20] In 2019, close to 250,000 people worked in the Swedish tech sector, corresponding to 4.9% of all people employed in the Swedish labour market, as shown in table 6. This proportion was the highest among all compared countries in Europe, although lower than the United States' proportion of 7.7%. However, the U.S. definition of a tech job is broader, and comparisons should be made with caution.

Table 5 shows that several European countries have had very strong growth in the number of employees in the tech sector during the 2015–2019 period. The highest growth was found in Estonia, followed by Bulgaria and Poland, although growth in Estonia and Bulgaria occurs from low levels. Sweden's growth during this period was 23.7%, which is on par with Germany and Croatia and falls somewhere in the middle among the selected countries. One explanation for why employment in Sweden hasn't grown as strongly as in the countries ranking higher is the many years of competence shortage, something which TechSverige has continuously highlighted.[21]

Germany is the country with the most tech employees in Europe, over 1.4 million people. In addition to the highest percentage growth in the number of people employed in the tech sector, Estonia also has the second highest proportion of employees in the tech sector in the selection. Estonia's population is just over 1.3 million people, but through reforms such as digital nomad visas and e-Residency, people from all corners of the world can live and work in tech in Estonia, physically or remotely.[22] These attractive conditions contribute to increased employment in the tech industry.

[20] Öberg, Ann, Zetterberg, Åsa, Höij, Magnus "It-branschen skriker efter folk – staten måste agera" [The IT industry is screaming for people – the state must take action], *Göteborgsposten*. 10 February 2022.
[21] See, for example, the IT Competence Shortage Report (2020).
[22] Republic of Estonia: E-Residency.

Table 5

Number of employees in the tech sector and change 2015–2019[23]

	2019	2015-2019
Estonia	**30,719**	**38.2%**
Bulgaria	**106,492**	**30.2%**
Poland	**442,501**	**29.4%**
Malta	**11,235***	**27.6%***
Latvia	**37,112**	**27.1%**
Romania	**227,408**	**26.8%**
Slovakia	**82,003**	**24.0%**
Germany	**1,418,585**	**23.8%**
Sweden	**249,872**	**23,7%[24]**
Croatia	**45,248**	**23.7%**
Lithuania	**38,686**	**22.3%**
Belgium	**145,123**	**20.7%**
Finland	**103,495**	**11.0%**
Norway	**90,345**	**11.0%**
France	**883,040**	**9.1%**

* Data for 2018

[23] Eurostat. *Annual enterprise statistics for special aggregates of activities (NACE Rev. 2).*
[24] IT&Telekomföretagen, *The IT Competence Shortage: A report on the Swedish digital sector's need for cutting-edge expertise.* November 2017. Data source for

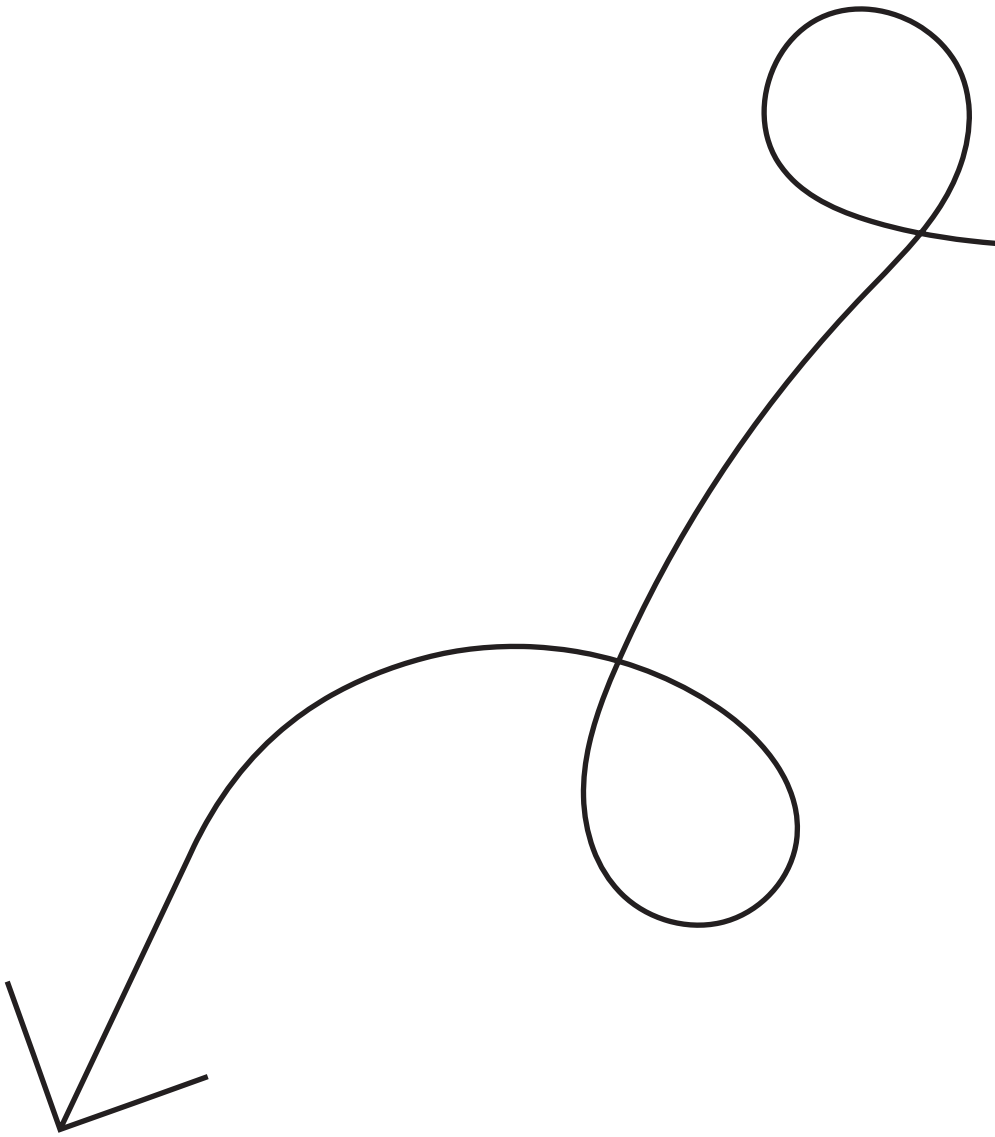
Table 6

The techsector´s share of total employment 2019 [25] [26]

	2019
Sweden	**4.9%**
Estonia	**4.8%**
Malta	**4.7%***
Latvia	**4.1%**
Finland	**3.9%**
Hungary	**3.8%**
Denmark	**3.6%**
Slovakia	**3.4%**
Czech Republic	**3.3%**
Switzerland	**3.3%**
Norway	**3.2%**
Germany	**3.1%**
France	**3.1%**

* Data for 2018

[25] Eurostat. *Percentage of the ICT personnel in total employment.*
[26] CompTIA Cyberstates 2020: *The definitive guide to the U.S. tech industry and tech workforce.*

