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STRONG DEMAND
over time

18,000 PEOPLE
needed annually until 2028

NECESSARY INVESTMENTS
to meet the competence need

A REPORT FROM TECHSVERIGE

The competence need in tech

TechSverige

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COMPETENCE NEEDS WITHIN TECH

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Good access to tech skills is crucial for Sweden

Tech has become increasingly important for the Swedish economy and society. Digitization is an underlying prerequisite for the innovation and competitiveness of other industries and for the development of the public sector. In addition, the tech industry's solutions create great value in individual people's everyday lives, for welfare and in climate change. The digitization of society and the development of the tech sector depend on skilled employees with the right skills.

Good and broad access to tech skills is crucial for Sweden. It is a prerequisite for the competitiveness of the entire business world and for creating growth, coping with welfare and climate change. A high digital maturity has historically been one of Sweden's strong branches that has benefited us very well and made us global digital pioneers.

One of the tech industry's biggest challenges is getting access to the right skills to be able to create new innovations, offers and solutions that are in demand in the market and in society.

Lack of tech competence has far-reaching consequences for Sweden's economic and technological development. The lack of skills is therefore not only a matter for the tech industry as such, but for society as a whole.

The economic downturn of the past year, together with geopolitical uncertainty and protectionist tendencies, has contributed to certain technological investments and development initiatives being limited. This combination of factors is expected to dampen the rate of growth in both the tech industry and the economy at large.

Despite the economic situation, the demand for tech skills over time remains strong. This is shown by our latest survey, which maps the demand for tech skills up to the year 2028 in the tech industry and in other parts of business life and the public sector.
The result shows that there will continue to be a lack of competence.

The need is greatest in the tech industry, where the number of people with tech skills needs to increase by 30 percent by the year 2028, which means a growth of another 10,000 people per year for the next four years. In the rest of business and in the public sector, the need is estimated to grow by 15–17 percent, corresponding to approximately 8,000 people per year until 2028.

In summary, our forecasts point to a continued and growing need for tech expertise over time.
Up to and including the year 2028, we estimate that an annual addition of 18,000 people with tech skills will be needed in Sweden.

Trends that have the strongest impact on skills needs are information and cyber security and new technologies, such as artificial intelligence (AI). AI affects many professions in society and of course also in tech. Thanks to AI, for example, programming can be made available to more people, made more efficient and quality assured. Being able to interact with different AI solutions is becoming increasingly important in the entire labor ma

The purpose of this report is to provide a clear picture of the demand for tech competence and what measures are required to meet the competence needs. The report is aimed at prospective students, education providers, companies, organisations, authorities and politicians. We hope it can be used to:

- Encourage more individuals to apply for IT courses.
- Promote the establishment of high-quality university and vocational education.
- Ensure an appropriate allocation of resources and sizing of IT courses.
- Improve the conditions for competence development.

In this report, we present concrete proposals to remedy the skills shortage and get more and more people to work with and in tech.

The tech industry welcomes more! Let's together make it possible for more talents to participate and create the future.

Åsa Zetterberg
Union Director
TechSverige

February 2024

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”Good access to tech skills is a prerequisite for the competitiveness of the entire business world and for creating growth, coping with welfare and climate”

Åsa Zetterberg

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Measures for better supply of skills

GOAL FOR ANOTHER 100,000 IT SPECIALISTS UNTIL THE YEAR 2030

In order to maintain and strengthen Sweden's competitiveness, it is crucial that we invest in digital excellence.
This means that we must set clear and ambitious goals to get more people to want and be able to work with tech. Countries such as South Korea, Japan, the United States and Canada have already acted in this direction and taken active steps towards attracting and training millions of IT specialists. In order not to fall behind, we need to act decisively.

Similar to what several other countries have done, the government should set a clear target for the future number of IT specialists and work to reach the target. The goal for the government should be to increase the number of professionals with digital excellence to 320,000 by 2030. This would mean an addit shot of around 100,000 professionals compared to today.

To achieve this, both long-term and short-term measures are necessary. Reforms are needed so that the education system as a whole better responds to the skills needs of the tech sector and the rest of the labor market, as well as measures to attract more people to apply for tech jobs. One way to focus on the goal and coordinate measures is to set up a special forum, a so-called collaboration council, which consists of representatives from business, the public sector, the social partners, relevant authorities and educational institutions. The council's role shall be to promote the development of digital excellence. The council's main task will be to carry out analyzes and forecasts regarding the needs for digital excellence as well as develop suitable proposals and act collectively or individually. The information from the council will be crucial in providing the government with well-informed basis for decisions at both national and regional level.

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EQUIPPED STUDENTS FOR THE DIGITAL FUTURE

The foundation for the jobs of the future is already laid in primary and middle school. Important areas such as programming and software engineering, computer science, algorithms, cryptography, artificial intelligence and mathematics should form mandatory parts of school courses and curricula. It is also important that students gain knowledge about how they can stay safe in the digital environment.Principals and teachers are the key to students' knowledge development. If they are to be able to design learning environments that contribute to raising the children's digital competence, it is necessary that they themselves have the right competence. Teachers and principals needs to be offered continuous competence development and the existing teacher training needs to be adapted and updated.

AI and digital tools have the potential to revolutionize learning through tailor-made teaching according to each student's unique needs and abilities. Access to and research into these techniques in teaching needs to increase.
The government should establish an "AI education lab", where researchers, teachers, principals and actors in business work together to improve the quality of primary and secondary education with the help of evidence and smart technology.

INCREASE THE PROPORTION OF WOMEN WHO CHOOSE IT EDUCATION

During most of the 2000s, the gender distribution in IT education and in the education programs that lead to work in this industry has been uneven. Gender differences in educational choices are established at an early age. Efforts are therefore required already in elementary school to encourage and guide more girls to take the step into tech.

A central goal of the upcoming STEM strategy should be to increase the number of girls who further their education in tech. Study and vocational guidance counselors play an important role in guide young people in their future study choices. This requires that they have a good knowledge of the skill needs within the tech industry. It requires regular further training and updating of their knowledge of new technologies, trends and the industry's needs.

Investments in supplementary education or preparand education can also contribute to more pathways into education and broadened recruitment.

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INCREASE QUALITY AND RELEVANCE IN COLLEGE EDUCATION

Higher education forms the basis for the tech industry's supply of skills. More than 60 percent of all tech companies in this survey state that they demand university graduates when recruiting IT specialists. The university has an important role in meeting the need for skills in the tech industry by training more people for IT professions.

At the same time, the resources for IT education and other technical education have been eroded for a long time. This is because the remuneration level has not followed the income trend and increased savings requirements in the higher education sector. The government's investment in engineering education in budget 2024 is a step in the right direction, but a larger and continuous addition of resources is required to ensure the quality of the education over time.

The erosion has already had major consequences on the quality of teaching and affected the possibility for students to absorb the education. Data that TechSverige has compiled (Dropouts from IT courses: 2022) shows that a majority of all students who start a higher education in IT drop out of their studies.

The dropout rate is between 65 and 80 percent, depending on the educational focus.

The majority of all students who drop out study less than half of the education. Almost 40 percent do not pass more than a quarter of the credits. TechSverige believes that the government should give the University Chancellor's Office (UKÄ) the task of continuously following up and analyzing dropouts and the reasons for them. UKÄ should also work on promotion by sharing good examples between higher education institutions.

INCREASING INVESTMENTS IN IT EDUCATION IN VOCATIONAL SCHOOLS AND INCREASE AWARENESS OF THE FORM OF EDUCATION

The training within the university of applied sciences is carried out in close cooperation with working life. The connection to working life means that the university of applied sciences' courses are designed to strengthen matching and manage changes in the labor market. It also means that courses within the university of applied sciences are well suited to meet the needs of new and growing industries that arise with the rapid digital and technological development.

The authority for the university of applied sciences should prioritize an-

searches for educations in data/it, both in terms of educations that lead to a degree and shorter courses. In addition, education in several educational areas should be supplemented with competence in digitization and new technology.

If the university of applied sciences is to be able to expand with quality, it is important that awareness of the form of education increases. The government should give the Authority for the University of Applied Sciences the task of increasing awareness of the form of education among companies and potential students.

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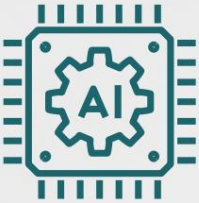

SPECIAL INVESTMENT IN INTEGRATING AI IN EXISTING AND NEW EDUCATION

In an age where technological advances are continuously transforming working life and tasks, it is becoming increasingly important to possess both specific domain knowledge and technical competence. In order to meet the needs, it is important that colleges and universities of applied sciences integrates AI perspectives and applied AI into existing and new educations. This applies in all areas of education. The government should allocate special resources that can be applied for by institutions of higher education and universities of applied sciences to adapt existing educations and develop new ones.

STRENGTHEN OPPORTUNITIES FOR COMPETENCE DEVELOPMENT AND ADJUSTMENT FOR PROFESSIONALS

The rapid technological development places increased demands on the labor market's adaptability.
It is important to create stronger incentives for universities and polytechnics to invest in restructuring and skills development.

The government should earmark resources for the development of short and flexible courses at the university. A large part of the university's education offering is currently tied to programs that are primarily designed for younger students.

The transition study support that was introduced in autumn 2022 has not yet reached its full potential. Long processing times have contributed to the fact that CSN has had to return funds that were intended to be used for restructuring and skills development of the Swedish workforce. In order to ensure that more people get access to the transition study support, it is crucial that the government takes measures. The government needs to act to ensure that processing times are shortened.

Professionals who apply for courses and training at the university or at the university of applied sciences with transition study support should be able to apply through a special application quota. This should apply within certain subject areas or to certain education shortages where the labor market's demand is particularly high.

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BEFORE A TARGETED TAX DEDUCTION FOR COMPANIES' SKILLS ENHANCING ACTIVITIES IN DIGITALIZATION, AI, INFORMATION AND CYBER SECURITY

In a world where digital changes occur at a rapid pace, organizations' ability to adapt and develop their operations is directly linked to the availability of the right skills. A major challenge for organizations today is to be able to effectively integrate and benefit from new technological advances. This requires not only technical knowledge, but also an ability to continuously learn and adapt to new digital trends and innovations.

To meet these challenges, better opportunities are required for organizations to invest in the skills of their employees. Such investments can directly affect the company's productivity and efficiency. This applies not least to small and medium-sized companies, which often lack the conditions to set aside resources and time for strategic work with competence supply and competence development. In order to facilitate and stimulate these investments, we propose that the government introduce a targeted tax deduction for competence-enhancing activities in digitization, AI, information and cyber security, a so-called digital competence deduction for digital development. This would give employers stronger financial incentives to invest in their staff's digital skills.

In order to test and evaluate the effectiveness of such a deduction, we propose that a pilot study be carried out in collaboration with the Swedish Tax Agency. Through this study, both the government and business can evaluate how well such a deduction works in practice and what impact it has on the companies' skill development.

PROMOTE INTERNATIONAL RECRUITMENT IN TECH

The talent pool is limited for the countries that compete for cutting-edge expertise and want to become leaders in AI. Political efforts and targeted efforts are required to attract the best of the best talents. Like Canada, the government should adopt a strategy for tech talent, introduce six-year work permits and introduce a cap on processing times for work permits in tech at ten days.

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INCREASE INVESTMENTS IN RESEARCH, DEVELOPMENT AND INNOVATION

A substantial increase in the ambition of the Swedish research budget and clear research policy priorities are required. The government should develop a national research and innovation policy that supports society's digital transformation through investments in cutting-edge digital technology (quantum technology, AI, 5G/6G, information and cyber security).

Efforts around clusters, innovation platforms and ecosystems must be designed to enable Swedish companies to be able to test how new technology can be used in existing operations and promote mechanisms for introduction and benefit realization.

STRENGTHEN THE COMPETENCE ASSET WITHIN INFORMATION AND CYBER SECURITY

To increase information security broadly in society and reduce the consequences of cyber attacks and information security incidents, more competence is needed at all levels. The demand for competence in information and cyber security has grown a lot and will continue to grow strongly in the future. Today, both a uniform picture of the demand for various security skills and access to an educational offering that meets the demand is missing. In order to to meet the growing demand, the government together with education providers should ensure that there are various forms of information security education at post-secondary level that meet the needs of the labor market. The supply of training courses should preferably be developed in collaboration with business. The government must also prioritize research and education at a higher level as today's supply is limited.

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Summary

The extensive digitization that is taking place both in Sweden and globally has contributed to a growing demand for tech skills. This development does not only affect the tech industry, but more parts of business life and the public sector. This report highlights the growing importance of tech skills in the Swedish labor market and maps the need over time.

Large increase in the number of people employed in tech professions Since 2014, there has been a large increase in the number of people employed in tech professions, both within and outside the tech industry. A significant part of this increase has taken place in the tech industry, but interestingly, the largest percentage increase has taken place in other sectors such as the finance and insurance sector, energy supply and healthcare including social services.

Continued need for tech competence over time Our projections point to a continued and growing need for tech competence over time. Up to and including the year 2028, we estimate that an annual increase of 18,000 people with tech skills will be needed in Sweden.

Biggest growth in the tech industry
The biggest growth is in the tech industry, where we estimate that the percentage of people employed with tech skills needs to increase by 30 percent in 2024–2028. The need for skills is also increasing outside the tech industry, albeit to a lesser extent. Here we assume that the increase will be 15 to 17 percent during the same period.

In-demand occupational categories and skills
Occupational categories that are most in demand in terms of numbers are software and system developers within the tech industry and IT support technicians outside the tech industry. Within the tech industry, it is AI Science and Data Science that show the greatest growth rate, while the demand for software and system developers is growing most outside the tech industry.

Central trends and need for competence-enhancing efforts
Information and IT security as well as new technologies, such as artificial intelligence (AI), are central trends that affect skills needs in all sectors. This development underlines the need for competence-enhancing efforts.
40 percent of the respondents in this survey indicate that upskilling or skills development is the most appropriate measure to meet the changes that these trends entail.

The demand for university graduates and engineers
The demand for people with a university education is consistently high, and in the tech industry the demand for engineers is particularly high. This points to a continued strong labor market for university graduates and underlines the importance of the university meeting labor market needs.

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About the report

This report presents a mapping of the needs of various professional roles and competencies required for organizations and companies to succeed in introducing, developing or providing digital products, services or solutions.

The mapping includes 16 occupational categories and 23 competencies that are deemed to be essential for the digital service or product, the management of these, or for the business.1 Of these 16 occupational categories, 13 are technical occupations, while three occupations are of a more general nature. This concerns, for example, non-industry-specific occupations such as technical salespeople or business developers. Appendix three contains more information about which professions and skills are included in the survey.

In order to provide a comprehensive picture of the competence needs, in this report we have extended the survey to also include a selection of activities in the private business world and the public sector.

The independent research company Verian (formerly Kantar Public) has, on behalf of TechSverige, conducted two surveys in 2023, one of which has been directed to TechSverige's member companies and the other to a selection of companies and operations in other industries.

Disposition

This report consists of four parts. In the first part, we give an overview of the historical development of employment in various tech professions. This information will form a background and give a context to the results presented in our mapping.

The second part describes which trends and driving forces affect the skills needs within the tech industry and in other parts of business life and the public sector.

In part three, we report on the tech industry's skill needs at the professional and skill level. In this part present-a forecast is also made based on the responses to the survey and employment development in the tech sector.

In part four, the competence needs in other designated industries that are included in this mapping are reported. A comparison is made with the needs of the tech industry. The second part also contains a projection of the employment development in other industries which is based on two scenarios.

Finally, there is information about the survey's method and approach, as well as appendices with which professions and competencies are included in the survey, tables and diagrams.

1 Appendix 3. Description of professional roles and which competencies they include.

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PART 1

Tech competence – a growing need in all sectors

The tech industry, which is a relatively young industry, includes many new professional roles and skills. It is common for job titles to be in English and to change quickly. This dynamic makes it difficult to identify and delimit the number of people employed in the technical professions. The official statistics, which are based on register data, are lagging and are based on an occupational categorization Swedish Standard for Occupational Classification (SSYK) which is blunt and rarely captures rapid changes.

At the same time, these are the statistics we have to deal with in order to get an idea of employment in the tech professions and how employment has developed over time. In this section, it is reported how many people work in different types of tech occupations based on a selection of occupational codes (SSYK codes) and how employment is distributed between different industries. General occupations are not included in this report.

