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Results of the Digital Skills Indicator (DSI 2.0) 2021

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1 Initial situation and research project

Eurostat publishes the *Digital Skills Indicator* (DSI) every two years. The data for the composite indicator, which is intended to provide information on the digital skills of EU citizens, was last collected in 2021. The results have not yet been systematically analysed from an Austrian perspective. As part of the Federal Ministry of Finance's *Digital Competence Initiative for Austria,* Statistics Austria has now compiled an initial assessment in the form of this analysis report. The report is divided into four chapters.

Chapter 1 briefly outlines the initial situation of the report and begins with an overview of key terms and measurement concepts. In this context, the European Union's digitalisation strategy is also outlined, and reference is made to the importance of the DSI.

Chapter 2 provides an international context for the results. The Austrian results of the overall indicator as well as the sub-indicators and individual indicators of the DSI are compared with the European results. For indicators for which time series are available, the development over time is also presented. Comparisons are made with the five countries with the highest levels of digital skills – Finland, the Netherlands, Ireland, Denmark and Sweden – as well as the EU-27 average.

Chapter 3 combines a descriptive and an analytical perspective. First, the basic digital skills of the population are presented according to socio-demographic characteristics: gender, age, education, employment status and degree of urbanisation. The socio-demographic variables mentioned are then analysed simultaneously using multivariate analysis. The aim is to identify the most important factors influencing the digital skills of the Austrian population and to provide a solid basis for a public debate and corresponding economic and socio-political considerations.

Chapter 4 summarises the key findings and contextualises the results once again. Finally, an outlook is given for future surveys and analyses based on the *Digital Skills Indicator*.

1.1 Digital skills in the digital age

Megatrends are driving forces of social change that are shaping our present and future worldwide. The European Union has defined 14 megatrends that are of great importance from an ecological, economic and social perspective. *Technological change and hyperconnectivity* forms one of these megatrends (European Commission 2022). It is precisely this megatrend that is increasingly shaping economic, working and living practices in Austria and Europe.

In this context, the European Union has proclaimed the Digital Decade. In the publication *Digital Compass 2030: The European way for the Digital Decade,* the European Commission presents concrete strategies and objectives for the digital transformation (European Commission 2023a). The aim is to support the digitalisation of companies and public services, ensure a secure and sustainable infrastructure and promote people's digital skills. One of the European Commission's targets is that at least 80% of 16- to 74-year-olds in EU member states should have *at least basic digital skills* by 2030.

The *Digital Economy and Society Index* (DESI) (European Commission 2023b) is the most important tool for measuring the progress of EU member states in the digital domain. The DESI reports published annually by the European Commission allow a comparison of the grade of digitalisation of the economy and society between the 27 EU member states over time. The DESI has been revised several times and was last adapted to the EU's Digital Decade in 2021. The four dimensions of the DESI – *human capital, connectivity, integration of digital technology, digital public services* – correspond to the dimensions of the policy programme.

The *human capital* dimension is in turn divided into the sub-indicators of *internet user skills* and *advanced skills and development*. The first sub-indicator relates to basic digital skills, while the second sub-indicator focusses on higher digital skills, which play a role primarily in the professional environment. **Table 1** lists the sub-indicators of the human capital dimension and the associated indicators.