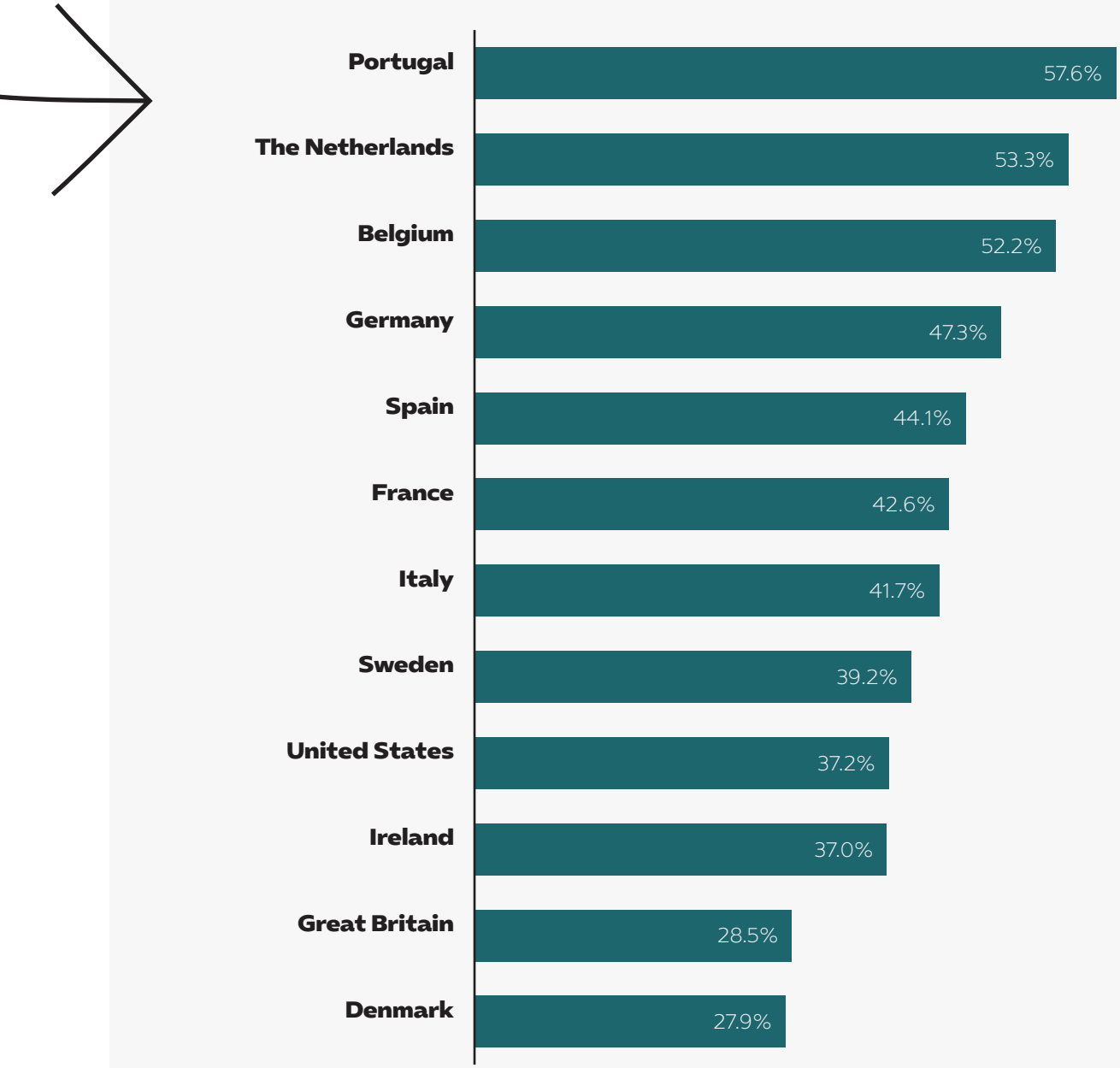


Demand for labour in the tech sector internationally is high, and competition for talent is fierce. Chart 2 shows the percentage of tech jobs that are difficult to fill for a selection of European countries as well as the United States. Portugal and the Netherlands stand out, having difficulty filling between 50 and 60 percent of their tech jobs. In Sweden, that percentage is 40%. The fact that a high percentage of tech jobs are difficult to fill reflects the prevailing competence shortage seen throughout the sector globally.

Chart 2

Tech jobs difficult to fill

Percentage per country [28]



[28] Atomico. *The State of European Tech 2020, Share of tech jobs (%) that are hard to fill by country per year.* October 2020.

Sweden needs to move up a gear in order to strengthen the growth and contribution of the tech sector and to become a world-class tech nation.

The EU global market share and Swedish exports

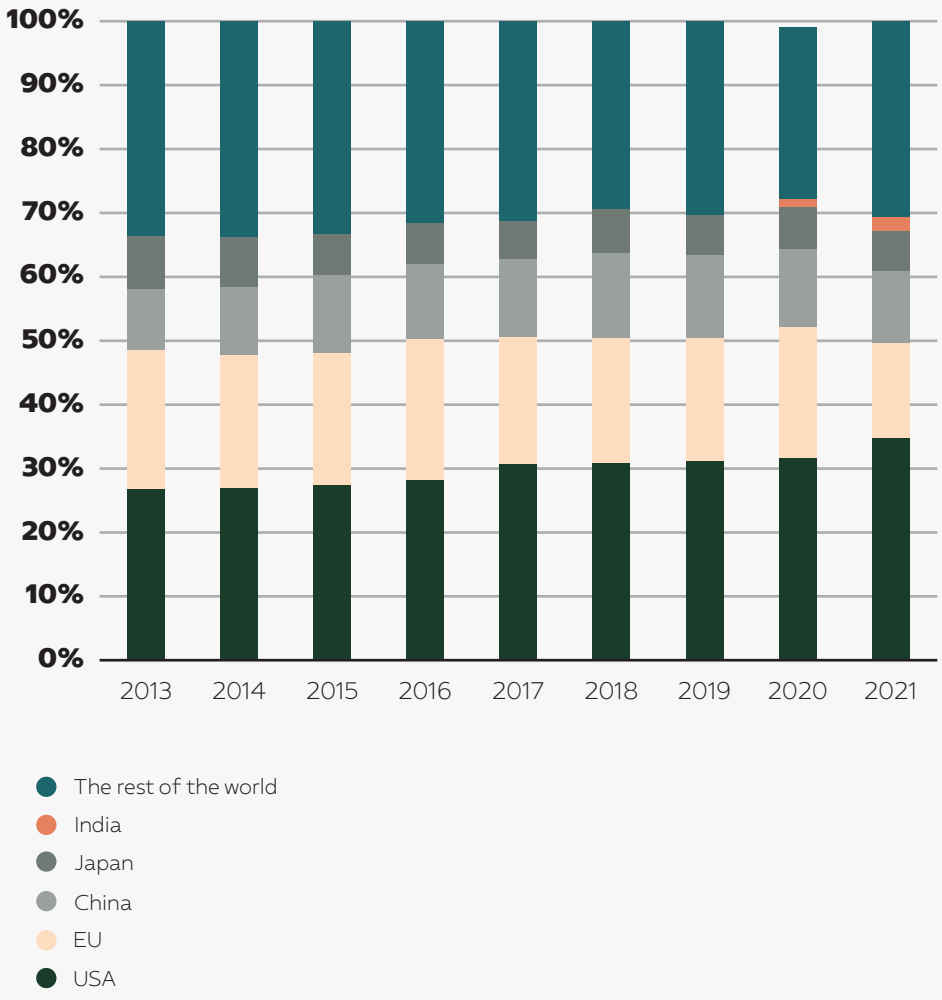
The tech sector's marketplace for goods and services is global, and a large part of trade takes place across national borders. Between 1998 and 2020, Swedish tech industry exports increased by over 1,200% to SEK 140 billion. This is more than the contribution from traditional basic industries like Paper, Pulp, and Wastepaper, Metals, and Plastics and Rubber. Sweden comes out strong from an international perspective as well, being the tenth largest exporter of IT services in the world, according to the list of the World Bank.[29]

The following chart shows the total EU market share, which includes Sweden, as a share of global revenues for the IT sector 2013–2021. For several years, this share has remained stable around 20% of global revenues, but in 2021, the trend changed abruptly as the share fell to 15%. The United States stands out by consistently having increased its share of total revenues from 27% in 2013 to 35% in 2021.