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Employment in tech professions

In 2021, the total number of people employed in tech professions amounted to approximately 210,000. Approximately 90,000 of these were active as software and system developers, which not only makes this profession the largest in its professional field, but also the fifth most common profession in Sweden.2

Table 1

The number of people employed in technical occupations (SCB)3

Tech occupations (SSYK)	Number of employed
Software and system developers, etc.	90,826
System analysts and IT architects, etc.	21,798
Support technician, IT	17,877
Other IT specialists	16,524
Operations technician, IT	10,913
Network and system technicians, etc.	10,448
IT managers	13,601
System tester and test leader	6,730
System administrator, etc.	6,450
System administrators	4,196
Developer in games and digital media	3,887
Designer in games and digital media	3,729
IT security specialists	3 105
Total	**210,084**

Source: Statistics Sweden. The 30 most common occupations in the country for employees aged 16-64, 2021

[2] Statistics Sweden, Gaining employees aged 16–64 by number in the profession, year 2021 3
Statistics Sweden. Number of employees aged 16–64 by occupation (Ssyk4), industry (SNI2) and gender. Occupational register 2021.

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During the period 2014–2021, the percentage of people employed in tech professions increased by 33 percent, which corresponds to 50,000 people. Diagram 1 illustrates the percentage change in employment per occupation.

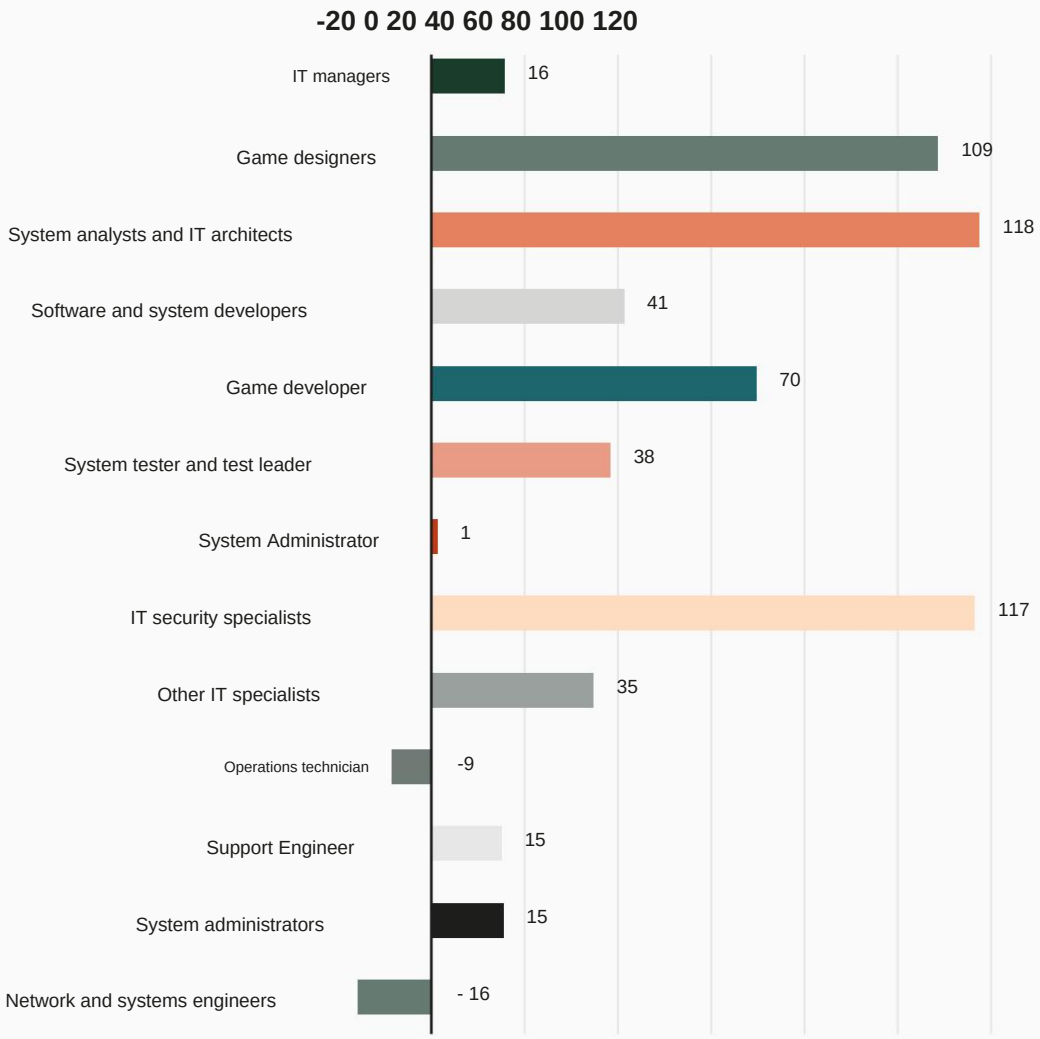
System analysts and IT architects are the professional group that has had the highest increase with a growth of 118 percent, which corresponds to 10,000 professionals.
The proportion of IT security experts has increased to almost the same extent, although the increase has taken place from low levels.

Within certain occupational categories, such as System Administrators, System Administrators and Support Technicians, employment remains relatively stable over the years. The fact that employment in these occupations is relatively constant may be due to a continuous need for these skills.

Within two professional roles, Network and system technician operation technician and Operation technician, employment during the period 2014–2021 has decreased by 16 and 9 percent, respectively.

Diagram 1

Change in employment in percentage per occupation between the years 2014–2021 (SCB)



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If we instead look at how employment is distributed between different sectors, diagram two shows that half of all those who work in the tech professions are found in the information and communication industry.

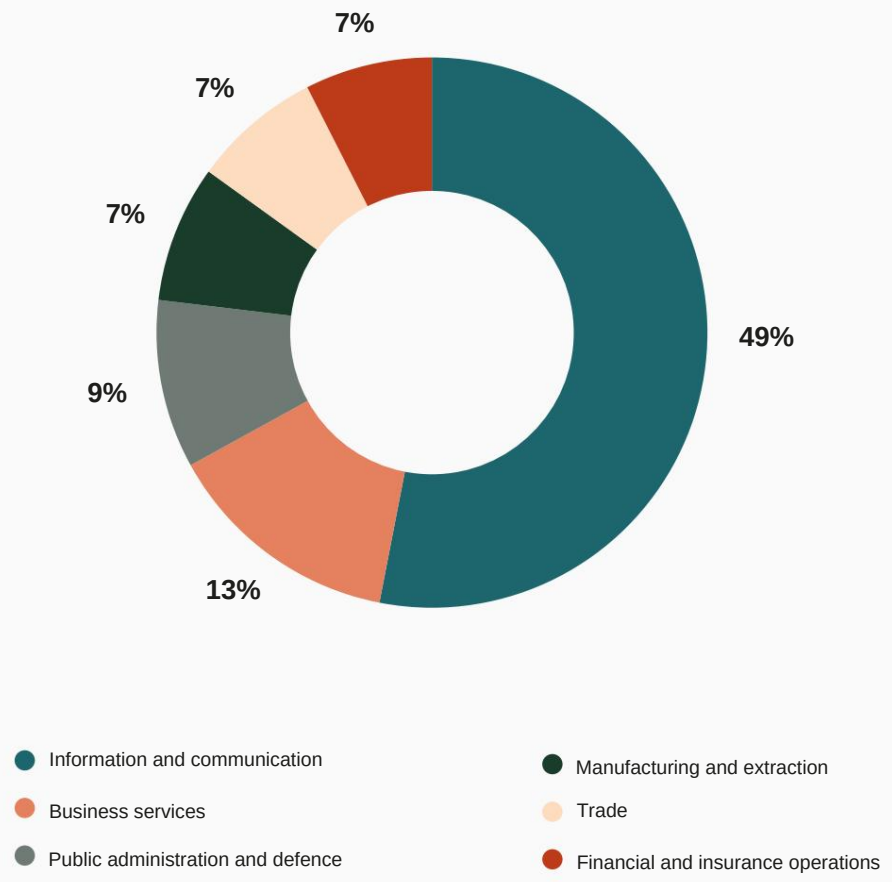
These are mainly active in the sub-sectors Data programming and data consultancy, Information services and Telecommunications.4

It is not particularly surprising that many who work in tech professions are active in the tech sector.

However, what arouses interest is their growth importance in other sectors. Business services stand out as the sector with the second highest number of people employed in tech professions. Within the branches of industry Public administration and defense (9 per cent) and Manufacturing and extraction (7 per cent) the proportion of people employed in these occupations is also high in comparison with other sectors.

Diagram 2

Distribution of the number of people employed in tech occupations by industry (SNI), 2021



The diagram only presents sectors where the number of people employed in tech occupations exceeds 3,000, which constitutes 92 percent of the total employment in these occupations in the labor market as a whole.

4 SNI 62 Computer programming, computer consulting etc., SNI 61 Telecommunications and SNI 63 Information services.

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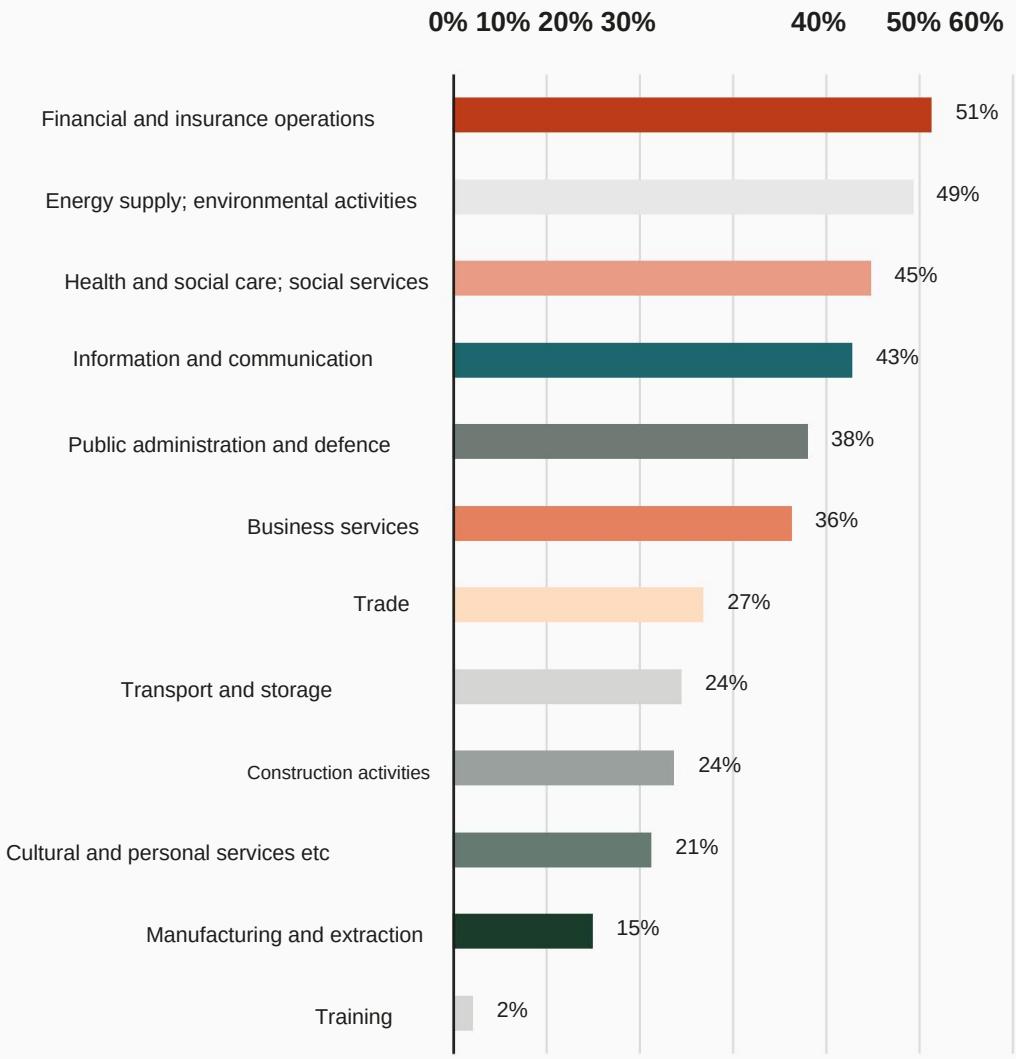
Data from Statistics Norway show that the number of people employed in tech occupations has increased in all sectors during the period 2014–2021.5 In percentage terms, the largest increase has occurred in the finance and insurance sector, where the proportion of people employed in tech occupations has doubled since 2014. A similar development can also be seen within the Energy Supply sector, albeit from low levels.

The information and communication sector, which mainly includes IT activities, stands out as the sector with the largest absolute increase. The growth has also been significant in the Corporate Services and Public Administration/Defence sectors, where the number of people employed in tech professions increased by 19,000 and 13,400 people respectively between the years 2014 and 2021.

The official statistics show a clear and growing importance of tech professions in the Swedish labor market, where the number of employed people has increased both within and outside the traditional tech sector. In this report, we will outline how this employment is expected to develop in the years 2024–2028.

Diagram 3

Change in employment between different sectors, 2014–2021



5 SCB. Number of employees aged 16–64 by occupation (SSYK 4), industry (SNI2) and gender. Occupational register 2021.

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PART 2

Development trends and driving forces

In recent years, working life has undergone major changes, with trends such as digitization, automation and the introduction of new technology being the main driving forces.

When working life changes, new demands are placed on co-workers. In order to be able to meet the new requirements, it is necessary that we have an idea of how trends affect the skills needs and which measures are most suitable to meet them. In this report, we present ten central trends, which have or will have a major impact on skills needs, not only in the tech industry but also in several parts of business life and the public sector.

These ten trends, which are based on previous years' surveys, have been modified and quality assured through in-depth interviews with experts in the tech industry, CEOs and HR managers in tech companies, representatives within government agencies and representatives of the business world. The purpose has been to ensure that the trends are still relevant and well substantiated. 6

The respondents in this survey have been asked to decide whether and to what degree these trends affect their competence needs and which measures are most suitable to meet the competence needs.

6 See references, other sources.

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Ten development trends

1. Information and cyber security

Management of data/IT/information security: IT systems and functions, in interaction with operational technology (OT), are now crucial for basically all operations to function. This places high demands on operational safety, robustness and protection against various forms of risks and threats. Examples are cybercrime, intrusion into systems (both cloud services and own environments) and negligence on the part of both IT developers and users.

2. New technical possibilities and business models

The emergence of new technological possibilities and new business models as a result of these, for example in quantum computer technology and AI applications: Inventions and innovations that radically change the way products and services are both produced and consumed. The effects may initially be small and characterized by "hype", to gradually completely transform businesses and sectors. Preparedness is required to be able to handle these incremental changes.

3. Fast and efficient deliveries

Requirements for fast, flexible and effective delivery of IT services and systems, with the use of, among other things, agile working methods, continuous competence development, continuous delivery and developed and long-term partner collaborations: Working methods and learning methods are developed in order to faster and more effectively support operations changing needs for digital solutions. IT services and systems, which are delivered in ecosystems with a large number of partners, are updated and kept up-to-date without hindering the customer or user in their activities.

4. Automation of production and processes

Automation of production and processes, using, for example, robotization, cloud services and IoT (internet of things): Production chains are becoming increasingly self-regulating (self organizing/optimizing) with the help of collected and analyzed data. Information from various connected products contributes to developing and optimizing both production and processes.

5. Application of AI

Applications with demands for responsibility in AI, Data Science , machine learning, natural language processing and more: Infinite access to data, in combination with increasingly efficient algorithms, creates the conditions for new, potentially revolutionary, tools for both data analysis and application development. One area of application is system development, which can be made even more efficient.
An important part of the development is that it takes place responsibly and does not reinforce prejudices and other distortions.

6. Ease of use and accessibility

Requirements for ease of use and accessibility/user experience: An increasingly extensive digitization and technical development leads to a greater focus on the user interface and making digital products and services even more accessible to wider target groups.