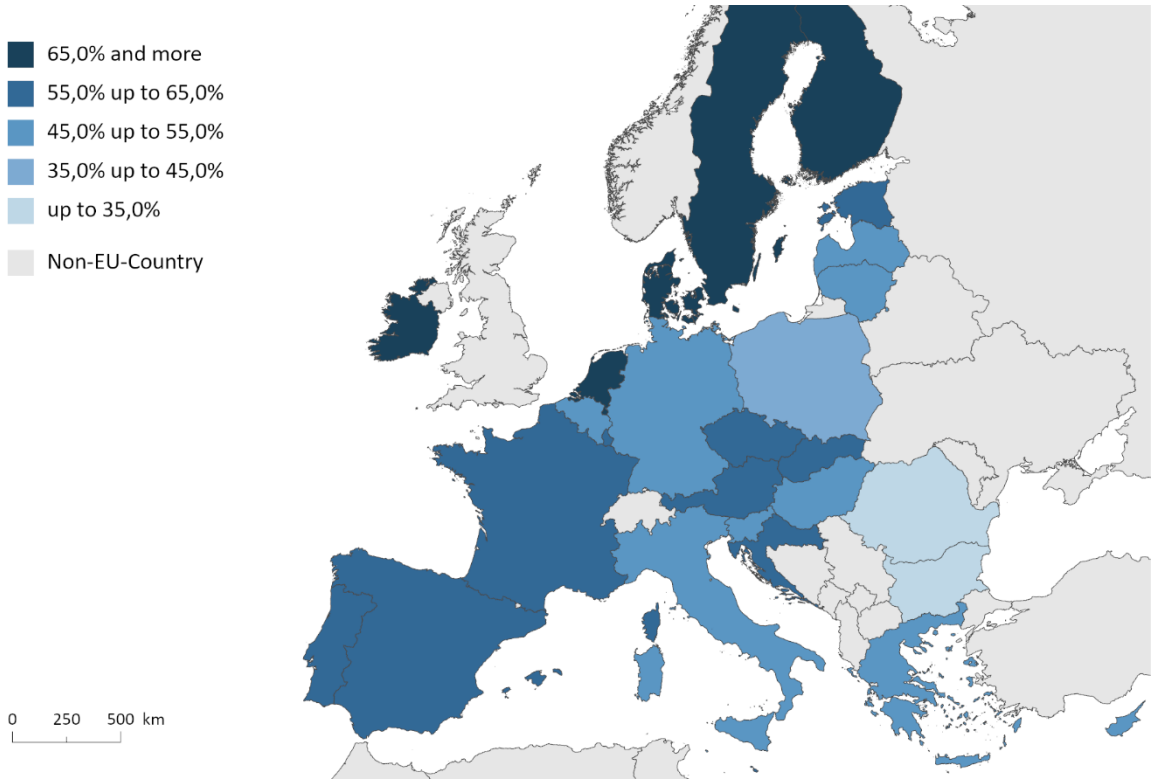
Table 1: Indicators of the DESI's human capital dimension

Subdimension	Indicator
Internet user skills	At least basic digital skills
	Above basic digital skills
	At least basic digital content creation skills
	ICT specialists
Advanced skills and development	Female ICT specialists
	Enterprises providing ICT training
	ICT graduates

Source: European Commission — Digital Economy and Society Index (DESI) 2022

The *internet user skills* sub-indicator was operationalised using the three indicators *at least basic digital skills*, *above basic digital skills* and *at least basic digital content creation skills.* The *advanced skills and development sub-indicator* is divided into the indicators *ICT specialists, female ICT specialists, enterprises providing ICT training* and *ICT graduates*. All three indicators of the *internet user skills* sub-indicator come from the *Digital Skills Indicator* (DSI), which is therefore one of the most important performance indicators of the European Union's Digital Decade. For further methodological information, please refer to the European Commission (2023c). **Figure 1** shows a cartogram of the overall DSI indicator. The darker a country is shown, the greater the proportion of people with *at least basic digital skills* in the population.

Figure 1: Cartogram of the overall DSI indicator 2021



Source: Eurostat, European survey on ICT usage in households 2021

1.2 The Digital Skills Indicator by Eurostat

Eurostat's *Digital Skills Indicator* (DSI) is a composite indicator consisting of selected activities of EU citizens in the area of internet and software use. It provides information on the basic digital skills of citizens in the EU member states. The DSI was developed in cooperation with the Joint Research Centre (JRC) and the European Commission's Directorate-General for Communications Networks, Content and Technology (DG CNECT) and was first published in 2015. From 2019 to 2022, the DSI was extensively revised to modernise the indicator and align it with the revised *European Digital Competence Framework for Citizens* (DigComp 2.0). The revised version of the DSI was surveyed for the first time in 2021. Due to the methodological changes, 2021 also marks the start of a new time series, which will continue in 2023.

A total of 33 internet and software activities are surveyed for the DSI, which are assigned to the five areas of the DigComp 2.0 framework. It is assumed that respondents who state that they have carried out specific activities also have the corresponding skills. The data is therefore used as a proxy for the population's basic digital skills. In addition to an overall indicator, the following five sub-indicators are provided:

- Information and data literacy
- Communication and collaboration
- Digital content creation
- Safety
- Problem solving

Figure 2 provides an overview of the sub-indicators and the corresponding individual indicators. The DSI is calculated in two steps. Firstly, each person in each competence area is assigned one of the three skill levels *above basic, basic* or *no digital skills.* The assignment is based on the number of activities mentioned in the respective area. The number of activities required for above *basic* or *basic skills* differs slightly depending on the competence area. **Table 2** provides an overview of the categorisation scheme.