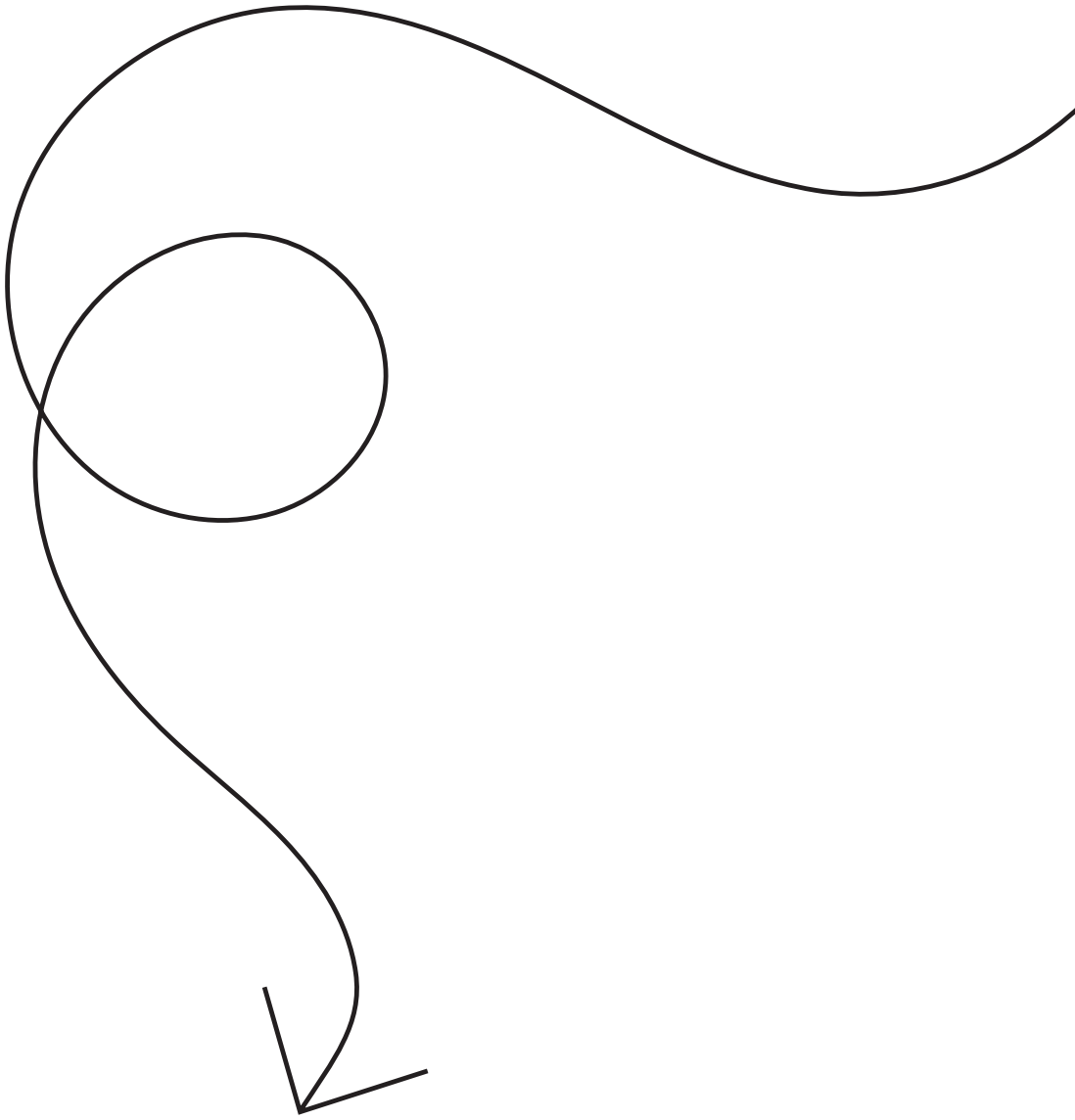
Chart 3

Global market share for the IT sector 2013–2021

Selected countries [30]



[29] The World Bank. *World Integrated Trade Solutions (WITS).*
[30] Bitkom. *Jahres-Pressekonferenz 2021.* 2021.



The Swedish tech sector is strong, but competition is increasing

The Swedish tech sector is strong, as shown by the comparisons in this section. In 2019, it accounted for 6.5% of Sweden's GDP and was the second most value-adding per capita in the comparison with European countries. However, its contribution could have been even higher had the growth been on par with the countries in the comparison. During the 2014–2019 period, Sweden's tech sector had the weakest growth in the selection, with many other countries growing significantly faster. Had the sector grown as the average in the comparison during this period, its contribution to GDP could have been half a percentage point higher (7.1%).

The tech sector is important for Swedish employment. In 2019, close to 250,000 people were working in the tech sector, accounting for 4.6% of Sweden's total employment. Between 2014 and 2019, the number of employed in the sector increased by 23.7%, which is on par with Germany and Croatia in the middle among the selected countries. One explanation for this development is the shortage of proper competence that has prevailed for many years.[31]

Both the United States and South Korea stand out in the comparison of tech sector contribution to GDP. In these countries, the sector contribution to GDP is 10.0% and 10.8%, respectively. Even though the figures are not entirely comparable, they do show, as do the other comparisons, the fact that Sweden needs to move up a gear in order to strengthen the growth and contribution of its tech sector and become a world-class tech nation. Bulgaria and the Baltic countries partly compete with low wages. In terms of reforms, it might therefore be more relevant to try to follow the examples of the United States, South Korea, and Switzerland when it comes to being at the forefront of technology, although inspiration should also be drawn from nearby countries like Finland and Estonia.

The next section describes how some of the countries that do well in the comparison work to promote the digitalisation of society and strengthen the competitiveness of the tech sector.

[31] See, for example, the IT Competence Shortage Report (2020), TechSverige.

OUTLOOK

Inspiration from other countries

The previous section showed that while the Swedish tech sector is strong from an international perspective, the tech sector in many of the competing countries is growing at a faster rate. In several of the countries with the strongest tech sector growth, governments have assumed clear digital leadership. In this section, we look at two of our neighbouring countries, Estonia and Finland, as well as South Korea and the United States. All these countries have, in various ways, rallied and implemented aggressive reforms in order to take advantage of the opportunities offered by digitalisation to bolster competitiveness and innovation and to ensure the growth of the tech sector.

Estonia

The Government of Estonia has assumed clear digital leadership, and digitalisation permeates many parts of society. One of Estonia's largest IT projects is the e-Estonia portal. Via the portal, residents can take care of common business, such as submitting their tax return, voting in elections, and starting a company. Through an e-Residency programme, Estonia enables companies from across the world to set up businesses in the country, and thus in the European Union, without setting up a physical office. Estonia is also the first country in the world to have a data embassy, located in Luxembourg. The embassy holds backups of ten national databases, including the population and company registries.[32] This system enhances security and reduces vulnerability in the event of a cyberattack.

[32] Khamila Mulia, "The Estonia-Singapore tech corridor: A conversation with Priit Turk, Estonian ambassador to Singapore", KrASIA, 8 January 2022.

INTERVIEW WITH DORIS PÕLD, CEO, ESTONIAN ASSOCIATION OF INFORMATION TECHNOLOGY AND TELECOMMUNICATIONS, ITL.

ITL is a member organisation that brings together Estonian tech and telecom companies and organisation.

"Focus is on closer collaboration with the private sector."

Which technology-related national political initiatives can Sweden learn from?

There are many initiatives that contribute to driving digital development in Estonia. Focus is on closer collaboration with the private sector, for example through changes in the State Assets Act. That enables the government to share the source code of government software on a transparent and uniform basis for all. The Digital Testbed Framework is another interesting initiative developed jointly with the private sector to support the use of new solutions in the public sector. For example, by publishing code in the source code list so that others can use it. There is also a programme called AccelerateEstonia, which brings together the private and public sectors to collaborate on complex global challenges. The programme is based on a start-up mindset in the public sector to test, validate, and implement solutions that give Estonia an international competitive edge and that have the potential for global scaling. All in all, these initiatives make it possible to accelerate innovation, make it more extensive, and include more stakeholders.

There are also many initiatives aimed at improving the provision of public services and moving towards more services that prioritise the needs of individuals. This is a global trend, and people expect their governments to provide the same high level of service as the private sector, but with even greater levels of trust, transparency, and security. In Estonia, we are moving towards proactive regulation and the development of "invisible" cross-agency services in order to make public services as user-friendly and efficient as possible.

In addition, one of the major goals for the coming years is to be an AI-driven digital nation, which involves using data for better decision-making and automating certain tasks that do not necessarily require human involvement. This is also in line with our initiative of #Bürokratt, which, in the long run, aims to provide an interoperable network of AI applications enabling citizens to use public services with virtual assistants through voice-based interaction. In the future, this will enable individuals to get everything they need from one device and through one virtual assistant in one single communication session.

Doris Põld
CEO ITL

Finland

In Finland, the government has prioritised digital matters and established its own ministerial working group for the development of digitalisation, the data economy, and public administration. It's mission is to guide the development of digitalisation, IT policy, and the data economy, as well as to coordinate activities and situational awareness related to these.[33] An inter-ministerial working group, called the Coordination Group for Digitalisation, operates in connection with the ministerial working group and is responsible for digitalisation and the data economy. The Coordination Group for Digitalisation is responsible for cooperation between the ministries and for promoting digitalisation and the data economy. The Coordination Group for Digitalisation also serves as a single point of contact for matters concerning data, digitalisation, and information policy.[34]

[33] Ministry of Finance. "Ministerial working group on developing the digital transformation, the data economy and public administration."
[34] Ministry of Finance. "Coordination group for digitalisation."

INTERVIEW WITH MATTI MANNONEN, EXECUTIVE DIRECTOR, INNOVATION AND ECONOMIC POLICY, TECHNOLOGY INDUSTRIES OF FINLAND.

Technology Industries of Finland is the lobbying organisation for companies in the Finnish technology industry and has more than 1,600 member companies.