7. Changing Regulatory Requirements

Changing laws and regulations, including those relating to privacy (e.g. GDPR, the AI Act), cyber security (e.g.NIS 2), sustainability (CSR, SCOPE 3, EED directives) and intellectual property rights: A greater political awareness of the challenges in a digitized world, for example around privacy and security, leads to new and changed regulations that require adaptability in both private and public sector. Special challenges, apart from the amount of regulations as such, are that the regulations, unlike the interconnected IT systems, follow country and regional borders, that they are not applied in a consistent manner and that standards are missing in certain areas.

8. Sustainable supply chains

Requirements for sustainability in all stages of the supply chain, with climate adaptation, circular economy and working conditions: There are today increasingly high demands for sustainability both from the government and from the market. Both customers and employees place increased demands on climate adaptation, biological diversity, developed circular economy and good working conditions in all stages of the supply chains. The tech sector has a particularly important role in enabling sustainability in other industries, while limiting its own climate impact, i.a. by building circularity into product and service design to an even greater degree.

9. Conflicting globalization trends

Dealing with conflicting globalization trends means the development of integrated value chains and mobile labor vs. measures to reduce dependence and secure production and traceability: In order to cope with competitive pressure and increase productivity growth, a strong specialization has taken place for a long time, through integrated global value chains and globally mobile workforce. The geopolitical turbulence of recent years has led to a development in the opposite direction, which has led to the need to reduce one's dependencies and secure production in other ways. One consequence is i.a. increased requirements for traceability of products, services and programs.

10. Performance requirements for telecom infrastructure

Bandwidth, 5G functionality and interconnections via IoT (Internet of Things): More and more machine elements can be linked together in networks.
More efficient sensors.

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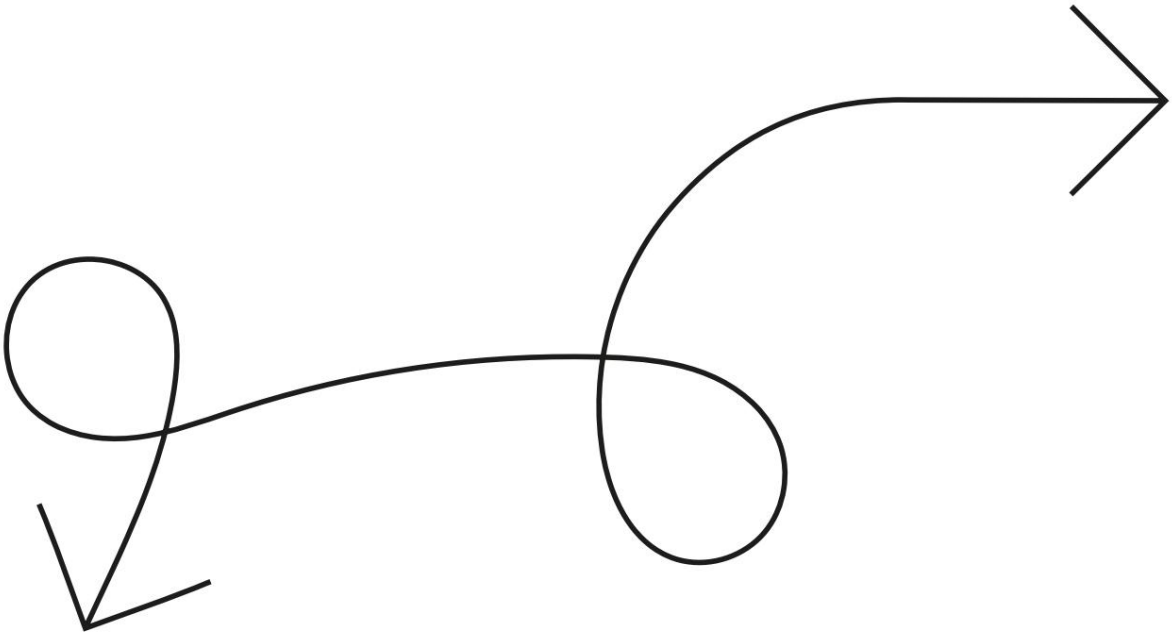

The emergence of new technology and the management of data/IT/ information security increases the skill needs in the tech industry and society in general

Diagram 4 gives an overview of which trends are expected to increase skills needs, either slightly or significantly, in tech companies as well as in other sectors of business and the public sector.

The information in the chart is based on data from two separate surveys: one has been directed at tech companies, while the other survey covers a selection of actors in both the private and public sectors, which we henceforth call "other industries".

A comparison between the responses from the tech industry and other industries shows that the trends have the greatest impact on the skills needs of tech companies. This may be because the tech companies, which are often at the forefront of developing digital services and products, need to continuously update and renew their skills.

Although the trends mainly affect tech companies, are their impact noticeable in other industries. More than half of respondents from other industries report that six of the ten trends affect their skills needs, which compares to eight out of ten in the tech industry.

Almost as high a percentage of respondents in other industries as in the tech industry state that the emergence of new technological opportunities affects their skills needs. This applies to over 70 percent of the respondents in both groups.

Managing data/IT/information security is another trend that has a major impact on the skills needs of all respondents, almost seven out of ten in other industries state this, compared to eight out of ten in the tech industry.

However, there are large differences in the answers between the tech industry and other industries. Regarding the trend Automation of production and processes, 70 percent of the respondents in the tech industry answer that it will increase their skill needs, while the corresponding increase is 56 percent for other industries.

Applications with demands for responsibility, in AI, Data Science , machine learning, natural language processing are expected to have a major impact on competence needs. Nearly 70 percent of tech industry respondents believe this trend will increase their need for skills, compared to 50 percent in other industries.

Only when it comes to the trend Performance requirements on telecom infrastructure are the skill needs in other industries affected to a greater degree than in the tech industry. This may be because the use of 5G/IoT is greater in the organizations that use the technology, which increases the skills needs in these businesses.

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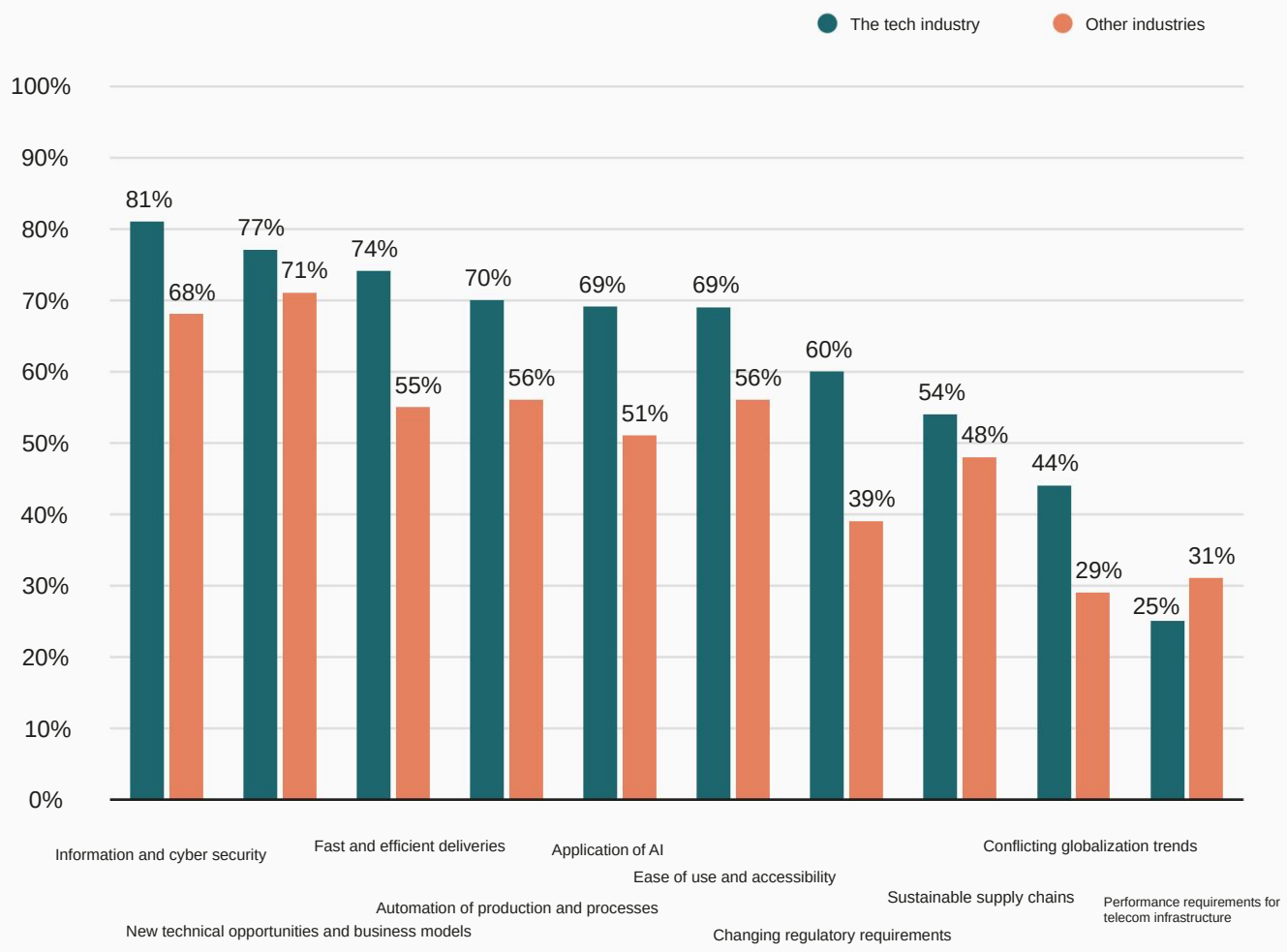
Chart 4

How do the following trends affect the skills needs in your business in three to five years?

Because only about 1 percent of respondents to this survey indicate that these trends will reduce their skills needs, we have excluded them from the chart.



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Three trends that stand out

There are a large number of trends that clearly affect the skills needs in the tech industry and other industries in the three to five year term. In this section, we list three trends that stand out:

1. Management of data/it/ Information security

As digitization becomes increasingly integrated in various businesses, the demand for people with the ability to manage information and cyber security is increasing. The demand for competence in information and cyber security is also affected by new rules and requirements in the area – both national rules and EU rules. Furthermore, attempted attacks are constantly occurring. The security company Truesec reported in September 2023 that the number of averted attacks had increased by 70 percent compared to the whole of 2022.7 In recent years, the problem with hostage programs (ransomware) has also been extensive.

The increasing problems with cyber attacks are also reflected in the crime statistics. In recent years have threats and IT incidents increased in scope. In Sweden, nearly 9,000 data breaches were reported in 2020, and this number increased to over 11,000 in 2021. 8 Notifications probably only represent a fraction of the actual number of data breaches, as the number in the dark is large.

Shortcomings in the management of information and cyber security can have serious consequences, such as financial losses and damages. It affects both individuals and society as a whole. This development increases the demand for security services but also the need for competence that can meet the growing demands to secure and protect digital resources.

2. AI's impact on competence needs

With AI, tasks traditionally performed by humans can be automated. This includes everything from simple administrative tasks to more complex analytical and decision-making work. According to a study by McKinsey, the use of AI can automate 20–45 percent of the work tasks of system and software developers.9 Other studies have shown that developers with access to AI tools complete tasks twice as fast compared to developers without these tools.10

The emergence of AI-based tools and language models simultaneously creates new areas of use and markets . The ability to develop, manage and maintain AI systems is becoming increasingly important. According to the World Economic Forum, the need for digital excellence is increasing with AI development . The majority of the fastest growing roles through 2030 will be tech-related, for example AI and machine learning specialists as well as IT and security experts.11

This survey shows that it is primarily the competence needs of tech companies that are affected by AI development. As high as 77 percent indicate that the emergence of new technologies, such as AI, increases their skill needs, which is an increase of 26 percentage points compared to 2020. In addition, seven out of ten tech companies indicate that applications with demands for responsibility within AI, Data science, machine learning and natural language processing are increasing their skill needs.

A possible explanation for these answers is that at the time of the survey, spring 2023, it was difficult to predict how AI affects and will affect the tech industry. Another explanation is that the tech companies see an increased need for more competence in order to take advantage of the technology's potential.

[7] Sweden's Radio (September 4, 2023) After the start of the war - twice as many IT attacks against Sweden.
8 BRÅ (2022) Reported data breaches.
[9] McKinsey (2023) The State of AI in 2023: Generative AI's breakout year.
10 Page Peng, Eirini Kalliamvakou, Peter Cihon, Mert Demirer (2022) The Impact of AI on Developer Productivity: Evidence from GitHub Copilot.
11 World Economic Forum (2023) The Future of Jobs Report 2023.

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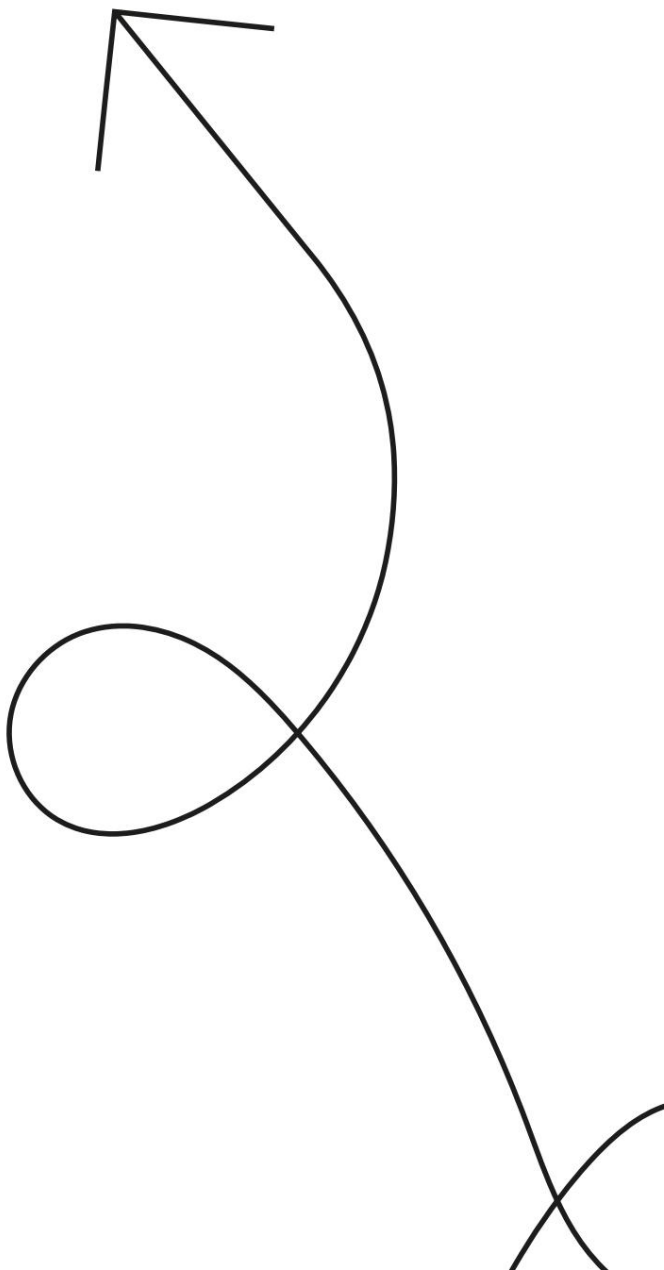
3. Higher requirements for 5G functionality and interconnections via IoT in other industries

The demands on telecom infrastructure, such as bandwidth expansion, introduction of 5G and connections via the Internet of Things (IoT), are low in comparison with other trends and have decreased since 2020.

A reasonable reason why the level is low and has been decreasing between years is that several large national infrastructure projects in telecoms are beginning to approach the final phase. The extensive expansion of fiber to households and businesses in Sweden passed its peak several years ago and now mainly smaller areas in sparsely populated and rural areas remain . At the same time, the comprehensive modernization of the mobile operators' national networks that has been ongoing since 2020 with the upgrade of 4G and the expansion of 5G is beginning to approach the final phase.

Although the networks constantly need to be developed and strengthened, it is likely that more focus is now being shifted to the use and potential of the networks, which may be a contributing factor to the fact that the category The emergence of new technological possibilities instead rises sharply.

At the same time, our research shows that the telecom infrastructure trend in the form of 5G functionality and interconnections via IoT (Internet of Things) has a greater impact on the skills needs in other industries compared to the tech industry. This may be because the use of 5G/IoT is increasing in businesses that introduce and use the technology.