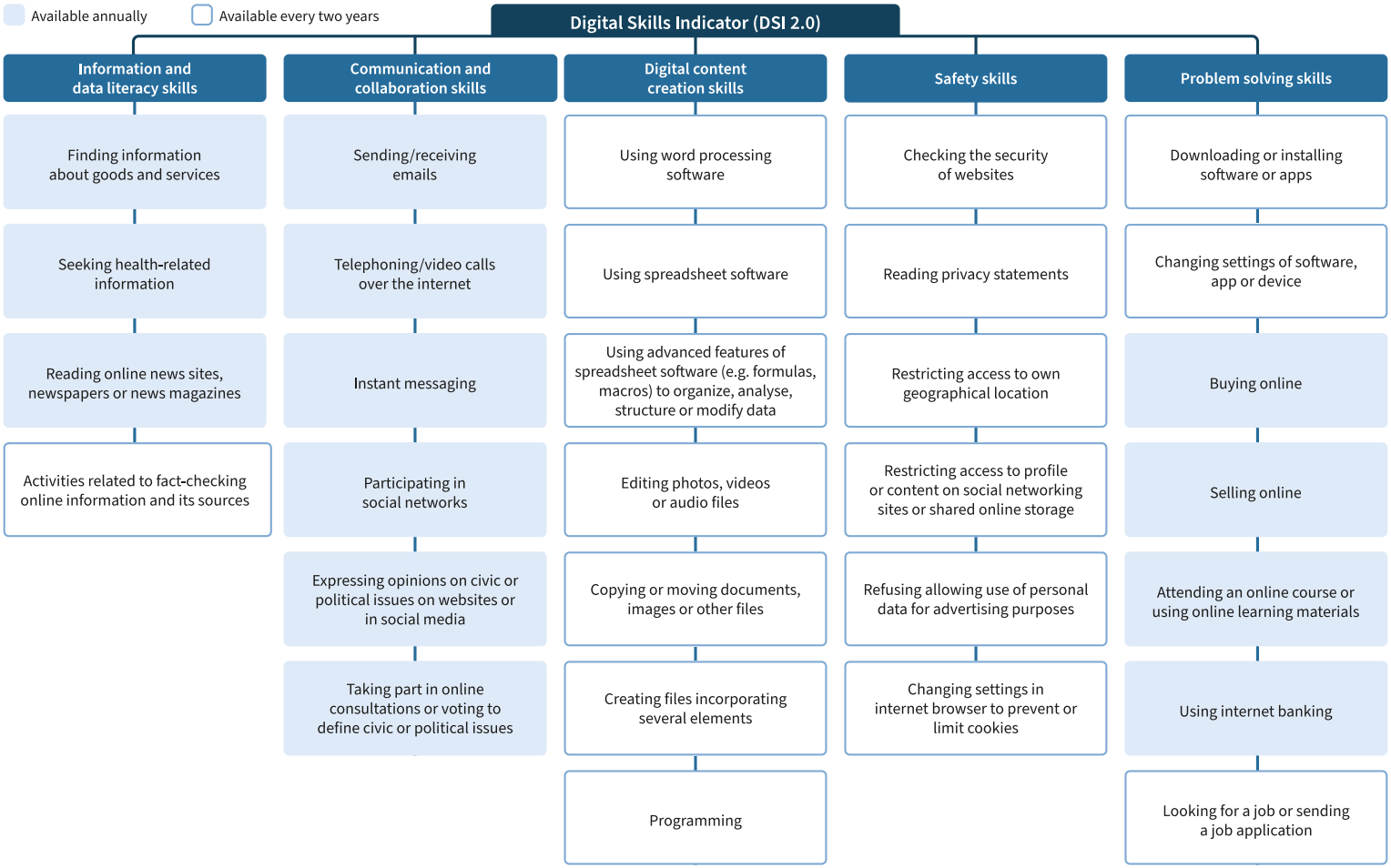
Table 2: Number of activities by competence area and skill level

Sub-indicator	No digital skills	Basic digital skills	Above basic digital skills
Information and data	0	1	≥ 2
Communication and collaboration	0	1	≥ 2
Digital content creation	0	1 to 2	≥ 3
Safety	0	1 to 2	≥ 3
Problem solving	0	1 to 2	≥ 3

Source: Statistics Austria — own illustration

It is sufficient to have completed one activity in the corresponding area to be assigned the skill level of basic digital skills in a competence area. Two or three activities are required for *above basic digital skills.*