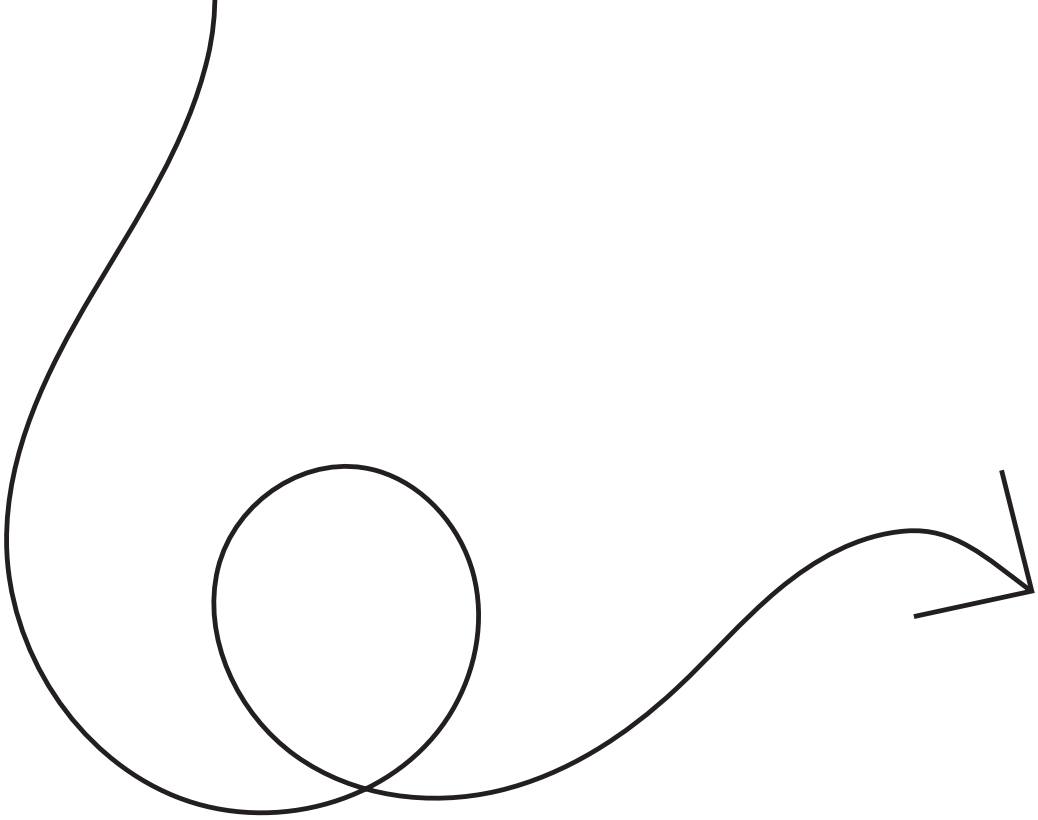
"A tech policy for making Finland the most attractive country."

What drives growth in Finland's tech sector?
Finland is an engineering country with a strong tech sector. The tech industry accounts for 50% of exports from Finland and two thirds of all private investments in research and innovation. Being a remote and small country, we cannot compete with the lowest price or benefit from economies of scale. Our own market is too small, which means that our products and services must be globally competitive. We have working models of collaboration between private companies and public research, which is conducted by private companies and sparingly supported by public innovation funding. And we have managed to create attractive ecosystems for start-ups that receive international joint venture funding and expertise.

Which tech-related national political initiatives can Sweden learn from?
In collaboration with the private and the public sector, we have defined Finland's tech policy for the 2020s. It comprises a large number of concrete proposals that will be implemented in order to make Finland the most attractive country for world-class tech companies, professionals, and researchers, to develop the most efficient public sector by harnessing the benefits of digitalisation and the data economy, and to benefit from Finland's ambitious goal of becoming carbon neutral through rapid development and application of green technology.

Among other things, the proposals include making public procurement a tool for innovation, carbon neutrality, and circularity. The platform also includes removing obstacles to applying for residency and work permits in order to increase the number of professionals wanting to move to Finland and to promote world-class quality research through increased long-term research funding. In addition, we have reached parliamentary consensus to increase our R&I intensity to over 4% of GDP by 2030 and are now taking the first steps on the road to doing this. We will also educate politicians and the departments of technology and tech policy in order to increase their understanding of the extensive change that is taking place.

Matti Mannonen
ED Technology Industries of Finland



South Korea

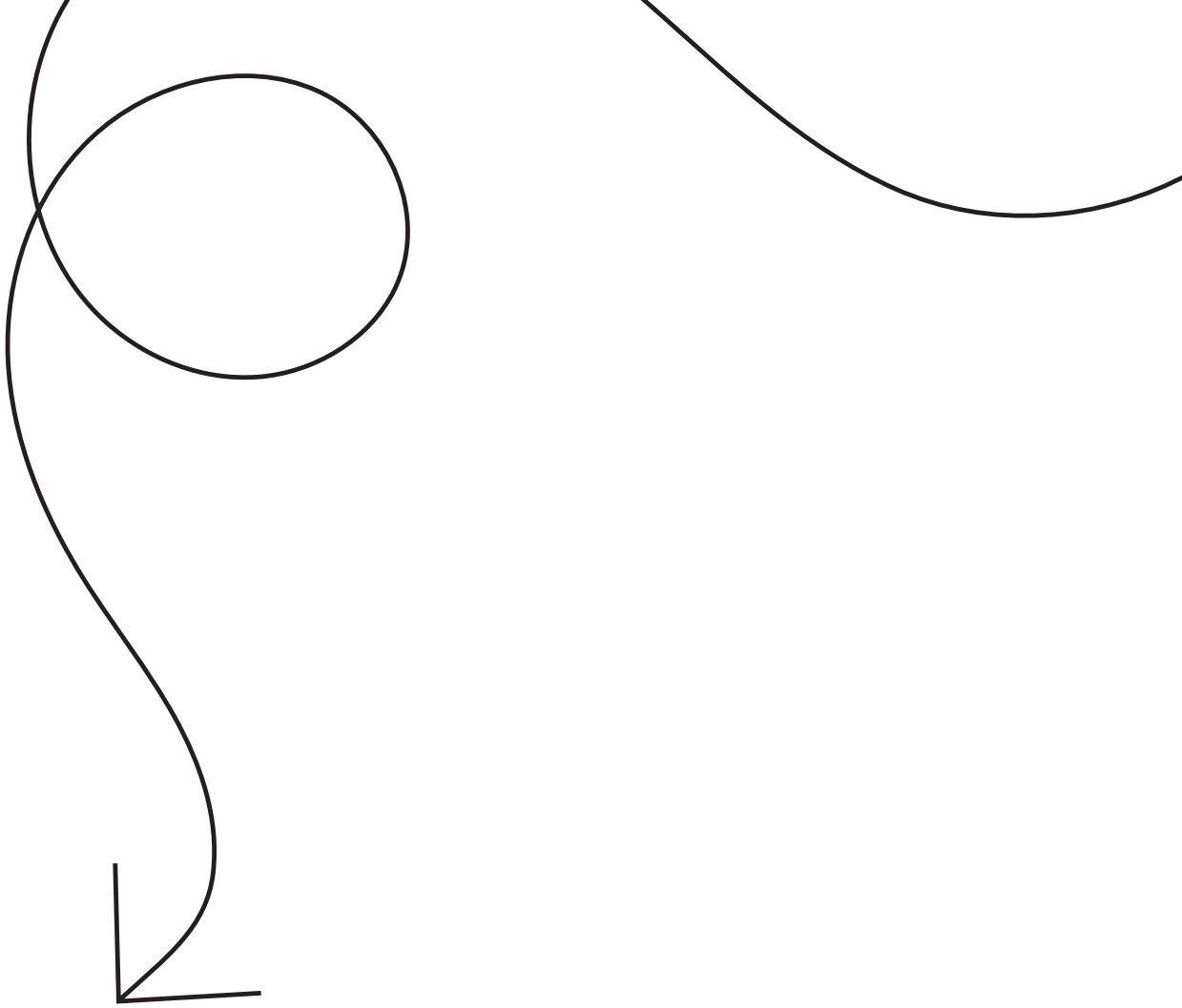
South Korea tops the *Bloomberg Index of Most Innovative Nations 2021* [35] and has a government that has long prioritised digital development and the tech sector. South Korea was one of the first countries to establish a national strategy for cloud services. The government presented its first plan for promoting the cloud data industry in 2015.[36] The country was also the first in the world to introduce a nationwide 5G network and commercialise 5G services. The Korean state played a key role in the development of 5G, creating a tailored institutional arrangement for it. Among other things, it established a detailed timetable, facilitated collaboration between companies, research institutes, and academia, and strongly promoted R&D for the development of 5G equipment, devices, and applications, for example by providing financial and administrative support.[37]