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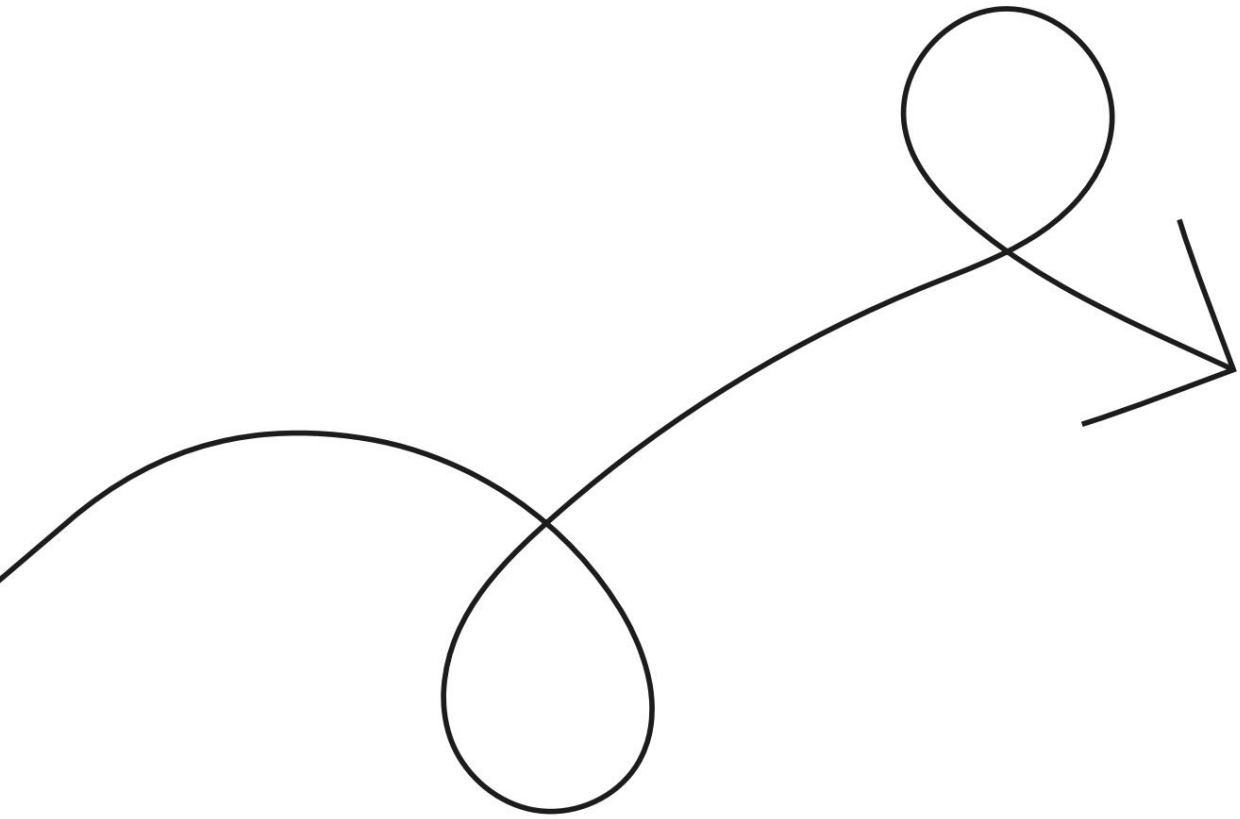

Strategies to meet skills needs: new recruitment and skills development peaks

The respondents who have answered that the trends increase their skills needs, have also had to decide which alternatives they consider to be the most suitable to meet the needs. In diagram 5, their answers are presented based on the six possible answer alternatives.

Four out of ten respondents state that competence development (upskilling) is the measure that is best suited to meet new changes and demands that these trends entail. It is a slightly higher percentage in other industries compared to the tech industry that states this.

When it comes to reskilling or retraining, a higher percentage of respondents in other industries state that it is a suitable alternative, compared to tech-the industry. Within other industries, it is the next equal percentage who state upskilling as reskilling as alternatives, namely 21 percent.

Recruitment is the main option for tech companies . Around 37 percent of tech companies state that recruitment is the most appropriate way to meet needs, compared to only 21 percent in other industries.

Recruitment of international competence is currently an extensive and complex process, which may explain why only a small percentage of companies consider it a suitable alternative. The need is most evident among tech companies when it comes to meeting the needs connected to AI.

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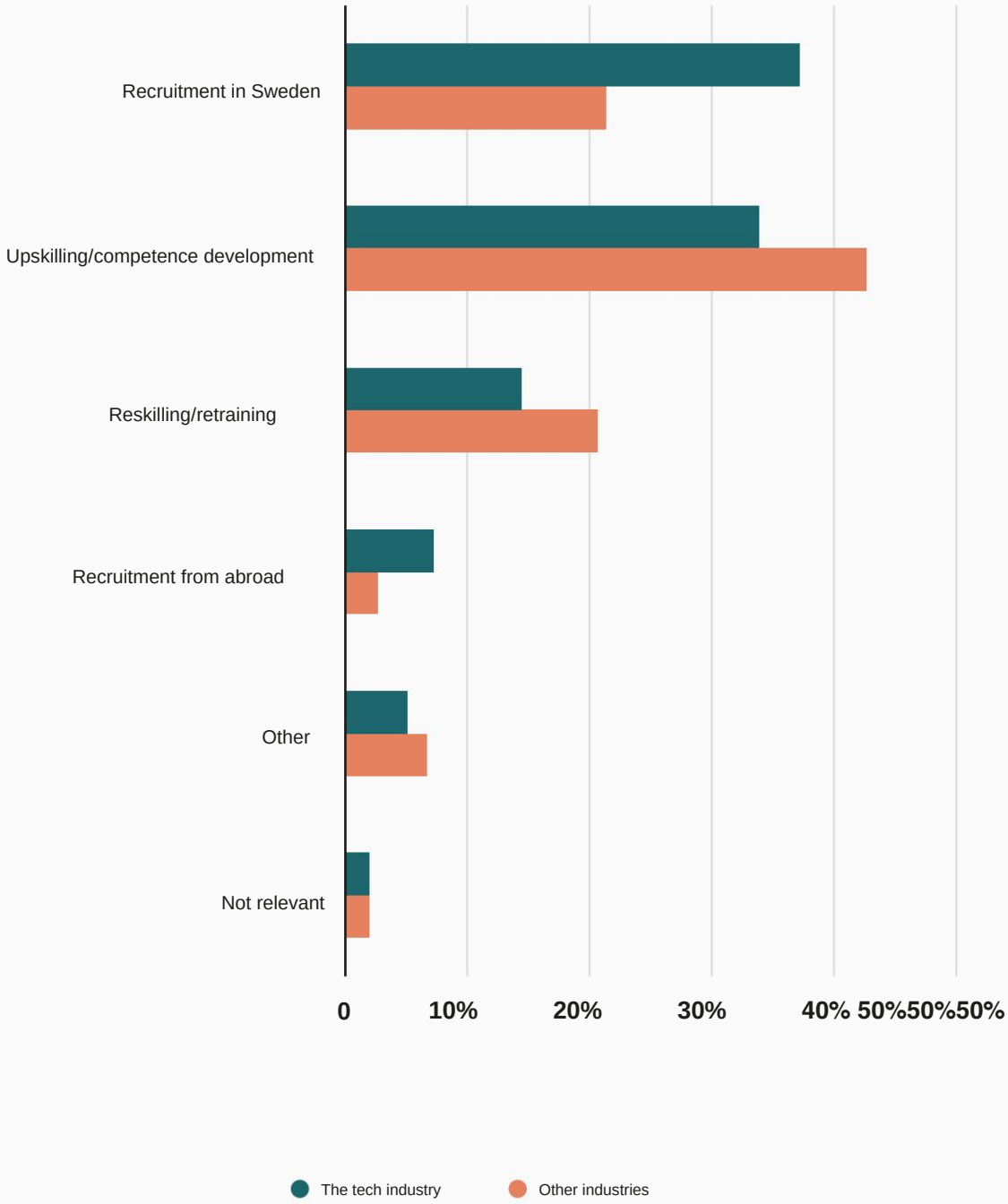
Diagram 5

Which measures are the most appropriate to meet the skills needs?



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PART 3

The tech industry's skills needs

Access to the right skills is crucial for tech companies' opportunities to grow and be competitive.
The skills shortage in the tech industry has been a challenge for a long time, and this challenge is as evident in this year's skills report as in previous reports from 2012, 2015, 2017 and 2020.

In this part of the report, we describe the tech industry's skills needs up to and including the year 2028. The results are based on the survey conducted by Verian (formerly Kantar Public) in the spring and summer of 2023. The survey has been directed at member companies in TechSverige.

A total of 167 companies answered the survey. These companies represent over 63,000 employees, which corresponds to 63 percent of all employees at TechSverige's member companies.

Large companies are overrepresented in the survey. An important starting point in the survey has been to measure the need for competence. All other things being equal, larger companies need to be overrepresented in a survey where the starting point is to measure a need for skills based on how many employees the companies already have.

The tech industry encompasses many different businesses. To illustrate the differences in needs between these businesses, the companies in the survey have been asked to take a position on a categorization based on the kind of services or products they provide.12 Diagram 6 reports their responses divided by these categories.13

Companies that provide digital services are represented in the survey to a higher degree than other businesses. At the same time, participation is lower among companies that provide public telecom infrastructure or engage in game development. It is therefore important to interpret the responses in these areas with extra caution.

[12] The categorization is a further development of the one reported in previous reports: IT skills shortage 2017, Acute and structural skills shortage in the IT and telecom sector 2015 and The skills shortage in the IT and telecom sector in 2012. The boundaries between the categories are fluid. Many businesses are active within several of them.

13 Appendix 3. Description of professional roles, which competencies they include.

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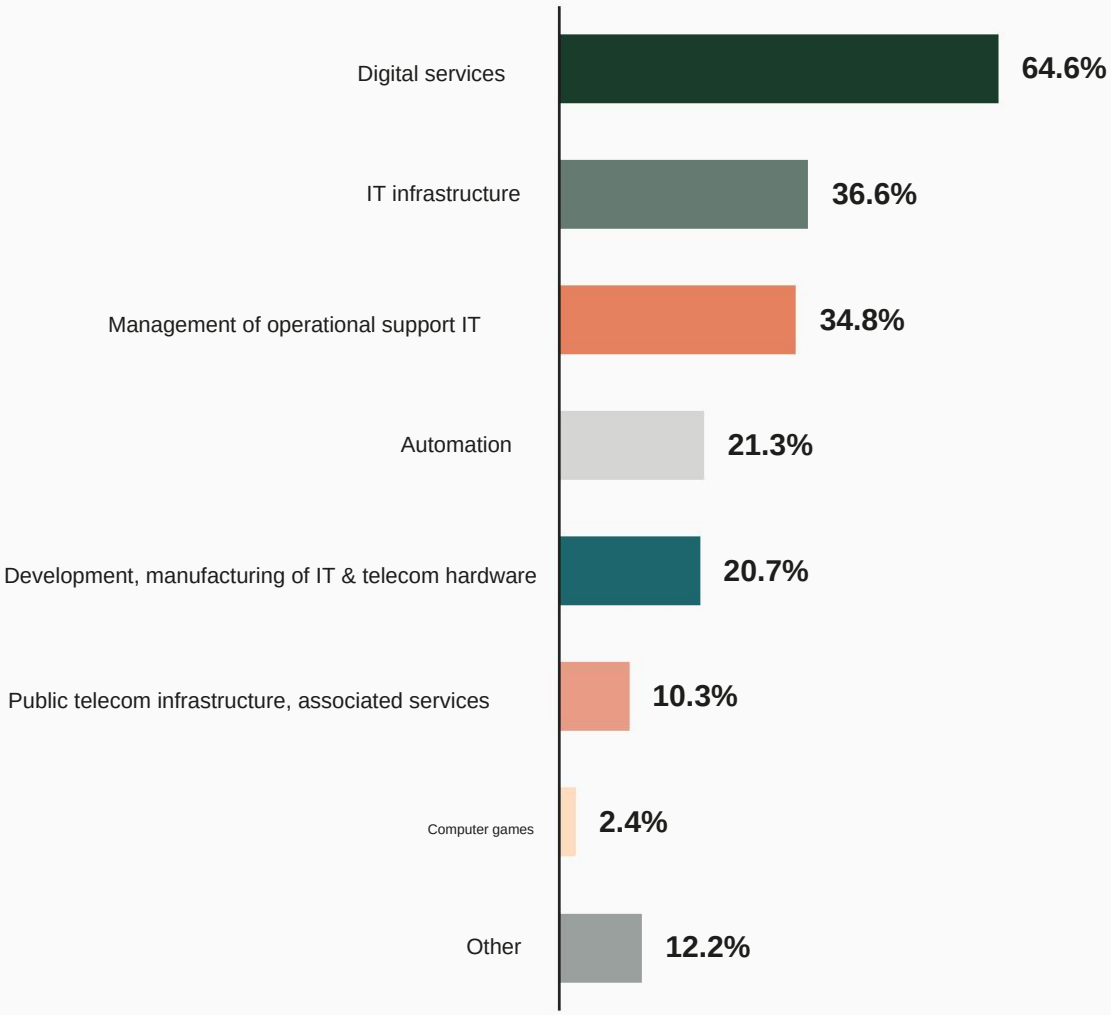
Diagram 6

Forms of IT/telecom/digitalization that my company/ organization develops or otherwise uses, where competence is needed



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REQUIRED FOR STREET SKILLS
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Information and cyber security as well as AI increase skills needs

In order to map the tech industry's skill needs in three to five years, the tech companies that responded to the survey had to take a position on the need for 23 skills. The skills, which are both tech-related and general, have great relevance for the tech industry. In Appendix 1 method for mapping the tech industry's competence needs there is information on how these competences have been identified.

First, the companies have had to estimate how many employees they have with the respective skills14 and then they have had to assess whether their need for these skills will decrease, remain in balance or increase up to and including the year 2028.

Diagram 7 illustrates the skills needs of tech companies in relation to the average number of employees with the corresponding skills. The skills that are expected to increase the most in number are primarily in various areas of system development. When it comes to general skills, the need appears to be particularly high for project managers and other forms of leadership skills.