Figure 2: Overview of the structure of the DSI 2.0



Source: Statistics Austria — own illustration

In a second step, the sub-indicators are summarised to form an overall indicator. The overall indicator distinguishes between the following seven skill levels:

- Above basic digital skills
- Basic digital skills
- Low digital skills
- Narrow digital skills
- Limited digital skills
- No digital skills
- No internet use in the last three months

People who have *above basic digital skills* in all five areas are considered to have *above basic digital skills* overall. People who have *basic* or *above basic digital skills* in every area (but not *above basic* in every area) are labelled as having overall *basic digital skills*. Individuals who lack skills in one or more areas are categorised at the lower skill levels. If they lack skills in one area, they are categorised as having *low digital skills*, if they lack skills in two areas, they are categorised as having *narrow digital skills*, and so on. The skill level of people who have not used the internet in the last three months is not assessed. **Table 3** provides an overview of how the skill levels of the overall indicator are derived from the sub-indicators.

Table 3: Characteristics of the sub-indicators and overall indicators

Characterisation of the sub-indicators	Characterisation of the overall indicator
five times above basic	above basic
five times above basic or basic (but not five times above basic)	basic
four times basic	low
three times basic	narrow
twice basic	limited
none to once basic	no skills
-	not assessable

Source: Statistics Austria — own illustration

For analytical purposes, the skill levels *above basic* and *basic* are often combined to form the skill level *at least basic.* The above-mentioned target set by the European Commission that 80% of 16- to 74-year-olds in EU member states should have *at least basic digital skills* by 2030 refers to this skill level.

The methodology of the DSI makes it possible to draw conclusions about the digital skill level of the population from data on internet and software usage behaviour. This is an indirect measure of digital skills. The central assumption is that there is a correlation between digital skills and usage behaviour. The European Commission has presented a report with initial analyses on the validity of the DSI (Vuorikari et al. 2022). Using psychometric indicators such as Cronbach's alpha and factor analytical methods, it is shown that the measuring instrument has good psychometric properties. However, the authors also emphasise the need to continuously evaluate and further develop the measuring instrument.

1.3 EU survey on the usage of ICT in households

The DSI is based on data from the European survey on the usage of information and communication technologies (ICT) in households. It has been carried out throughout the European Union since 2002 by the respective national statistics offices, in this case by Statistics Austria, using a standardised methodology and harmonised definitions. EU regulations form the legal basis for the survey[1].

In Austria, the survey is conducted as part of the microcensus, which is a statistical survey that provides information on the structure and development of the economic and social situation of the population. For this purpose, 22,500 households are drawn each quarter in a single-stage, stratified random selection. In principle, a household remains in the sample for five quarters and is therefore surveyed five times at three-month intervals. The first survey is conducted face-to-face (CAPI – Computer Assisted Personal Interviewing). The other four interviews are conducted via the Internet (CAWI – Computer Assisted Web Interviewing) or telephone (CATI – Computer Assisted Telephone Interviewing). In principle, the member states of the European Union can choose the form of survey (CAPI, CATI, CAWI or PAPI — Paper and Pencil Interviewing) themselves, whereby an exclusive web survey (CAWI) is not permitted.

The ICT household survey includes households that have already been surveyed at least once as part of the microcensus and in which at least one person aged 16 to 74 lives. In this sense, the ICT household survey sample is a subsample of the households in the microcensus. Participation in the microcensus is mandatory in Austria, but participation in the ICT household survey is voluntary. It

[1] The 2021 survey on ICT usage in households was subject to the Commission's Implementing Regulation (EU) 2020/1013 of 20 July 2020 laying down the technical specifications of the data set, specifying the technical formats for the transmission of information and defining the modalities and content of the quality reports on the implementation of a sample survey on the usage of information and communication technologies for the reference year 2021 in accordance with Regulation (EU) 2019/1700 of the European Parliament and of the Council of 10 October 2019, and a Commission Delegated Regulation (EU) 2020/1432 of 14 July 2020 supplementing Regulation (EU) 2019/1700 of the European Parliament and of the Council by specifying the number and titles of variables in the field of ICT usage for the reference year 2021.

is up to the EU member states to decide whether participation is voluntary or compulsory. In addition to Austria, 15 other EU member states have opted for voluntary participation. The survey itself is carried out in the first half of the year. The reporting period for households is the time of the survey. The reporting period for individuals is the time of the survey or the last three or twelve months prior to the time of the survey. The data is delivered to Eurostat as microdata in October, which in turn publishes the aggregated data for all member states in January of the following year. It should be noted that the ICT household survey takes place annually, but that all indicators included in the DSI are only collected every two years, meaning that the DSI can also only be reported every two years.