South Korea is also making major investments for the development and application of digital cutting-edge technology and data sharing, as well as for solving major societal challenges. Aiming to spearhead digital transformation, the country's government is making significant investments in digitalisation within the framework of the Digital New Deal and the Green New Deal initiatives. For the 2020–2025 period, a total of SEK 334 billion will be allocated to twelve major commissioned projects within the framework of the Digital New Deal.[38] One of the projects, *AI for Government Agencies*, aims at enabling government agencies to go completely digital using blockchain technology and 5G, while another focuses on smart healthcare, equipping hospitals with 5G and IoT in order to offer real-time monitoring and enabling collaboration between different medical institutions. The project also involves the development of software to diagnose around ten diseases, such as lung cancer and diabetes.[39]

South Korea's investment in the Digital New Deal would, according to Vinnova, correspond to a total of SEK 64 billion in Sweden in relation to the population, i.e. just over SEK 10 billion per year.[40] In addition, investments are being made in eight major commissioned projects within the framework of the Green New Deal in order to, among other things, increase Wi-Fi coverage to 100% in all classrooms at compulsory and upper secondary school levels and build an educational platform that uses big data and creates tailored educational content. Yet another project focuses on digital twins and will involve the development of high-resolution 3D maps for the entire country.[41]

[35] European Commission. *Bloomberg Innovation Index 2021*. 4 June 2021.
[36] International Trade Administration. *South Korea – Information and Communication Technology*. 13 August 2021.
[37] Massaro Maria, Kim Seongcheol. "Why is South Korea at the forefront of 5G? Insights from technology systems theory." 24 December 2021.
[38] Ministry of Science and ICT. *The Digital New Deal Is to Lead Digital Transition in the World After Covid-19*. 15 July 2021.
[39] International Energy Agency. *Korean New Deal - Digital New Deal, Green New Deal and Stronger Safety Net*. 2021.
[40] Vinnova, *International efforts for digital conversion*. 19 January 2022.
[41] Ministry of Economy and Finance. *Government Announces Overview of Korean New Deal*. 14 July 2020.

South Korea's investment in the Digital New Deal would, according to Vinnova, correspond to SEK 10 billion per year.



United States

The United States tops the World Digital Competitiveness Ranking, which measures capacity and readiness to adopt and explore digital technology as a key driving force for economic transformation in companies, government agencies, and society at large.[42] The United States is home to the headquarters of many of the major international tech companies, and, as previously shown in the report, the country's IT sector has a global market share of nearly 35%.

Part of the U.S. digitalisation efforts is a new department for technology and innovation (TIP) under the National Science Foundation (NSF).[43] The original proposal for an infrastructure plan from the U.S. administration included an allocation of USD 6.25 billion to the department for advanced technology development over 8 years. Vinnova estimates that this corresponds to approximately SEK 1.6 billion per year in Sweden, given the size of our population.[44]

Among other things, the TIP will be responsible for initiatives to promote new and critical technology, contribute to accelerated commercialisation of research, and help find new educational paths to improved skills supply and a diversified and qualified tech workforce. The TIP will also contribute to the fulfilment of the NSF goal for the Missing Millions: democratising computation and data to bridge digital divides and increase access to science for underrepresented communities.[45]

The TIP department will leverage strategic partnerships spanning multiple disciplines and sectors to promote emerging industries, from reliable artificial intelligence systems to biotechnology, cyber security, next-generation wireless networks, microelectronics and semiconductors, as well as quantum computer platforms.[46]

In 2021, the U.S. administration also started the Digital Corps initiative, a two-year internship programme for IT students with placement in federal agencies and public services. The purpose of the programme is to transform public services in line with digital transformation and to ensure skills supply.[47]

[42] IMD. *World Digital Competitiveness Ranking.*
[43] National Science Foundation. *NSF establishes new Directorate for Technology, Innovation and Partnerships.* 16 March 2022.
[44] Vinnova, *International efforts for digital conversion.* 19 January 2022.
[45] National Science Foundation. *The Missing Millions.* 3 October 2021.
[46] National Science Foundation. *NSF establishes new Directorate for Technology, Innovation and Partnerships.* 16 March 2022.
[47] United States Digital Corps. *Build a brighter future: Use your technology skills to help create more effective, equitable government.*

The United States tops the ranking in adopting and exploring digital technology as a key driving force for economic transformation in companies, government agencies, and society at large.

Summary and conclusions

The international comparison and the interviews in this section show that:

- **The tech sector is extremely important for the Swedish economy.** The Swedish tech industry is the second most value-adding per capita in the comparison. In 2019, the contribution of the Swedish tech sector to Sweden's economy was 6.5%. This puts Sweden in third place in Europe when it comes to how much the tech sector contributes to the economy, topped only by Malta and Bulgaria.
- **The contribution to the Swedish economy would be higher if the tech sector was given the conditions to grow at the same rate as competing countries.** While the Swedish tech sector is vital to the Swedish economy, it is growing at a lower rate than in many other countries and has the second weakest growth during the 2015–2019 period. If, instead, the Swedish tech sector had grown as the selection average during the period, 27.7%, the sector's contribution could have amounted to EUR 30.4 billion in 2019, and the contribution to GDP could have been half a percentage point higher (7.1%). Had it grown as Estonia's, by 64.7%, its contribution to GDP could have been 2.5 percentage points higher (9%). Such increase corresponds to more than what the entire transport sector contributed to the Swedish GDP in 2020 (2.0%).
- **Tech is essential to Swedish exports, but the global market is dominated by the United States.** Since 1998, the tech industry's contribution to Swedish exports has increased significantly – by nearly 1,200% – to as much as SEK 140 billion in 2020. Internationally, however, the United States is dominating trade, and the country's market share has grown consistently since 2013. In 2021, it was nearly 35%, while the market share of the EU fell to 15%.
- **Sweden has the highest proportion of tech employees in the EU – but other countries are approaching fast.** In 2019, nearly 250,000 people were employed in the Swedish tech sector, which corresponded to 4.9% of all people employed in the Swedish labour market. This proportion was the highest among all countries in the European selection for 2019. Sweden's growth in the number of tech employees for the 2015–2019 period landed in the middle of the comparison, on par with Germany and Croatia. The highest growth in number of tech employees was seen in Estonia, followed by Bulgaria and Poland. Estonia also has the second highest level of employment in the tech sector.
- **The competition for talent is fierce, and many jobs are difficult to fill.** Demand for labour in the tech sector internationally is high. In Sweden, 40% of tech jobs are difficult to fill, while our competing countries have difficulty filling up to 50–60%of the jobs. This reflects the major prevailing competence shortage in the tech sector globally.
- **Estonia has taken on a clear digital leadership role.** Residents in Estonia can take care of common business, such as submitting their tax return, voting in elections, and starting a company via the e-Estonia portal. Through an e-Residency programme, companies from across the world can set up businesses in the country without setting up a physical office. Estonia is the first in the world to have a data embassy, located in Luxembourg. The embassy holds backups of data from the public sector.
- **In Finland, digitalisation permeates all policy areas.** The Finnish government has established its own ministerial working group for the development of digitalisation, the data economy, and public administration. It's mission is to guide the development of digitalisation, IT policy, and the data economy, as well as to coordinate activities and situational awareness related to these.[48] An inter-ministerial working group, called the Coordination Group for Digitalisation, operates in connection with the ministerial working group and is responsible for digitalisation and the data economy. The Coordination Group for Digitalisation is responsible for cooperation between the ministries and for promoting digitalisation and the data economy.
- **The United States and South Korea are international sources of inspiration.** The U.S. is rallying, and has, as part of its concentrated efforts, established a new Directorate for Technology and Innovation (TIP) under the National Science Foundation (NSF). Among other things, it contributes to the goal of bridging digital divides and increasing access to science for underrepresented communities. South Korea's goal is to spearhead digital transformation, and its government is making substantial investments within the framework of the Digital New Deal and the Green New Deal initiatives for the development and application of digital key technology and data sharing as well as for solving major societal challenges.

[48] Ministry of Finance. "Ministerial working group on developing the digital transformation, the data economy and public administration."