14 Appendix 2. The number of employees with different types of digital excellence, on average per company.

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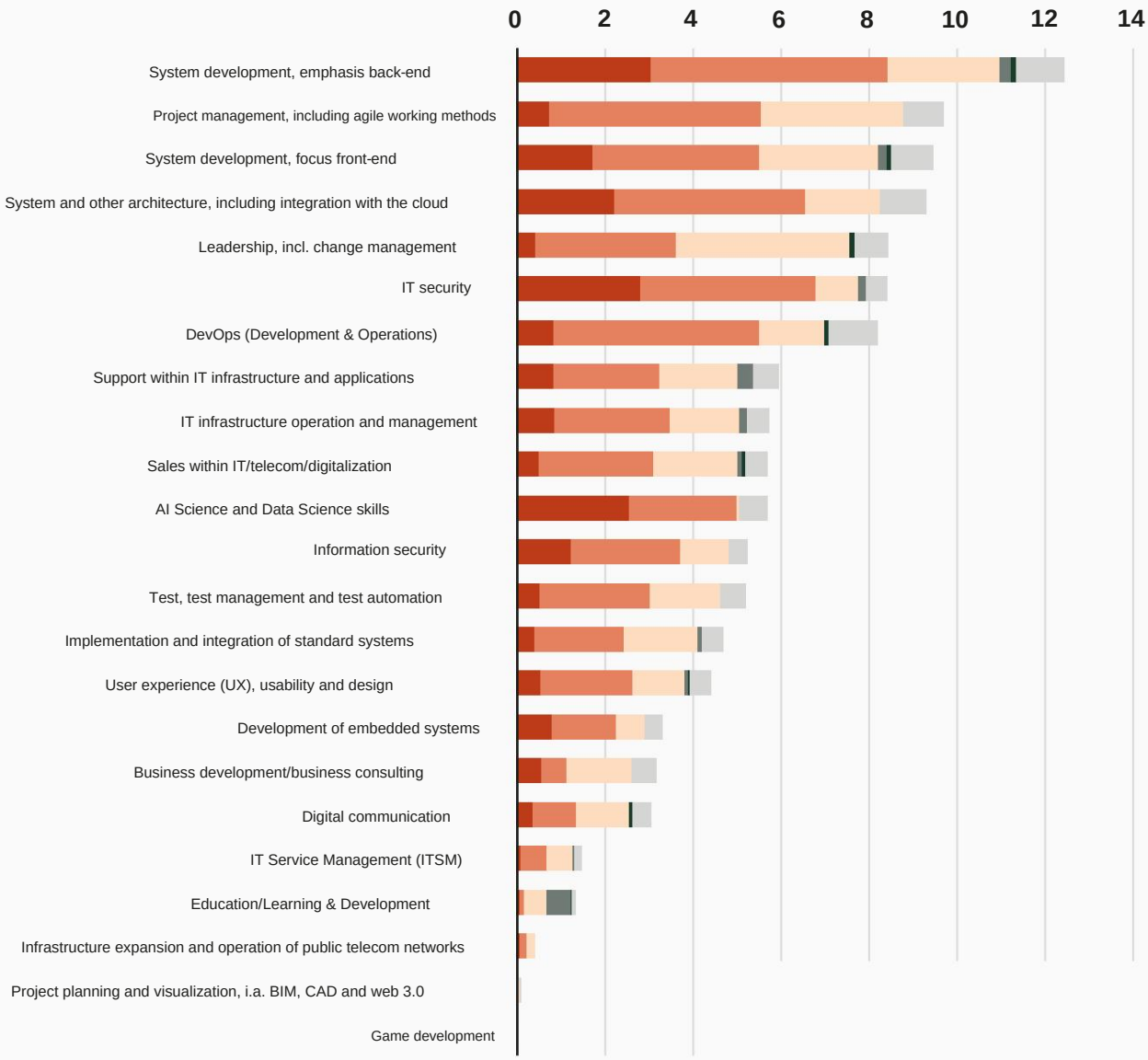
Diagram 7

Need for different skills in 3–5 years' time, in relation to the number of employees in 2023



- Increases by 15% or more
- Increases by 5-15%
- Balance
- Decreases by about 15% or more
- Decreases by approx. 5–15%
- Do not know

The concept of competence refers to individual's ability to perform a task to perform through knowledge and skills.
The difference from professional role is that competence is a about possessing skills in that certain area (such as programming) while a professional role is about work followed by a title or position (such as programmer). Competence and professional role do not have to coincide; a person can have a special competence in IT security, and at the same time the professional role of programmer.

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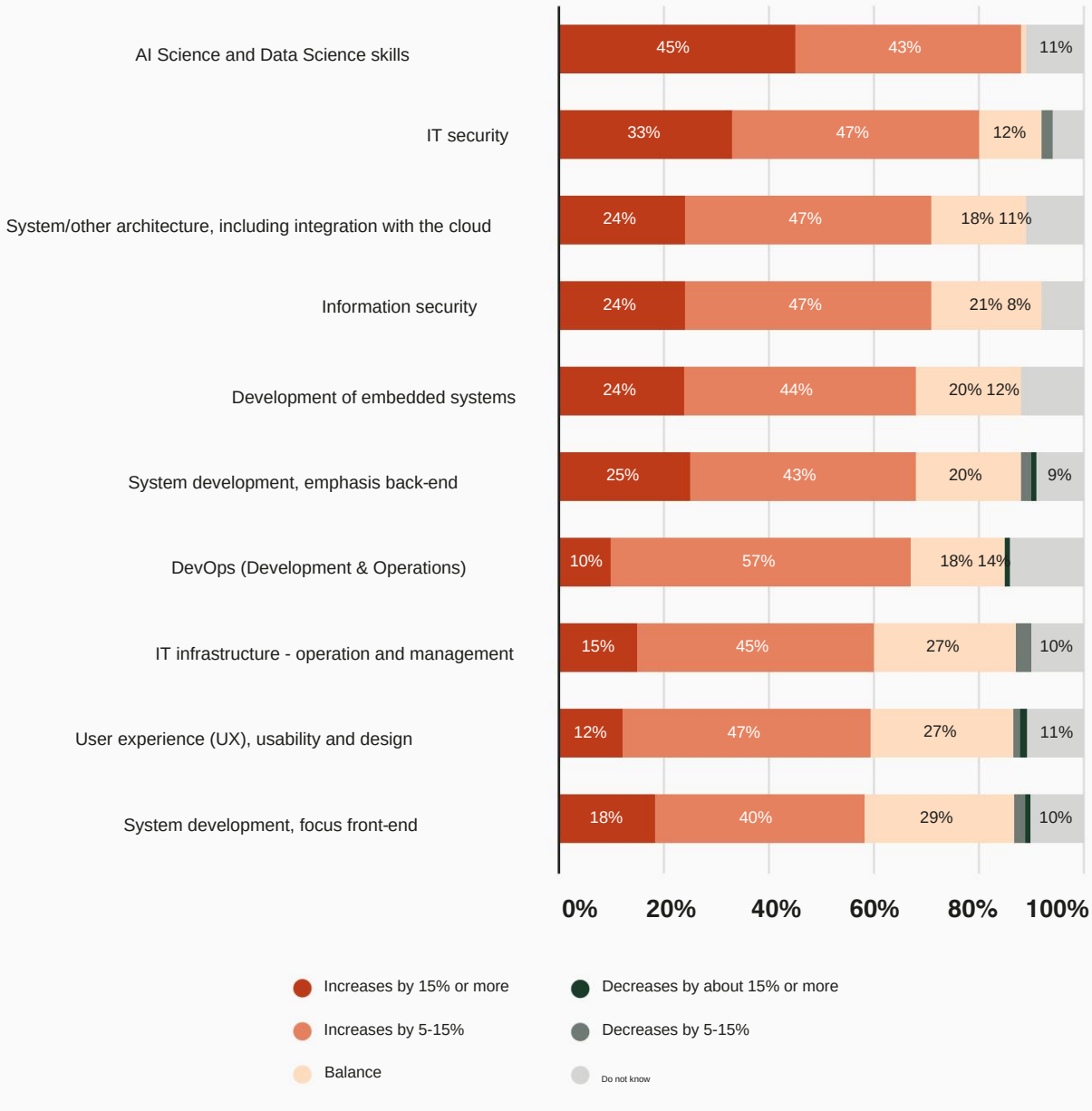
If we instead look at the rate of increase, in diagram 8, the demand for skills in the fields of AI Science and Data Science are the ones that grow the most over a three to five year term. Almost half of all tech companies state that the need for competence in AI Science and Data Science will increase by over 15 percent per year.

Although information and cyber security professionals are a relatively small group, they rank highest in both 2020 and 2023 in terms of expected growth rate.

Diagram 8

The ten skills that have the strongest growth in demand over a three to five year term



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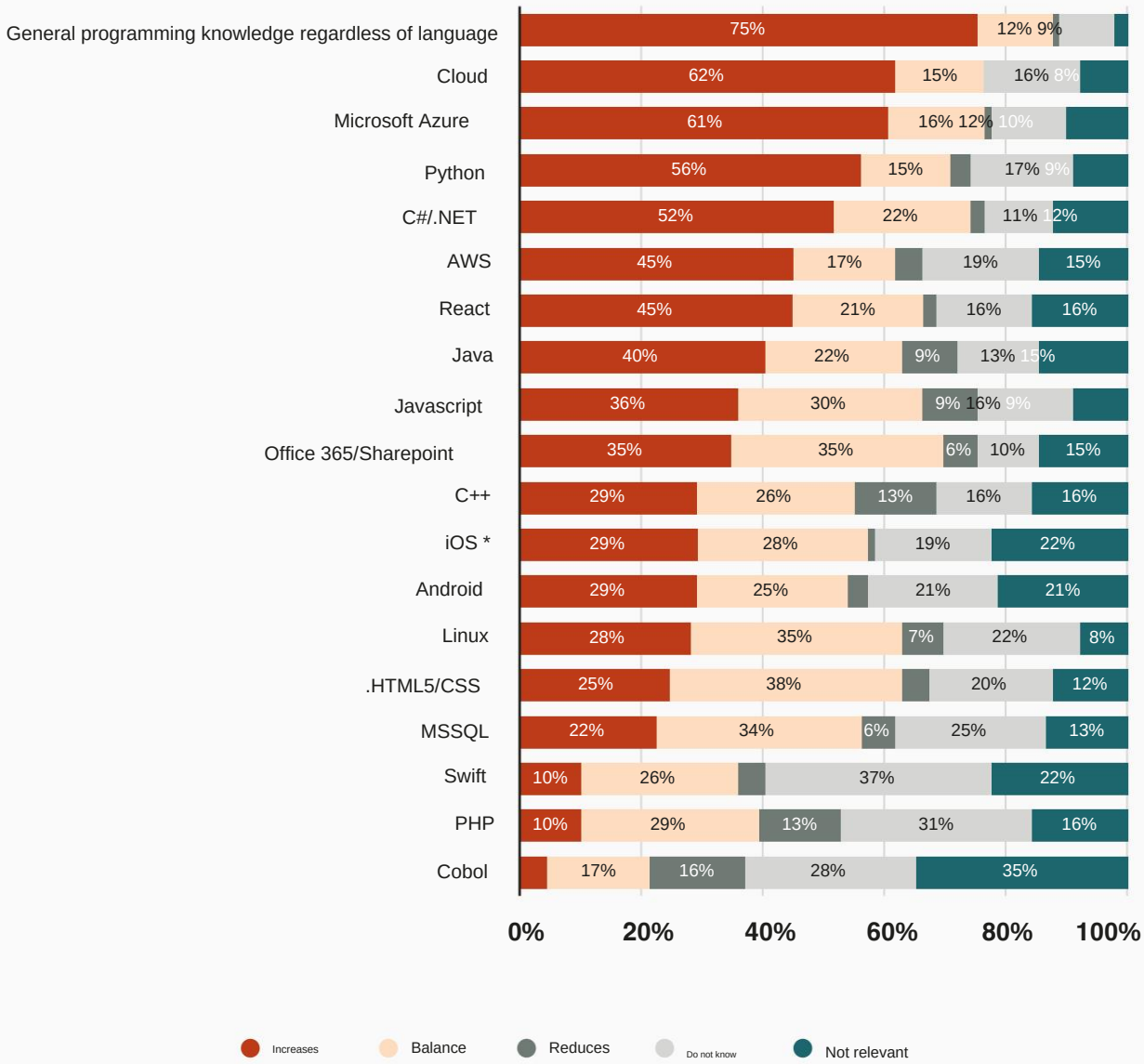
General programming skills regardless of language tops

The mapping also highlights the need for skills in specific programming languages and other digital tools. As in the years 2017 and 2020, the answer option ends up at General programming skills regardless of languagethe top, which confirms what many actors want to highlight: it is programming competence as such, rather than specific languages, that is in demand.

Chart 9

What does the need for people with competence in the following programming languages, operating systems and other technologies look like in three to five years'



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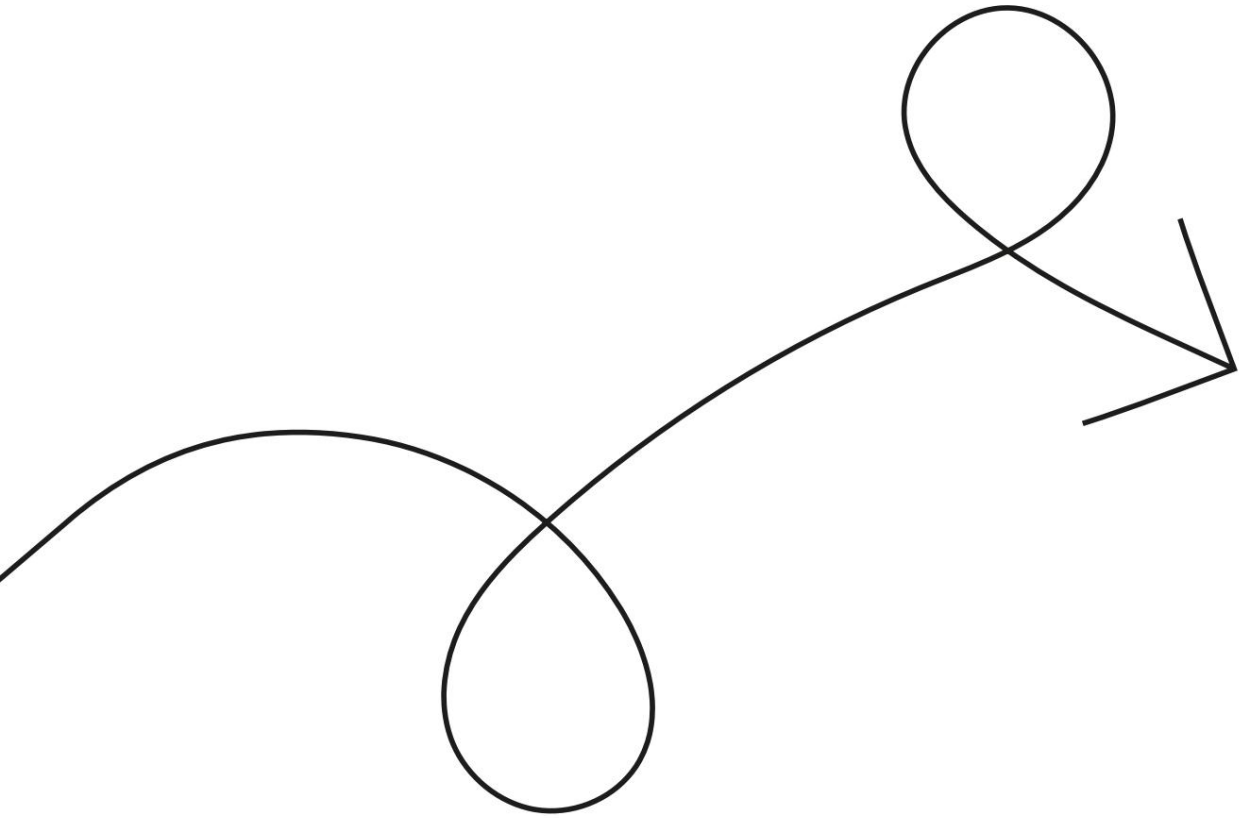

Required educational background

In order to investigate what educational background is in demand, the companies in this survey also had to decide on different answer options. In diagram 10, the responses are presented based on the average for all 23 competencies.

At tech companies, university education is the educational background that is most in demand. It states 65 percent. Demand is particularly high for education in systems science, computer science or other IT specializations. For competence in system development, AI Science and Data science as well as information security, the companies respond to a higher degree that they demand university education compared to other forms of education.

Only 14 percent of the companies have answered that they demand some form of vocational training, which is a decrease by 30 percent compared to 2020. One explanation for the result is that the companies only had the opportunity to choose one answer option, which is different from 2020. Another explanation is that the knowledge of the university of applied sciences or other vocational training among those who have answered is low. The demand for university of applied sciences education is particularly high in the competence areas of infrastructure development and operation of public telecom networks, IT infrastructure, operation and management as well as User Experience (UX), usability and design.

Postgraduate education and upper secondary education are the educational backgrounds that are least in demand. It is above all within AI Science and Data Science that there is a demand for research training. For upper secondary education, it is competence in Support.