1.4 Methodological notes

This section contains some basic comments on methodological and statistical details. The DSI is based on sample surveys. The results of the DSI, like the results of any other sample survey, are subject to measurement errors. In the social sciences, a measurement error that leads to a distortion of the results is also known as bias. In general, a distinction is made between two types of bias sources: random and non-random bias.

Random bias sources are due to the sample design of the survey and can be quantified using statistical methods. In general, the larger the sample size, the lower the random bias. The regulations cited in the previous section therefore also regulate the sample size to be realised nationally[2] . A random bias can be easily controlled using statistical methods and is balanced out when measurements are repeated.

This is different with non-random bias sources, which lead to a systematic distortion of the results. There are theoretically many possible sources of systematic bias in questionnaire surveys. For example, selection bias or non-response bias can be mentioned here, which might lead to systematic distortions.

In order to minimise the influence of such confounding variables, a number of bias control measures are implemented at both national and European level. Documentation of these measures and further details on the national surveys will be made available online by Eurostat (2023).

[2] In order not to place a disproportionate burden on small member states, the population size of the member states is also considered in the specifications. The specifications are selected in such a way that the standard errors of the surveyed indicators are generally not greater than one percentage point, even for small states.

2 Digital skills in an EU comparison

This section takes a descriptive look at the digital skills of the Austrian population in an European comparison based on the results of the DSI 2021. The analysis begins with the overall indicator, which categorises the digital skills of the EU-27 population into a total of six skill levels. It then continues with the sub-indicators of the DSI, which provide information on digital skills in five specific skill areas. Due to a revision of the DSI, no historical data is available for the overall indicator and the sub-indicators. However, it is available for some of the indicators on which they are based. The time spans covered by these time series are therefore vastly different. While some internet and software activities included in the DSI have been surveyed since the early days of the ICT household surveys in the noughties, other activities were only gradually included in the survey later. The last adjustments were made in 2021, meaning that no time series are available for some indicators. However, where the data allows, the analysis is extended to include a time dimension.

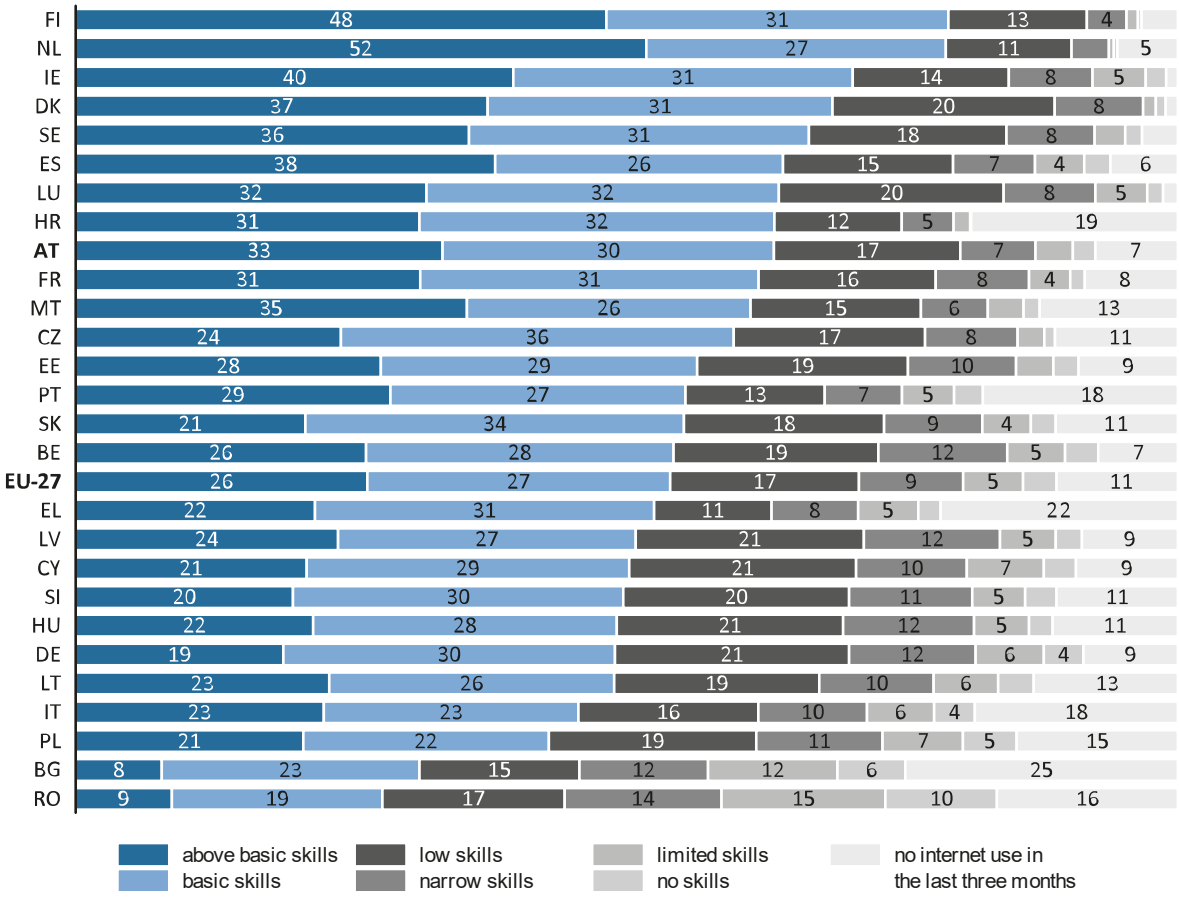
2.1 Results of the overall indicator in an EU comparison