Tech has established itself as a new base in the Swedish economy, as clearly shown by its contribution to GDP, exports, and employment. Digitalisation is now one of the strongest factors of change, and innovation and technology are key driving forces for societal development. The tech industry also enables development in other industries and provides a solution to many societal challenges.

Even before the corona pandemic, we were in the middle of a strong structural transformation driven by digitalisation and technology. This development has been accelerated, and great digital strides have been made. However, much of the digitalisation, its societal benefits and value to the economy, still lies ahead of us.

In this report, we have shown that the Swedish tech sector is strong, but that global competition is increasing and that the level of ambition needs to be raised for Sweden's economic growth, competitiveness, employment, and prosperity.

When looking at the global market share for the IT sector, the U.S., for example, has grown its share consistently as opposed to the EU, whose share of total revenue has not seen the same development. Competition from the rest of the world is constantly increasing, not just for Sweden but for the EU at large. There is a risk that innovative entrepreneurs, talent, investors, and growing companies will increasingly look across the Atlantic or to Asia for a better development climate.

When comparing Sweden to other countries with similar conditions, Sweden is well positioned; however, our previous edge and digital competitiveness is starting to lose momentum as other countries are developing very rapidly. Without strong measures, Sweden will lose its current position – and it might happen quickly.

This report shows that the tech sector is growing increasingly stronger in two nearby countries – Estonia and Finland. These countries prioritise digitalisation and the development of the tech industry at the highest political level. Digitalisation permeates all policy areas and is cohesive.

In order for Sweden to grow at the same rate as several other countries, and for the tech sector to contribute even more to the Swedish economy, Sweden must rally, step up, and demonstrate digital leadership.

Sweden needs to draw inspiration from other countries that are leading the way with reforms – we cannot sit back and relax. The world is changing rapidly, and politics need to keep up and aim forward. The right conditions must be provided. Global competition is a reality for companies here and now, and we cannot afford to wait or fall behind. Rather, the ambition is for us to be leading the development. For Sweden to be a world-leading tech nation.

[42] IMD. *World Digital Competitiveness Ranking.*
[43] National Science Foundation. *NSF establishes new Directorate for Technology, Innovation and Partnerships.* 16 March 2022.
[44] Vinnova, *International efforts for digital conversion.* 19 January 2022.
[45] National Science Foundation. *The Missing Millions.* 3 October 2021.
[46] National Science Foundation. *NSF establishes new Directorate for Technology, Innovation and Partnerships.* 16 March 2022
[47] United States Digital Corps. *Build a brighter future: Use your technology skills to help create more effective, equitable government.*

TechSverige's 37 proposals for Sweden as a world-leading tech nation

If Sweden is to be a leading tech nation, we need a new powerful policy, an ambitious and future-oriented digitalisation and tech policy that affects all areas of society. It's time for a Tech Agenda for Sweden. Presented below are 37 policy proposals in 10 different areas for Sweden as a world-leading tech nation. Proposals that should be implemented during the coming term.

- Raise the ambitions – a policy for Sweden as a world-leading tech nation
- Attract talent and accommodate the need for tech competence
- A fully connected Sweden
- Invest in digital cutting-edge technology
- Enhance information and cyber security
- A tech policy without unnecessary obstacles
- The tech industry as an enabler of Swedish competitiveness
- Future-proof the welfare system and the public sector using tech
- Tech for sustainable development
- Allocate resources and build partnerships with the tech industry

Below is a description of the currently most prioritised initiatives in each area.

Raise the ambitions – a policy for Sweden as a world-leading tech nation

In order to build Sweden strong for the future, competitiveness and growth need to be strengthened. Sweden's competitiveness and our chances of attracting long-term investments depend on our ability to utilise the opportunities offered by digitalisation. By embracing technological development, our entire society can benefit from the possibilities of digitalisation, which means increased participation and cohesion, a better welfare system, and efficient institutions. Therefore, we need a new and more ambitious policy that is results-oriented and benefits the whole of society. It should be based on the following elements:

1. **We call for political commitment with higher ambitions for Sweden as a digital leader.** Sweden's digitalisation policy needs to be made clearer and more results-oriented. Sweden will not be able to meet the societal challenges of our time if we don't fully take advantage of the opportunities offered by digitalisation. The digitalisation policy must facilitate participation for all and promote an innovative and competitive business community. This requires political commitment and responsibility as well as a coherent policy. The digitalisation policy must be stated in the Statement of Government Policy. The government must have concrete and ambitious goals for digitalisation. Having goals that say we should be the best in the world at utilising the opportunities offered by digitalisation is not enough. We need, and have the capacity to, lead digital development in certain areas, creating innovations that strengthen Sweden's development, competitiveness, green transition, and welfare. Furthermore, we need political commitment and knowledge throughout the Swedish Parliament and Government Offices. Draw inspiration from Finland and educate politicians and the departments of technology and tech policy in order to increase their understanding of and role in the change that is taking place.

2. **A government that takes responsibility – ensure governance and management that accelerate and support development.** We need to gear up digital transformation, which means that the government needs to assume leadership so that the digitalisation perspective permeates the daily work in various policy areas in order to quickly identify needs and promote the management of them. Each minister must have a clear digitalisation mandate in their portfolio. The government needs to ensure a structure that allows actual implementation of the digitalisation policy and pressing proposals, ongoing review of Sweden's challenges, and submission of reform proposals, as well as follow-up and evaluation of the digitalisation policy by an independent body.

Attract talent and accommodate the need for tech competence

The competence shortage in tech has long been significant, and the need is now pressing. 70,000 IT specialists will be needed as early as 2024, and the government needs to immediately implement targeted initiatives in order to reduce the shortage in both the short and long term. The structural transformation that drives digital transformation in society also changes the way we work and conduct business. This will increase the need for upskilling in many professions, such as health and social care. But also the need for enabling innovations in several important development areas, not least the green transition.

To increase access to competence in the short term:

3. **Enhance the conditions for reorientation and upskilling.** Increasing reorientation and upskilling in the labour market requires incentives for both educational organisers and employers. Earmarked resources, for example, are required if universities and vocational colleges are to increase access to short and flexible education adapted to the needs of working life for reorientation and upskilling. In addition, employers need to be given incentives to invest in staff competence with an expanded competency deduction.

4. **Invest in research and strong research environments in digitalisation.** The government needs to increase and prioritise the funding of research on digitalisation and digital tools. Collaboration between research and the business community as well as research and academia should be a requirement when distributing grants to support long-term skills supply in the industry.

5. **Establish a talent express into Sweden and stop talent deportation.** The government should introduce an extended talent visa for competence in demand and should ensure a high ability to process these applications. The government should also work to increase Sweden's attractiveness as a knowledge nation and end destination through predictable regulations and proportionate measures in the event of errors.

To strengthen access to competence in the long term:

6. **Increase access to and throughput from tech programmes at university and educational college levels.** The throughput for some programmes and specialisations is just under 50%. Investments in validation, supplementary education, or preparatory education can contribute to additional pathways into education and help increase throughput.

7. **Implement a national digital competence upgrade among teachers and headmasters.** Teachers and headmasters need adequate training and upskilling. Review the teaching programme and introduce digital competence as a central area of knowledge.

8. **Ensure that digitalisation permeates knowledge content throughout the school system.** Despite changes to curricula and the introduction of programming in schools, the role of digital competence in teaching is still too small. Digitalisation should be consistently integrated in education and school activities to both strengthen and arouse the interest of students.

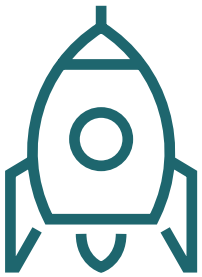
9. **Increase the interest in technology and promote digital inclusion.** There is still digital exclusion among people who, for various reasons, do not participate in the digital society at all or only to a very small extent. It is important that all social actors take greater responsibility for increasing participation in and understanding of digitalisation and technology. Targeted initiatives are needed to arouse an early interest of both girls and boys in digital tools. Initiatives are also needed for people of working age and older.

A fully connected Sweden

Access to fast and stable broadband, including 5G and future technology solutions, is a prerequisite for being able to work, study, communicate, and socialise throughout the country. The private and public sectors need secure and fast connections in order to conduct business.