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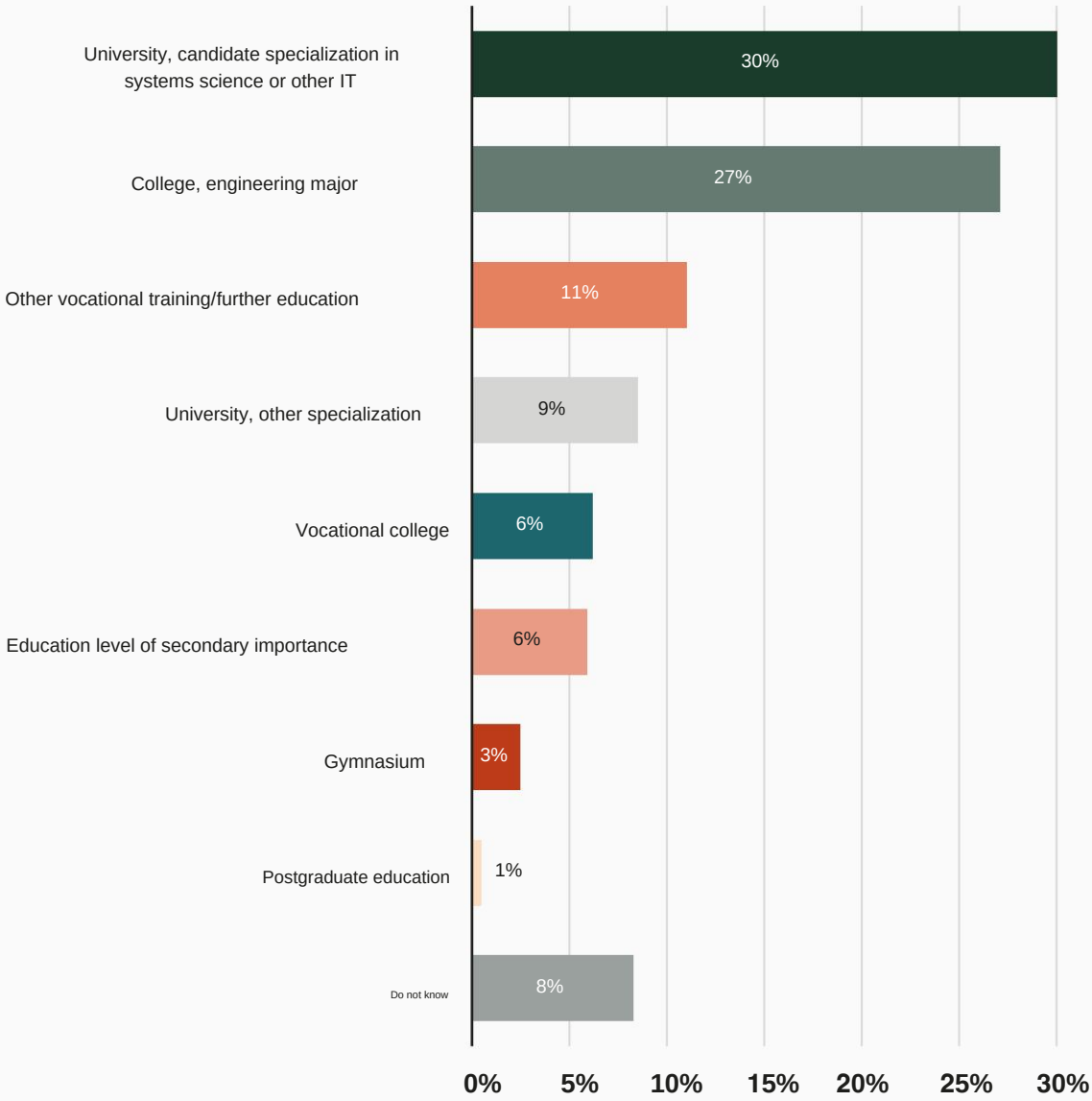
Diagram 10

Required educational background



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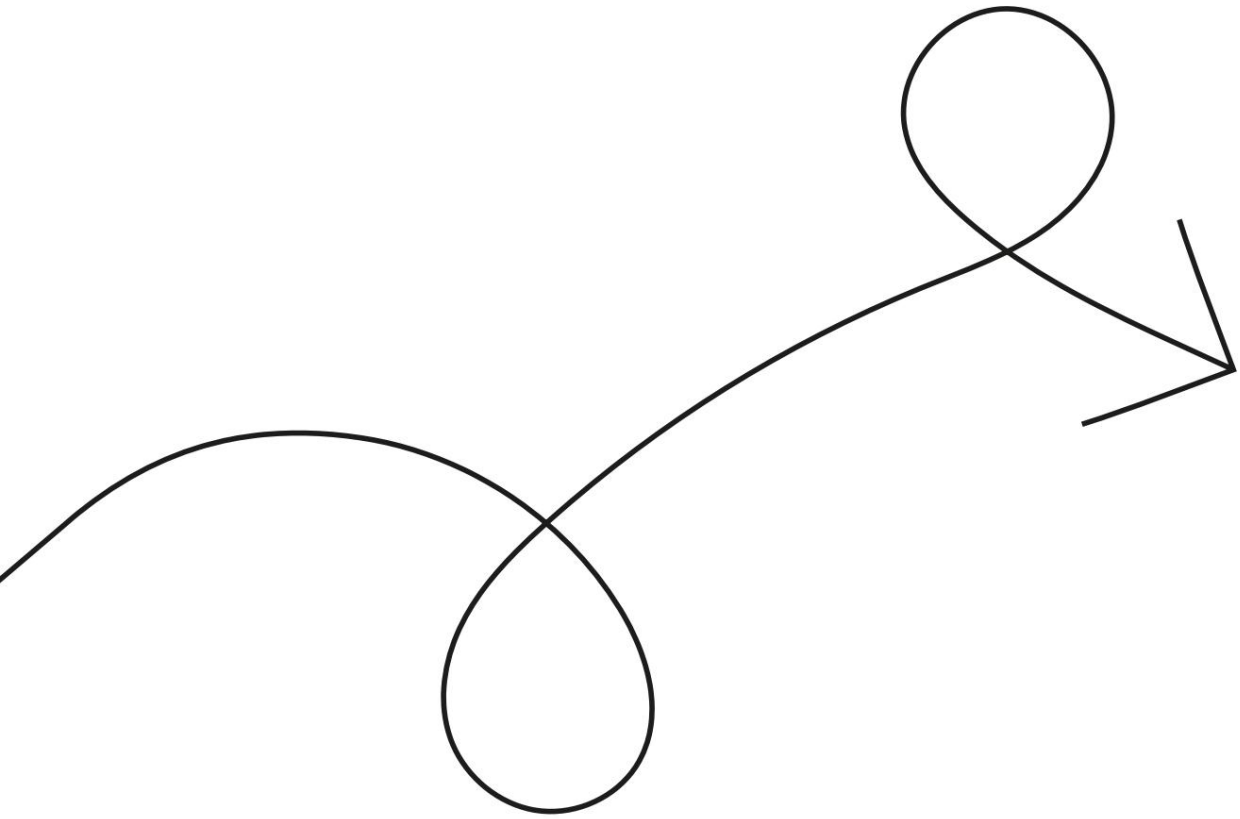

Required professional experience

Diagram 11 shows how many years of professional experience are usually required to work in the various areas of competence . Generally, the requirements for professional experience are high. For all competencies, with the exception of Support, the companies request at least three years of professional experience.

The highest are the requirements for leadership skills, where over 80 percent of the companies have answered that they demand more than three years of professional experience. The requirements for professional experience are next to as high in information and cyber security.

However, the requirements vary between different areas of competence. Within UX, user interface, technical sales and testing, at least 20 percent of companies request professional experience of up to two years.

When it comes to competences in operation and administration and support, more people state that they are looking for shorter professional experience than three years.

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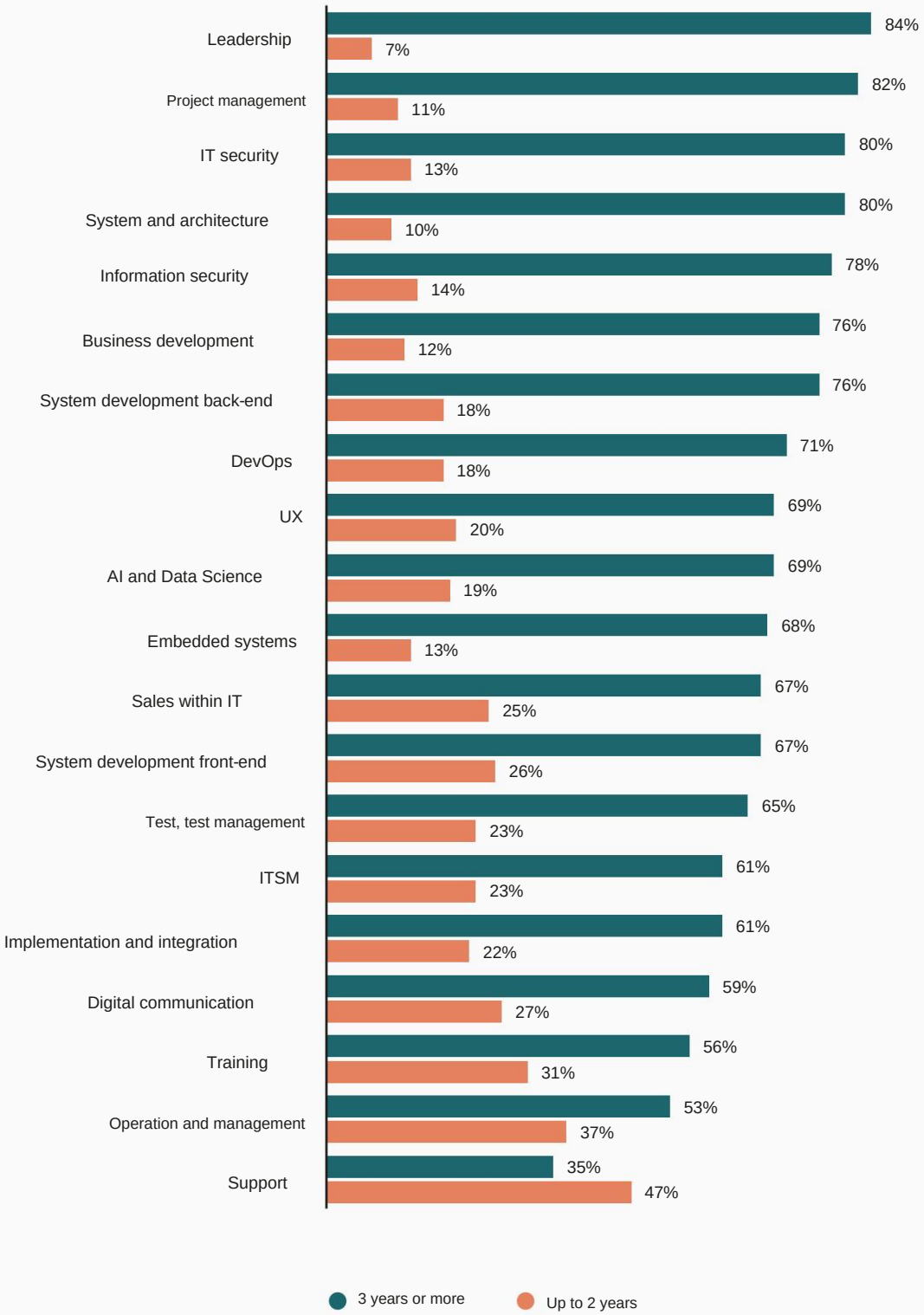
Diagram 11

How many years of relevant experience should the people needed for the skills below* generally have?



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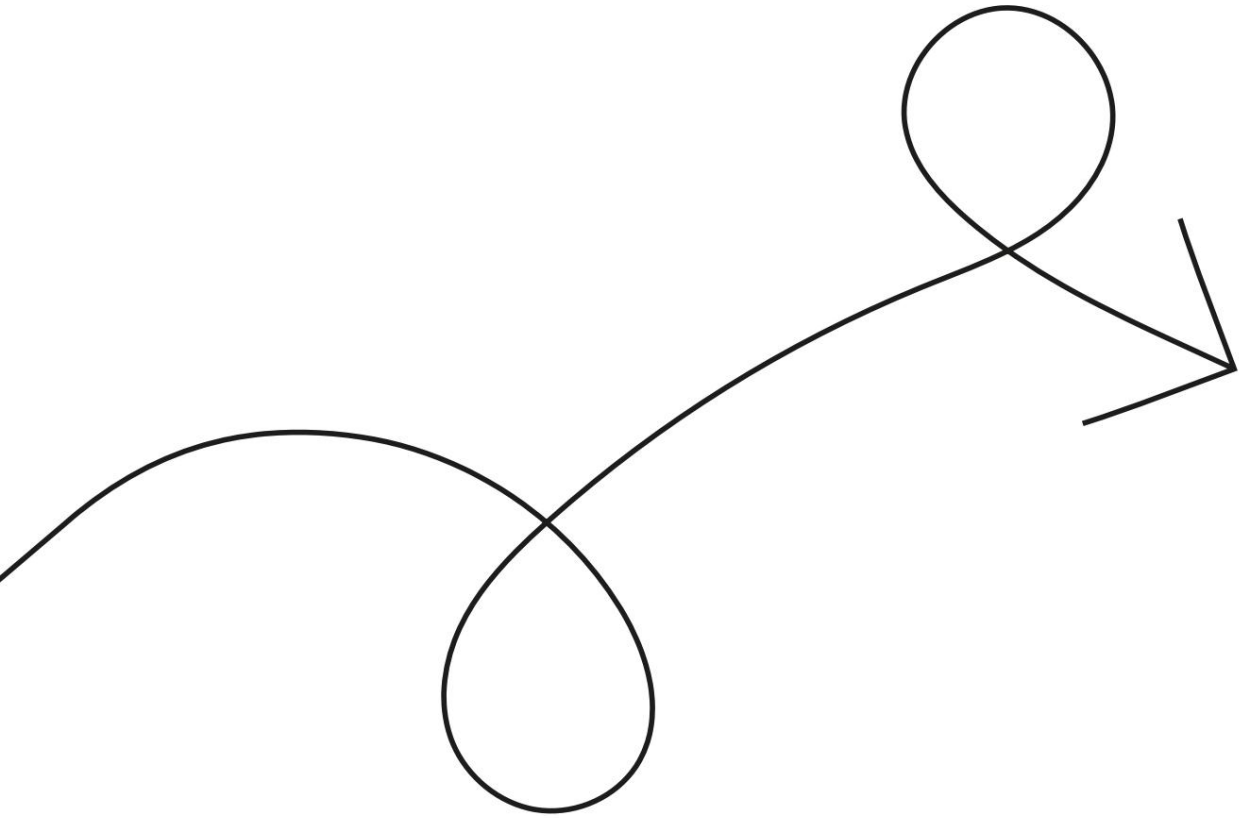

Thousands of specialists in Tech are needed by 2028

Table 2 shows an estimate of how many more people are needed per professional role within a four-year period, resulting in an estimated need for an increase of approximately 40,000 people.

The estimate is based on the survey responses reproduced in diagram 15 (in appendix 3), 7 and 8 and employment development in the tech industry. Information on the number of people employed in the tech industry is limited in this rvey to the information and communications industry (J).15

Read more about the survey's method in Appendix 1.

[15] Statistics Sweden, (RAMS) Gainful workers (day-time population) in the country by industry SNI 2002.

[16] Statistics Sweden, Occupational register with occupational statistics.

Machine Translated by Google

Table 2

Occupational roles: number employed and assessed need by 2028

The tech professions	Number of people employed in the tech sector	Assessed need 3-5 year term	Percentual increase
Software/System Developer	47,273	15,344	32%
Project manager	12,184	2,813	23%
IT architects	4,557	1,701	37%
Data scientists and database developers	7,960	2,640	33%
Business developers/business consultants	6,884	1 825	27%
Tester	3,331	863	26%
System Administrator	2,782	779	28%
Infrastructure experts, both IT and telecom	14,855	3,467	23%
Support technician, IT	10,716	2,663	25%
Infrastructure engineer, telecom	4,985	1,163	23%
Technical salesperson/salesperson with business responsibilities	2,035	2,202	22%
Information/IT security experts	2,035	805	40%
Usability experts in IT	2,947	780	26%
Digital leaders/IT managers	5,414	929	17%
Trainer in IT/telecom	170	27	16%
Digital communicators	1,606	347	22%
Total	**137,522**	**38,348**	**28%**

* In the vast majority of cases, the occupational roles have their counterpart in Statistics Norway's official occupational register SSYK (Standard for Swedish occupational classification, which in turn is based on international standards)16. In Appendix 3, these equivalents are reported, as well as which competencies the various professional roles include, in a more detailed table.

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PART 4

Comparison with other industries

Digitization and its tools create significant opportunities for all types of companies and organizations, but they also pose a common challenge. To be able to take advantage of the potential of digitization, access to the right skills is required. At the same time, the lack of such competence is a continuing obstacle to digital development, growth and innovation. Dealing with this shortage is therefore not only a matter for the tech industry but for the whole of society.

In order to broaden the picture of the demand for digital cutting-edge competence, in this report we have expanded the survey to also include industries outside the tech sector.