10. **Ensure access to a fast and secure connection for all.** Allocate sufficient funding for broadband expansion and give the relevant authorities clear missions to actively contribute to such expansion. Access to fast and secure broadband is a prerequisite for fully participating in the digital society. It is also absolutely vital to being able to live in the whole of Sweden. There are not enough resources to make sufficient investments in the infrastructure to ensure access to fast broadband for everyone across the country. The goals established in the government's broadband strategy for 2025 are insufficient. Focus needs to be on actual connection, not theoretical possibility.

11. **Regain the position as the EU's leading mobile nation – ensure that spectrum is quickly deployed.** Sweden needs a stated ambition to be the country with the most efficient spectrum management in the EU. Quickly allocating and efficiently utilising spectrum is key to being at the global forefront when it comes to using new technology, innovations, and the services that come with them. It is also crucial for all of Sweden to have access to modern digital services. Delayed auctions and important spectrum left unused or used inefficiently will lead to Sweden falling behind and being unable to meet the goal of a fully connected Sweden. A review of spectrum management is needed for Sweden to regain its position as the EU's leading mobile nation.



Invest in digital cutting-edge technology

The emergence of new research, innovation, and companies in cutting-edge technology should be promoted, as should the use of technology. This involves everything from Artificial Intelligence (AI), the Internet of Things (IoT), 5G, and next-generation wireless networks, biotechnology, microelectronics, and blockchain technology for quantum computers. In today's society, data is a strategic resource and asset that needs to be given much more focus in order to increase the value of use.

12. **Initiate concrete development programmes with focus on the application of 5G.** The use of 5G can revolutionise many industries. This can involve smarter manufacturing and logistics or new applications of sensors and connected equipment, IoT. Other examples include advanced healthcare solutions with analysis, remote monitoring, or surgery supported by robots. Increased optimisation and efficiency using 5G can also provide major climate gains in many sectors. The government therefore needs to initiate and support the establishment of testbeds and concrete development programmes so that government agencies, academia, and businesses can jointly test solutions for the promotion of sustainable technology solutions and the creation of new innovations in the field.

13. **Increase the use of cutting-edge technology, not least AI, to increase the competitiveness and innovative capability of the entire business community.** The ability to implement and use new technology is crucial. The right conditions are needed for Swedish companies to dare and be able to quickly adopt new technology, AI, IoT, automation, and 5G. Initiatives around clusters, innovation platforms, and ecosystems must be designed to enable Swedish companies to test how new technology can be used in existing operations. Not least, Sweden needs to raise its ambitions and mobilise further in applied AI to strengthen Swedish competitiveness and innovative capability.

14. **Facilitate the use of data as a strategic resource.** The work with free data flows and making open data easily accessible must continue and be intensified both nationally and within the EU in order to advance the ability of the tech industry to create smart and sustainable solutions using, for example, AI. Sweden must have a stated ambition to become the best in the Nordic Region in making government data available. Data is a central component of the ongoing digitalisation and is crucial for Sweden's competitiveness, for the development of sustainable business models, and for enabling streamlining. Contributory requirements imposed on government agencies that currently sell their data to finance activities must be removed. The cost of accessing open data should be set at zero or, at most, cost price. Unclear rules for data transfer and localisation requirements hamper digitalisation.

Enhance information and cyber security

Companies, the public sector, and citizens must feel safe, even in the digital reality. A high level of information and cyber security is a prerequisite for such safety and thus for our ability to fully utilise the opportunities offered by digitalisation. Confidence and trust in digital development risk being damaged if security flaws and cyberattacks cannot be managed. This is true for everyday operation, for threats from criminals, and during times of impaired security in Sweden. The business community is currently taking major responsibility, working to increase information and cyber security. There is a great need for collaboration on these matters in order to increase security for businesses and other organisations. No actor can solve the information and cyber security issues by themselves, and strengthening security requires raised awareness of the threats as well as increased collaboration, competence, and ability to combat cybercrime.

15. **Raise awareness of information and cyber security threats.** Awareness of information and cyber security has increased as more serious incidents and threats are occurring. Despite this, awareness needs to be raised at all levels in society. IT and security companies educate, give advice, and contribute to their customers' security. The National Cyber Security Centre has been tasked with coordinating the work to prevent, detect, and manage cyberattacks and other IT incidents. The Centre also provides advice and support related to threats, vulnerabilities, and risks. The Centre, the Swedish Civil Contingencies Agency, and other government agencies responsible for key security issues must contribute to efficient ways of raising awareness of information and cyber security threats through long-term and effective information efforts. This applies to many types of threats in normal operations, but also to issues of emergency preparedness and overall defence.

16. **Increase trust and intensify collaboration between government agencies and companies.** The forms for how government agencies and private companies and organisations collaborate and share information about security threats need to be further developed. Today, the public sector demands information from and sets security requirements for businesses – without providing the businesses with information or the results from the agencies' work with information and cyber security. In many cases, the business community has information and knowledge that would enhance security for several actors if the right conditions were in place for sharing such information safely. Effort must therefore be put into developing functions aimed at strengthening collaboration, including more two-way information, in order to support companies and organisations with respect to information and cyber security.

17. **Increase access to competence in information security.** In order to reduce the risk of and consequences of cyberattacks, competence is needed at all levels. TechSverige's surveys show that security issues are among the most important, both as a driving force in the need for competence and the growth of demand. If there were more people with information security competence, more companies, the public sector, and other organisations would receive support from security companies. The demand for knowledge of information and cyber security must have receive greater consideration in the educational system and the labour market.

18. **Advance the competence, capabilities, and resources of the police, prosecutors, and courts in dealing with cybercrimes and cyber security threats.** Businesses and citizens are increasingly subjected to online crimes. The main cyber threat to medium-sized and large companies is so-called ransomware, malicious code used for extortion. The increase in ransomware is due to the automation of attacks and the fact that criminal networks are able to continue their activities. Several actors in the judicial system and supporting agencies need to improve their ability to prevent, investigate, and prosecute crimes committed online. Appropriate legislation as well as resources are needed to keep up with the rapid development of technology and crime. This also places great demands on international collaboration, both in terms of setting standards and fighting crime.

A tech policy without unnecessary obstacles

The tech industry is developing rapidly, and digitalisation means that new legislation needs to be drawn up on an ongoing basis. Legislation is both national and European, and because services and actors are cross-border, they need to comply with new laws and regulations in different countries. To create better order, legislation in Sweden and in the EU should be adapted to digitalisation. Sweden needs to strengthen its voice when digitalisation policy is discussed and negotiated in Brussels.

19. **Implement proposed changes that facilitate.** As early as 2018, the so-called inquiry into digitalisation law proposed the introduction of regulations to facilitate the ability of the public sector to outsource IT operations. In 2020, a new inquiry proposed the same thing, i.e. the need to introduce regulations that deal with the privacy issue in such outsourcing. This is just one example of regulatory changes aimed at facilitating the digitalisation of the public sector that have been investigated and proposed to the government but that have not yet been implemented. Recently, the government commissioned the Swedish Agency for Digital Government to identify legal obstacles to the digitalisation of the welfare system and to submit proposals that could develop the regulation. The government now needs to ensure that the proposals that have been and will be submitted are promptly addressed and translated into concrete action.

20. **Review current law.** Establish a digitalisation committee tasked with reviewing current law and proposing changes on an ongoing basis to ensure that legislation does not hinder or unnecessarily complicates digitalisation.

21. **Ensure that legislation keeps up with the rapid development of technology.** Establish a function responsible for ensuring that all new legislation that is presented is "digital by default". Any new legislation must be accompanied by an impact analysis in which the effects of digitalisation have been examined, and new laws must not put digital services and technologies at a disadvantage.

22. **Increased commitment and responsibility for EU legislation.** Sweden should actively promote that any legislation that is adopted, whether at EU or national level, is based on the principle of "think small first" to ensure facilitation of regulatory compliance. Companies in the tech industry face a series of laws from the EU, and in certain cases, new, detailed legislative proposals are drawn up that overlap existing ones. It becomes more difficult for companies to navigate the mass of regulations, and the threshold for new companies to enter the market is raised as compliance costs increase. Basic requirements involve that proposals for new or revised regulations must be based on clearly defined and recognised problems, not give rise to disproportionate costs, and not hinder the industry's global innovative and competitive capacity. The government must ensure that Sweden takes an active and committed role in negotiations and pushes for the consequences of new legislation to be analysed prior to adoption. It must also ensure that final proposals for compromise meet basic requirements for proportionality and do not go beyond what is necessary to achieve the goals.

The tech industry as an enabler of Swedish competitiveness

The digital structural transformation in the business community is vital to Sweden's competitiveness. The tech industry is a basic industry that makes a crucial contribution to Sweden's exports and GDP. By sharpening the digitalisation of other industries and sectors, it will further contribute to creating competitiveness and prosperity.

23. **Lay the foundation for entrepreneurship and the next Swedish "unicorn".** Sweden needs a strong landscape and ecosystem for entrepreneurship and start-ups to make sure that the next European billion dollar tech company is a Swedish unicorn. It must become cheaper and easier for companies to experiment. We need to create a corporate climate and arenas that allow "learning by using", where companies can test and develop services and ideas and then update and adjust according to needs and proportionate requirements. This can involve arenas that are co-financed to accelerate development and use, to create greater collaboration between major corporations and SMEs, or to get a more diversified and innovative range of products and services.

24. **Enable digital transformation in all industries.** There are still big differences between sectors and company sizes when it comes to implementing and using new technology. In order to enable digital transformation in all industries, we need access to competence and the ability to establish new working methods and business models among regulatory changes and contexts to create innovative capability in companies. This also requires great collaboration and partnership with the tech industry. Initiatives are needed to strengthen innovation and ecosystems in all industries, and science parks around the country play an important role in this.

25. **Initiate an export upgrade for the tech industry.** Exports from an internationally competitive business community are a prerequisite for Sweden's economic prosperity. Almost half of Sweden's GDP comes from exports of goods and services. The government should establish an ambitious industry and export promotion programme for all forms of tech, such as HealthTech, EdTech, FoodTech, FinTec, and CleanTech, to further strengthen the tech industry's export capabilities. The programme should focus on strengthening partnerships, innovation platforms, and service development.

26. **Enhance the tech industry's capacity for research and development and ability to participate in research environments in digitalisation and new technologies.** Companies' research and innovation are vital to Swedish growth and competitiveness and to Sweden as a knowledge nation. Academia and research institutes must be given great conditions to assist the business community as well as appropriate funding that rewards doing so. Other countries invest in and improve the conditions for their companies' research and development and Sweden needs to raise its ambitions as well.

Future-proof the welfare system and public sector with tech

In order to future-proof Swedish welfare, face the demographic challenge, and increase both efficiency and quality, investments are needed in digital transformation in the public sector, not least in the welfare system. In the service of humanity, technology can place the individual citizen in focus and contribute to more individually tailored solutions and thus to increased quality of life. The public sector needs to strengthen its interaction with the market in order to succeed. The state needs to take a more unified and powerful approach to digitalisation in the public sector and accelerate development in close collaboration with regions, municipalities, and the tech industry in the following areas:

27. **Collaborate with the market for a secure and cost-effective national digital infrastructure and IT operation.** In order to accelerate innovation and service development in the market for the benefit of society as well as the individual, the state, in collaboration with the business community, needs to invest in a common digital infrastructure and data sharing in, for example, healthcare and education. To accommodate the public sector's need for secure and cost-effective IT operations, the collaboration with private actors needs to be strengthened and the proposals provided by the so-called inquiry into whether services should be primarily supplied by private actors need to be implemented.

28. **Implement open standardised interfaces for data transfer as default.** Public actors should be required to share open APIs, and requirements for public open and shared data should be imposed to accelerate the ability of the tech industry to create smart solutions for society and the citizen at large. This also creates key conditions for large-scale implementation and a competitive market.

29. **Increase the interest of more tech companies in the public market.** The number of tenders in the public IT market is decreasing. Many companies testify to the difficulty and complexity of navigating the public market and the demanding procurement processes. They also feel that the potential of their solutions is not fully realised. At the same time, the public market is very important for many companies. When new technology creates ground-breaking opportunities, a clear collaboration between the business community and the public sector is necessary. There is lots to do on both ends. The public sector needs, among other things, the courage to procure function and results to a greater extent. In order to realise this, a high level of procurement competence and digital maturity is required. Innovation procurement, innovation awards, and outcome-based contracts are possible ways forward to achieve technological breakthroughs and utilise the potential of health data, data-driven solutions, and AI to increase patient safety and strengthen research. More seamless data sharing between both private and public health and social care actors is needed.

30. **Create a consent function for the use of, for example, health data for government agencies, municipalities, regions, private healthcare providers, research, and welfare services.** Enhancing the individual's ability to contribute data in a safe manner also makes it easier for research to use these data. The state plays an important role in this. Increased access to such data is a powerful contribution to the development of AI, decision support, and machine learning, which in turn can lead to improved health and increased patient safety. It also strengthens Swedish life science.

31. **Accelerate the use of HealthTech and welfare technology.** New innovative HealthTech solutions and welfare technology for things like self-monitoring, increased security, and prevention are of great importance, not least for the chronically ill, the multimorbid, the elderly, and the disabled. Tech is a prerequisite for quality health and social care, with security, independence, and increased participation in one's own health as clear benefits. Society stands to gain a lot as well. The use of HealthTech solutions and welfare technology needs to be accelerated by taking a new approach to incentives for the individual, compensation models, standards, and initial investments in organisation and digital competence.

32. **Cross-fertilise technology and life science for new Swedish export opportunities.** In many industries, developments in tech have been ground-breaking. In life science, those benefits have not been fully utilised. The strong Swedish tech sector has the potential to help Sweden become a leading life science nation. In order to promote this, the conditions for cross-fertilisation of the industries need to be enhanced, and the ability of the market to contribute to the use of technology in healthcare and life science need to be expanded. A new innovation platform is needed for collaboration between tech and life science to enable various actors in both academia and the business community to drive the development of new innovative solutions.

Tech for sustainable development

The green transition is one of the most important issues of our time, and the tech sector has a unique ability to contribute products, services, and innovations that promote sustainability throughout society. Initiatives are needed to release the potential of digitalisation for sustainable development and to promote the industry's own sustainability efforts:

33. **Accelerate the use of technology in the green transition.** Digitalisation is an enabler of the entire society's green transition, and the tech sector has the potential to contribute to smart societal development with reduced energy consumption and less CO2 emissions in many sectors, such as transport, industry, agriculture, and construction. The government must raise its ambition and accelerate its work for broad use of tech in the green transition as well as increase investments in order to achieve Sweden's climate goals through digitalisation. Inspiration can be drawn from Finland, among other countries, and from South Korea's Green New Deal.

34. **Increase the circularity of small electronics by 2030.** The government needs to raise its ambitions for the circularity of small electronics by modernising producer responsibility and steering towards increased reuse. This would mean going from traditional collection and recycling to also promote and utilise the opportunities to reuse small electronics.

35. **Effectively phase out unwanted chemicals in electronics.** The Swedish chemicals tax on electronics is a national tax on products for a global market. It is not effective because it does not lead to the desired environmental effects and discourages the reuse of products. The tax should be abolished in favour of voluntary or other legislative initiatives within the framework of the EU work to promote the substitution of unwanted chemicals.

Allocate resources and build partnerships with the tech industry

While ambition and high-level goals are necessary, so is the allocation of resources for long-term investment in the digital transformation of society and the business community. A decisive success factor for whether Sweden will be a world-leading tech nation is close collaboration with the tech industry.

36. **Prioritise resources for long-term investments.** Driving digital transformation of society, the business community, and the public sector requires a long-term perspective and certain joint investments. With inspiration from other countries, such as South Korea and the United States, which allocate billions to promoting development, Sweden should invest for a digitalised and competitive Sweden in areas like competence, broadband, security, cutting-edge technology, and concrete development programmes.

37. **Lay the foundation for frequent dialogue and close collaboration with the tech industry.** For Sweden to succeed as a leading tech nation, we need a world-class tech industry. The government needs to make it clear to companies in Sweden and around the world that it wants to promote the growth of innovative tech companies. The needs of businesses and various sectors must be accommodated in a national programme – Digitalised Sweden – whose work, like that of Fossil-Free Sweden, is conducted in extensive collaboration. Inspiration can be drawn from the way Estonia and Finland work to digitalise the business community through close collaboration and partnerships between the tech sector and various actors.

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A REPORT FROM TECHSVERIGE

A tech agenda for Sweden

TechSverige is an industry and employer organisation for all companies in the tech sector, with the mission to create the best conditions possible for a world-leading Swedish tech industry together with our members. Our 1,400+ member companies, collectively employing close to 100,000 people in Sweden, include everything from small start-ups to major multinational corporations with thousands of employees worldwide.

TechSverige is one of nine collaborative federations in Almega. Our members are also members of the Confederation of Swedish Enterprise. Visit us at techsverige.se

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