On behalf of TechSverige, Verian (formerly Kantar Public) has conducted a survey to a selection of designated industries between September and November 2023. Together with the tech industry, these industries represent the majority of all employed in the occupations (SSYK codes) included in the survey.

The selection consists of activities within SNI codes 26, 28, 29, 46, 64 and 84:

- Law, economics, science and technology/ Architectural and technical consultancy; technical testing and analysis
- Manufacture/ Manufacture of other means of transport and Manufacturing of computers, electronics and optics
- Public administration/ Public administration and defense; compulsory social insurance
- Trade; repair of motor vehicles and motorcycles/ Wholesale and commission trade, except with motor vehicles

In total, 170 respondents answered the survey, which resulted in a response rate of 11 percent. This relatively low response rate limits our ability to present the results broken down by industry. Instead, we report on the aggregated needs of the respondents (henceforth "other industries") and compare these with those of the tech industry. The comparison is made at occupational level according to predetermined occupational codes. 17

17 Appendix 3. Description of professional roles and which competencies they include.

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Growing need for tech professions in other industries

Diagram 12 describes the need for different professional roles in the tech industry and in other industries. In the diagram, the length of the bars represents a measure of the proportion of respondents who have expressed their need for these professional roles. The white area in the diagram reflects the respondents who have no need for the professional roles.

The need for most professional roles is greater in tech companies than in companies and organizations in other industries. The tech companies also expect a higher rate of increase in terms of the need for various professional roles, which indicates faster growth and development in the tech industry compared to other industries.

Interestingly, the results show that even outside the tech industry, many companies and organizations experience tions a growing need for tech professions and cutting-edge digital competence. Although the number of companies experiencing the need is smaller, the rate of increase is often just as strong.

When we look at individual professional roles in different industries, it becomes clear that the demand for tech jobs is significantly higher in the tech industry compared to other industries. This becomes particularly noticeable when it comes to the professional roles of "information/IT security experts" and "software/ system developer".

The difference in demand is less prominent for the professions "digital communicators" or "IT support technicians". When it comes to "infrastructure experts", which includes both the IT and telecom areas, the need is higher in other industries compared to the tech industry.

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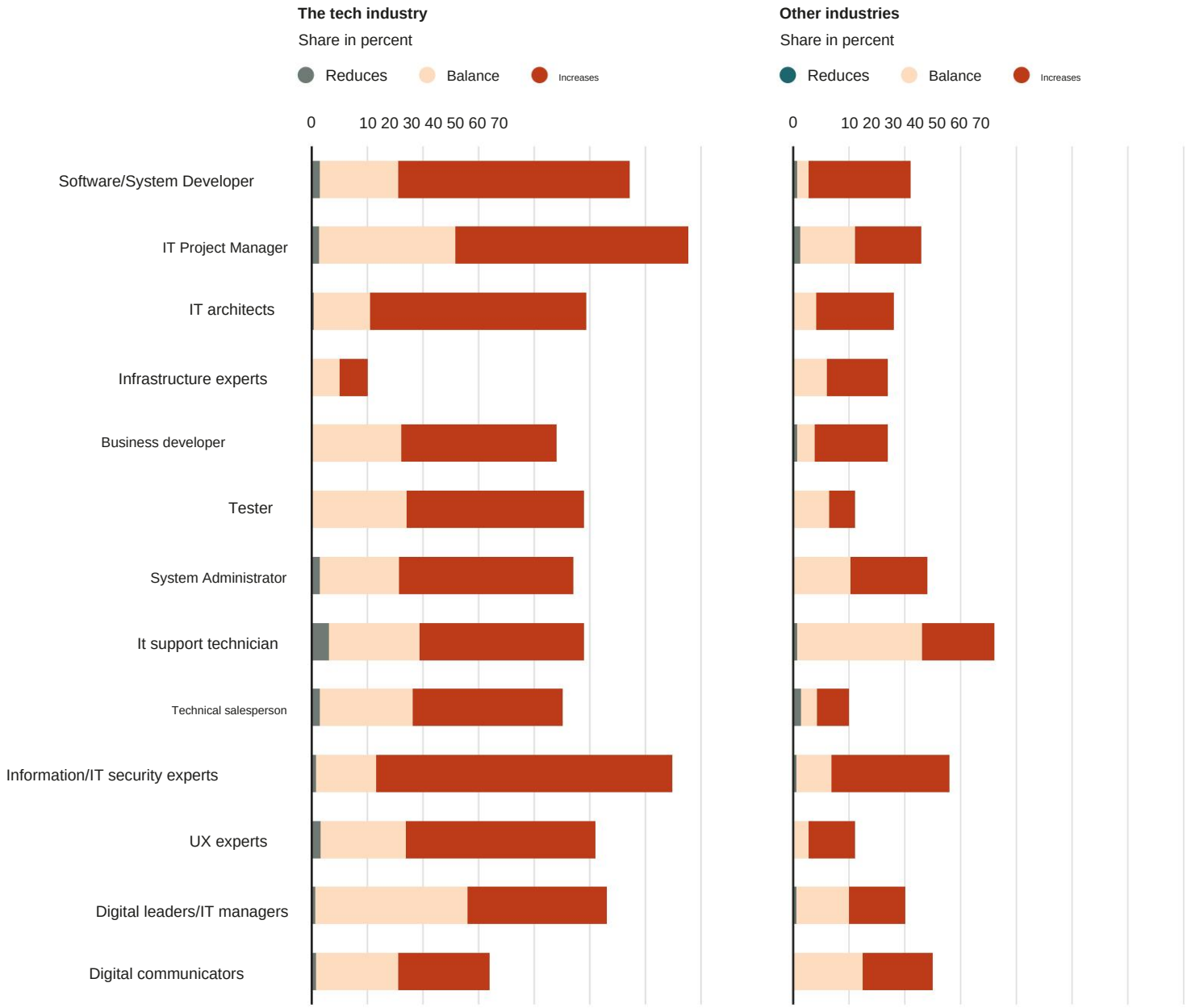
Diagram 12

Need for professional roles/competences per year in the 3-5 year term



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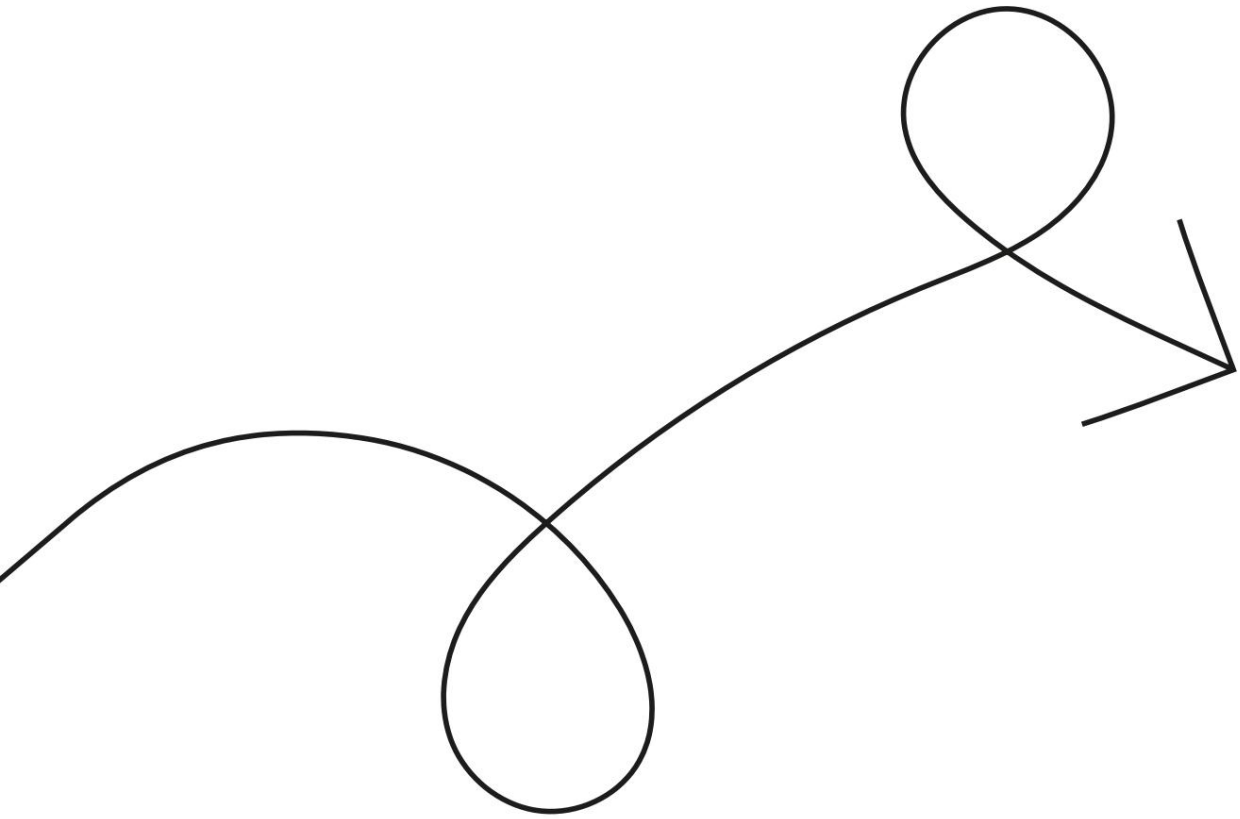

High demand for university graduates

The demand for university graduates is consistently high in all industries. When we add up the percentage of respondents who state that they are requesting some form of higher education, this response percentage exceeds more than 50 percent.

In comparison to the tech industry, other industries show a lower demand for people with "university education in the field of engineering". At the same time, the demand for people with "another university education" is somewhat higher in other industries compared to the tech industry. In the case of post-secondary vocational education, for example university of applied sciences education and other vocationally oriented programs, demand is higher in other industries compared to the tech industry. A possible explanation is that the demand refers to different professional roles that require different educational backgrounds or that knowledge of the university of applied sciences is higher among respondents in other industries.

Interest in people with upper secondary education or postgraduate education is consistently low among all respondents. It is noteworthy that almost 10 percent of the respondents are unsure of the educational background they are requesting.

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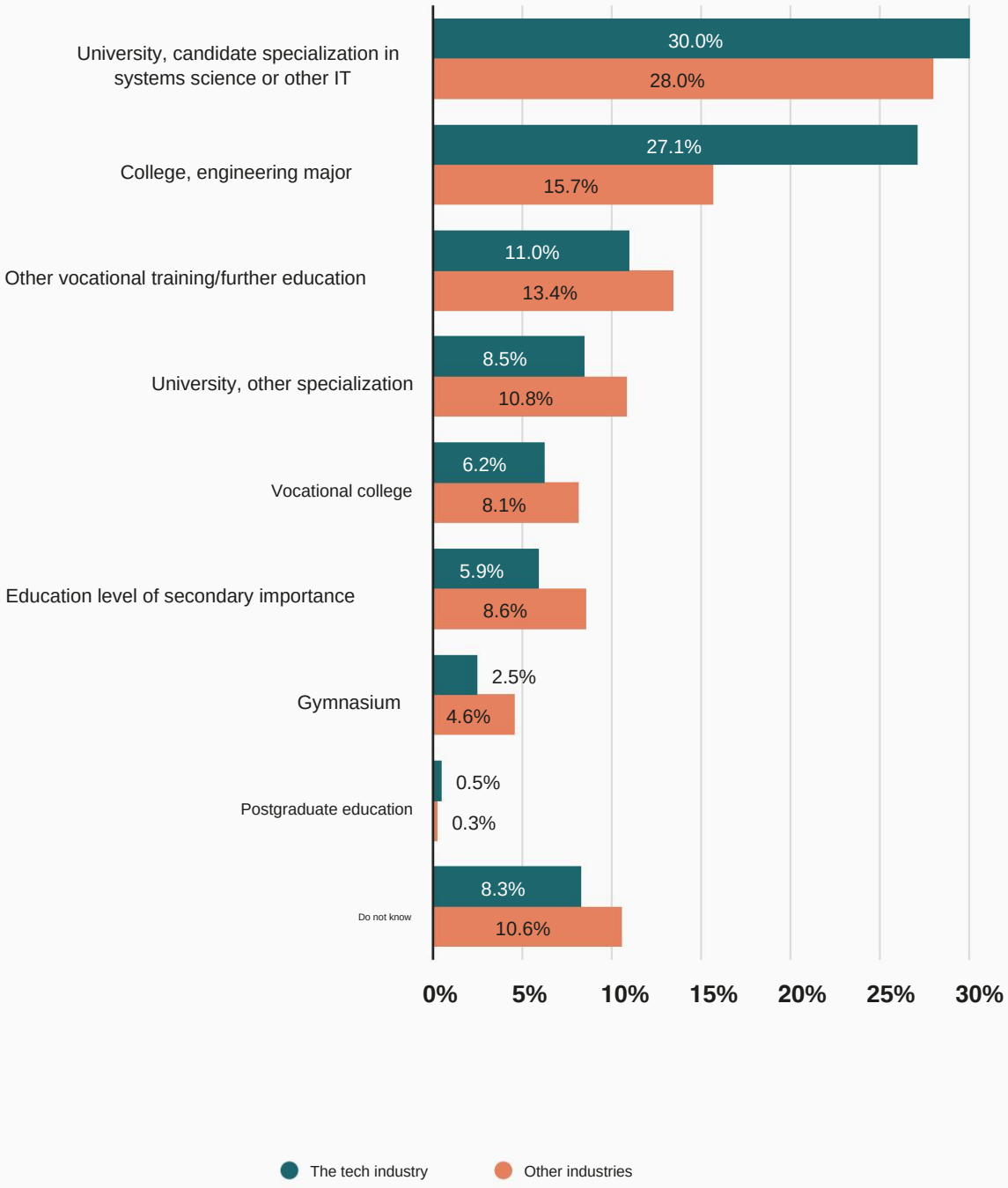
Diagram 13

Required educational background



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Projection based on past employment trends

In this section, we present a projection of the demand for tech skills outside the tech industry, which is based on the historical growth of the number of people employed in various tech professions.18 The projection shows how the number of people employed in these professions can be expected to increase until the year 2028, based on two different the scenario.

The first scenario is based on the growth rate between the years 2016 and 2021 (4.1 percent annual growth increase), while the second scenario is based on the growth rate during the period 2014 to 2021 (3.6 percent annual growth increase). In order to estimate how the number of employed people changes, we have calculated an average based on the annual development . In these scenarios, it is assumed that employment will continue to develop in line with these average growth rates.

It is important to point out that these projections are based on historical growth and do not necessarily take into account future factors that may affect labor supply and labor demand. Therefore, they should be seen as indicative trends rather than definitive predictions.

Diagram 14 illustrates the expected employment development outside the tech industry, based on two different scenarios. The timeline starts from 2021, which is the latest available official statistics on the number of people employed in tech professions broken down by industry.19

In the first scenario, an annual growth rate of 4.1 percent is assumed. This scenario results in an increase of 17.23 percent in the number of people employed in tech professions during the period 2024–2028. This corresponds to an increase of 33,371 more employed people.

In the second scenario, with a slightly lower annual growth rate of 3.6 percent, the number of people employed in tech professions grows by 15.2 percent during the same time period. This corresponds to an increase of 28,972 more employed people.

Given that employment increases at the rate we indicate in the two different scenarios, the total number of people employed in tech occupations in other industries is expected to exceed 220,000 employed in 2028.

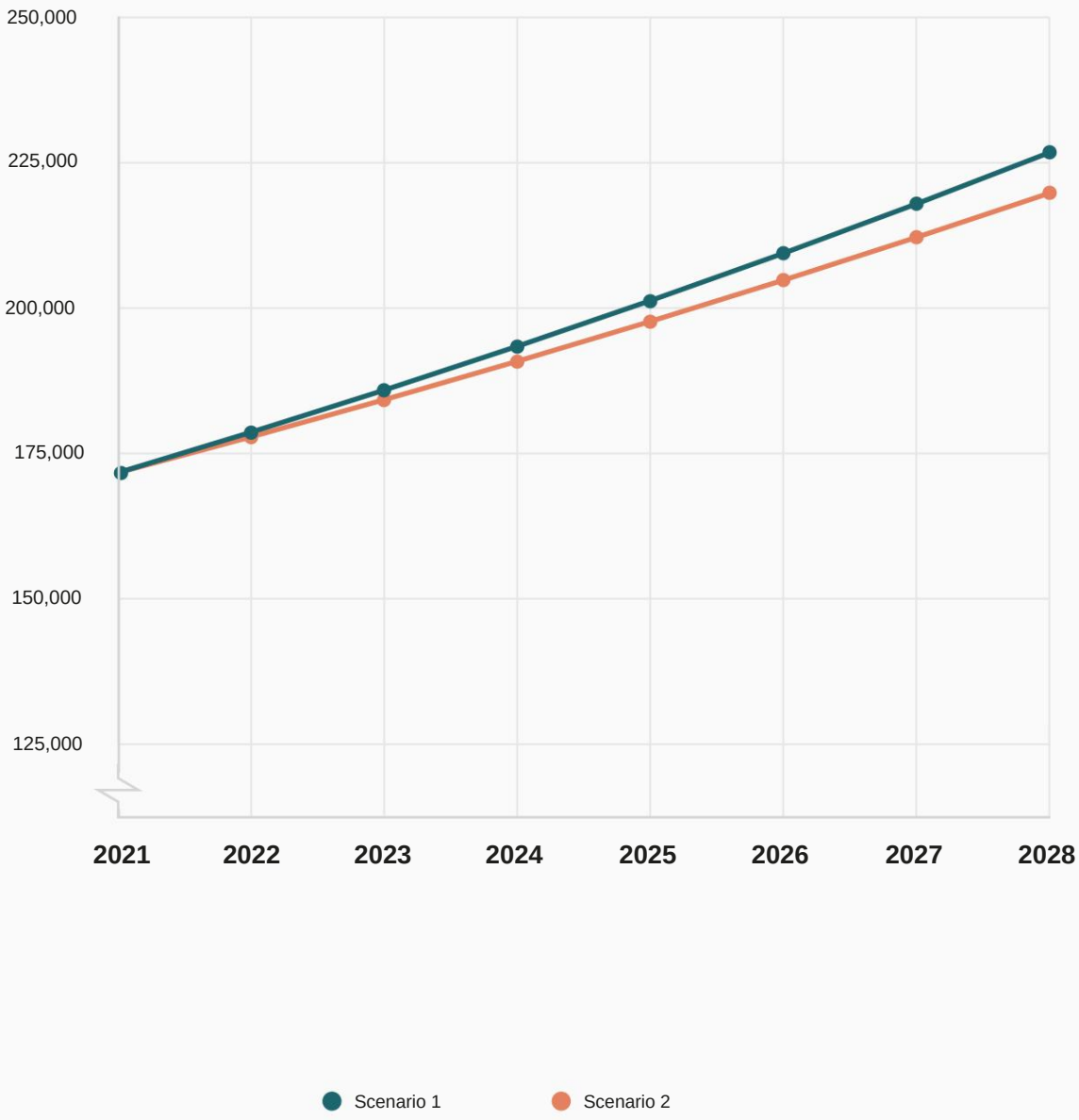
18 General occupations have not been included in the analysis because it is difficult to determine whether changes in these occupations are linked to the needs for tech skills. See Appendix 3. Description of professional roles and which competencies they include.

19 The occupational register.

Machine Translated by Google

Diagram 14

Projection of demand for people with tech skills outside the tech industry 2024–2028



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Add tech

Do you want to be involved and influence the development of society or contribute to smart solutions to the challenges of today and the future?

For those who want to take the step into the tech industry, there are many options. Add tech and search for tens of thousands of open jobs in a growing industry of the future.

Working in tech is being part of something bigger.
And the tech industry is growing and developing. It has become an increasingly important part of society, a prerequisite for our economic development and for how we live our lives.

At adderatech.techsverige.se, TechSverige has collected links and tips on study and career choices. You can also take a test and read reports about people who already work in the tech industry. There are so many different career opportunities and assignments within the tech industry and several different paths to tech jobs. Tech is the new base for the Swedish economy and enables sustainability, competitiveness, welfare and jobs.

About Adda tech

TechSverige has initiated the "Add tech" campaign to attract more people to the tech industry. The aim of the campaign is to show the varied career opportunities, assignments and exciting challenges offered within the tech industry and that there are several different educational paths to all these jobs. The campaign is aimed at people of working age who, by adding tech, can qualify for jobs in the tech industry.

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Sida Peng, Eirini Kalliamvakou, Peter Cihon, Mert Demirer (2022) The Impact of AI on Developer Productivity: Evidence from GitHub Copilot.

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TechSverige (2023) The tech industry's proposal to meet cyber threats.

Sweden's radio (September 4, 2023) After the start of the war – twice as many IT attacks against Sweden: After the start of the war – twice as many IT attacks against Sweden - News (Ekot) | Swedens radio.

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Other sources

Interviews about trends, occupations and skills were conducted in the spring of 2023 by consultant Fredrik von Essen (Essenlearn) with representatives and experts within Ericsson, ABB, Wirelesscar, Microsoft, Telia, Försäkringskassan, SAS Institute AB, Truesec, Atea and TietoEvry.

Quality review and opinions on professions and competencies in research have also been done by TechSverige's IT competence council.

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APPENDIX 1

Method for mapping the tech industry's skills needs

In the spring of 2023, a consultation phase was carried out together with TechSverige's IT skills council and experts in the tech industry, industry and the public sector to ensure the questionnaire's relevance and to identify trends and revise occupations and skills.

The survey

The member survey was conducted during the period May to August 2023. The first mailing with a link to the web survey was made at the end of May. A number of reminders were carried out before and after the holiday period. The survey was completed at the beginning of September.

Selection

A total of 1,449 businesses were invited to participate in the survey. The invitations were based on TechSverige member registers that were handled in accordance with the GDPR and according to a personal data processing agreement (PUB agreement) signed between the parties.

Response rate

A total of 164 interviews were conducted. The response rate was 11.3 percent. The 167 companies that responded to the survey represent over 63,000 employees, which corresponds to 63 percent of all employees at TechSverige's member companies.

Representativeness

The representativeness is affected by the design of the survey, asking about skills needs automatically excludes businesses that do not have or feel they have a skills need. In contrast to previous reports, the survey has been sent to all member companies in TechSverige and not just those that indicated an interest in answering the survey.

Large companies are overrepresented: 52 percent of companies with more than 500 employees in the sample have responded to the survey. Within other size segments, the response frequency is between 10 and 15 percent. At the same time, the starting point of the survey is to measure the need for competence. All other things being equal, larger companies need to be overrepresented in a survey where the starting point is to measure a possible need for skills, based on how many employees they already have.

Company size

- 0–9 employees (673 companies, 62 responses, frequency 9 percent)
- 10–49 employees (526 companies, 55 responses, frequency 10 pro-cent)
- 50–499 employees (225 companies, 32 responses, frequency 14 percent)
- 500– employees (29 companies, 15 responses, frequency 52 percent)

Briefly about the forecast 40,000

Assessment is based on the questionnaire, with the answers to the questions about the needs in the three to five year term as a basis. The starting point for the calculation is the number of employees in 2020 and 2021 in the SSYK category as reported officially by Statistics Sweden. The differences between the 2020 and 2021 data have been extrapolated by one year.

For the role categories that do not have a direct equivalent in SSYK (e.g. project manager), the average number of employees within the corresponding competence according to the survey (cf. diagram 15) has been used as the distribution key.

Information on the number of people employed in the tech industry is limited in this survey to the information and communication industry (J).20 In previous reports, the definition of the tech sector has been broader, it has also included activities in industries other than the tech industry.

With the support of other studies, **TechSverige has previously** written down forecasts based on current recruitment needs, which the research company Verian considers to be reasonable. Downgrades are also made for all generic occupations. The estimates in the forecast should be interpreted with some caution, especially within specific competencies or professional roles.

[20] Statistics Sweden, (RAMS) Gainful workers (day-time population) in the country by industry SNI 2002.

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Method for mapping the competence needs of other industries

In the spring of 2023, an interview and consultation phase was carried out together with TechSverige's IT skills council and experts in the tech industry, industry and the public sector to ensure the questionnaire's topicality and relevance as well as identify trends and revise definitions of occupations and skills.

The survey

The broader industry survey was conducted during the period September to October 2023. The first mailing with a link to the web survey was done in batches during the first half of September. A number of reminders were carried out during September and October. The survey was completed in October.

selection 1

Verian was responsible for the purchase of a predetermined business sample of 2,982 businesses within a number of designated industries with the following SNI codes: 26, 28, 29, 46, 64 and 84. The sample for the survey is based on companies with at least 25 employees within the sub-sectors where the number and proportion of professional roles with IT skills are judged to be high according to SBC's available data. Processing of the basic selection has been done via Verian's call-in service.

Manufacturing (724 companies, 221 after processing) 21 responses

- SNI-29 (149 businesses, 42 after processing)
- SNI-26 (129 businesses, 37 after processing)
- SNI-28 (446 businesses, 142 after processing)
- SNI-46 (1837 businesses, 572 after processing) 83 responses
- SNI-64 (200 businesses, 48 after processing) 5 responses
- SNI-84 (221 businesses, 81 after processing) 17 responses

Selection 2

For sub-industry 71, available contact information has been obtained with the help of the industry organization Innovationsföretagen . The invitations from Innovationsföretagen's member register have been handled in accordance with the GDPR and according to a personal data processing agreement (PUB agreement) signed between the parties.

- 1,158 member companies in total within the Innovation Companies
- SNI-71 (708 companies after processing) 44 responses

Total Processed Selection

A total of 1,630 businesses within the specified SNI codes have been invited to participate in the survey. The processed sample consists of companies that provided individual contact information to the relevant contact person within each business.

Response rate

In total, 170 interviews were conducted where the businesses answered at least 2 of the questions in the survey. The response rate is thus assessed at 10.4 percent.

Representativeness

The representativeness is affected by the design of the survey, asking about skills needs automatically excludes businesses that do not have or perceive themselves to have a skills need.

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APPENDIX 2

The number of people employed with different types of digital excellence

The diagram below shows the number of employees with different types of tech skills, on average per company. The question that the respondents have had to decide on is how many employees they have with the respective competence (it should constitute their main competence).

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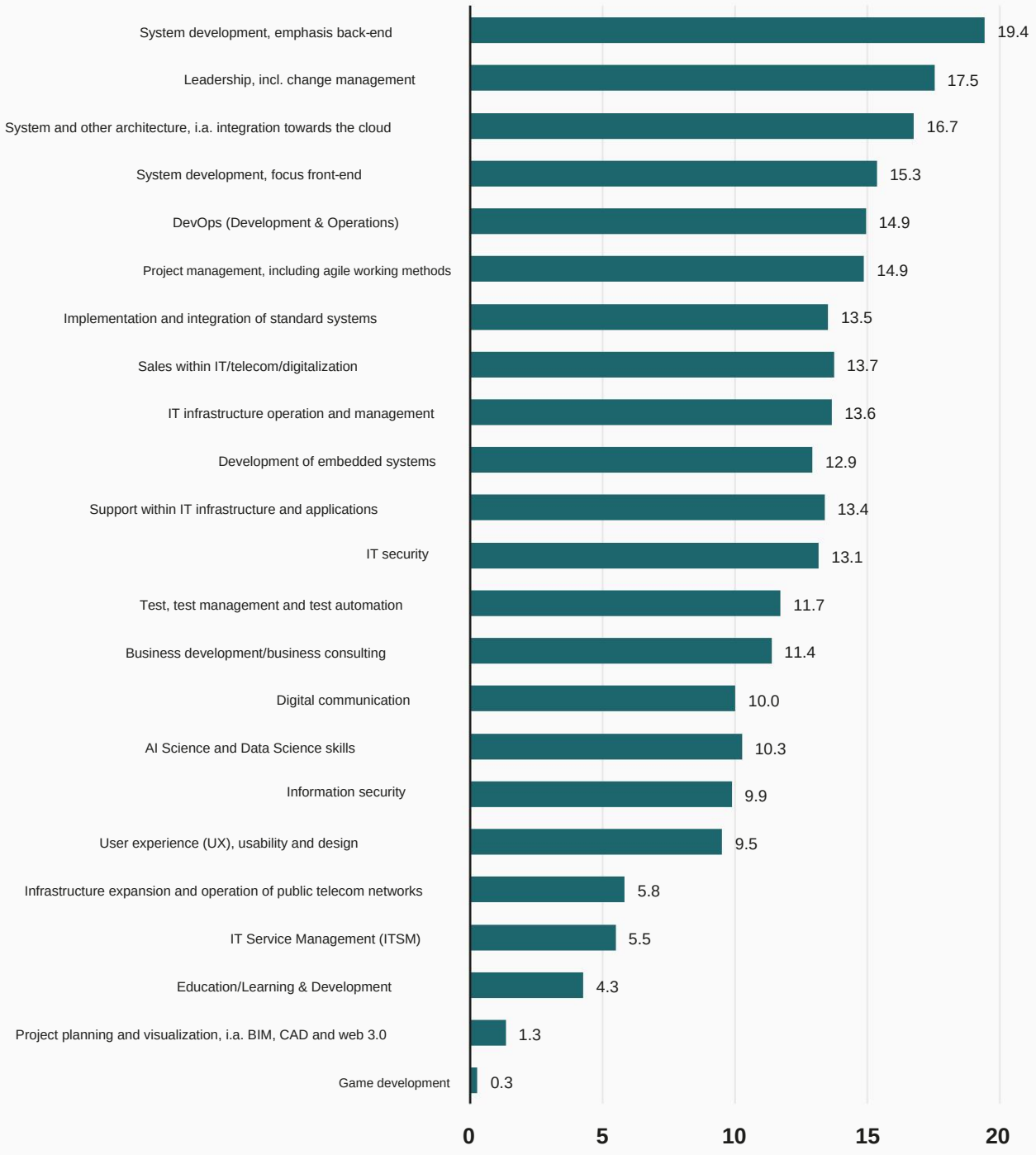
Diagram 15

The number of employees with different types of digital excellence, on average per company



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APPENDIX 3

Description of professional roles and which competencies they include

PROFESSIONAL CATEGORIES/ IT PROFESSIONAL ROLES:	SKILLS AND ROLES INCLUDED:	CORRESPONDING ROLE ACCORDING TO SCB'S SSYK*)
Software/ system developer	System development front-end System development back-end Development of embedded systems DevOps Game development	Software and system developers, etc. + developer in games and digital media
IT project manager	Project management including agile working methods Project planning and visualization, including BIM, CAD and other technology in virtualization and web 3.0	
IT architect	Systems and other architecture	System analysts and IT architects, etc. + other IT specialists
IT architects & qualified data analysts and database developers	System and other architecture, including integration with the cloud AI and Data Science skills IT Service Management (ITSM) Implementation and integration of standard systems	
Business developer /business consultants*	Business/business consulting	Management and organizational developer
Tester	Test, test management and test automation	System tester and test leader
System Administrator	IT infrastructure – operation and management	System administrator etc. + system administrators
Infrastructure experts, both IT and telecom	Infrastructure expansion and operation of public telecom networks	Civil engineering professions in electrical engineering + engineers and technicians in electrical engineering
It support technician	Support within IT infrastructure and applications	Operations Operations technician, IT + support technician, IT
Infrastructure engineer, telecom	Infrastructure expansion and operation of public telecom networks	Network and system technicians, etc.
Technical salesperson*	Technical sales within IT /telecom/ digitization	Business salesperson
Information/IT security experts	IT security Information security	IT security specialists
UX expert	User experience (UX), usability and design	Designer in games and digital media
Digital leaders/IT managers	Leadership, incl. change management	IT managers level 1 + 2
Trainer in IT/telecom*	Education/pedagogical competence in IT/telecom/ digitization	Other trainers and instructors
Digital communicators* Digital communication		Informants, communicators and PR specialists

*) The italicized roles are generic, non IT/Telecom specific roles.

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A REPORT FROM TECHSWERIGE

The competence needs in tech

TechSverige is an industry and employer organization for all companies in the tech sector, with the task of creating, together with the members, the best possible conditions for a world-leading tech industry in Sweden. Among our more than 1,400 member companies - which in total have close to 100,000 employees in Sweden - everything from small startup companies with a few employees to large, multinational companies with thousands of employees around the world can be found.

TechSverige's members are also members of the Swedish Confederation of Business.
Feel free to visit us at techsverige.se

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