As part of the European Digital Decade, the European Commission (2023a) has set a target that at least 80% of the European population should have basic digital skills. This target relates to the two highest skill levels of the overall DSI indicator - *basic skills* and *above basic skills*. Together they form the skill level of *at least basic skills*.

Figure 3 shows the distribution of skill levels in an EU comparison. The percentages for the six skill levels and the percentage of non-users of the internet are shown. The EU member states were ranked according to the proportion of people with *at least basic digital skills.* According to this figure, the digital skills levels of 16- to 74-year-olds in the individual EU member states differ quite much from one another. The highest percentages of people with *basic digital skills* are found in Finland and the Netherlands. Almost 80% of the population there have *basic digital skills*. Romania (28%) and Bulgaria (31%), on the other hand, fare the worst. Not even every third person in these two countries has *basic digital skills*. The difference between the member states with the highest and lowest proportion of people with *at least basic digital skills* is therefore more than 50 percentage points. Austria ranks in the top third in this relatively extensive field. In Austria, just over six in ten people have at least *basic digital skills* (63%). This puts Austria in ninth place in the ranking and clearly exceeds the EU average of 54%. However, there is still some way to go to reach the goal of the Digital Decade, according to which eight out of ten people should have *at least basic digital skills.* At present, only Finland and the Netherlands are close to achieving this goal. These two member states are around 16 percentage points ahead of Austria. In addition, only Ireland (70%), Denmark (69%) and Sweden (67%) achieved percentages that indicate a significantly higher proportion of people with *basic digital skills* than in Austria. Their difference to Austria is between

seven and three percentage points. Although Spain (64%), Luxembourg (64%) and Croatia (63%) are also ahead of Austria, the gap is less than one percentage point in each case.

Figure 3: Digital skills by skill level in an EU comparison 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

The two highest skill levels, *basic* and *above basic digital skills,* which together form the skill level *at least basic digital skills*, are roughly equally distributed across the EU-27 average (*basic skills:* 27%; *above basic skills*: 26%). In Austria, the two skill levels are also roughly equally distributed (*basic skills:* 30%; *above basic skills*: 33%). This is not the case in all member states. One pattern that can be observed is that the proportion of people with above *basic skills is* higher in member states that are at the top of the ranking than the proportion of people with only *basic skills* (e.g. Finland: *basic skills*: 31%; *above basic skills*: 48%). The reverse is more likely to be the case for member states that are further behind (e.g. Romania: *basic skills*: 19%; *above basic skills*: 9%). Here, the proportion of the population with only *basic digital skills* usually predominates.

People at lower skill levels do not have *at least basic digital skills*. These people completely lack skills in one or more of the five specific competence areas. The more areas they lack skills in, the lower the skill level[3] . For this reason, the skill levels below *basic digital skills* appear to be particularly interesting. People with *low digital skills* only lack knowledge in one specific area[4] . These people therefore only just fall short of a basic *digital skill level.* The proportion of the population *with low digital skills* is relatively high in Austria and in the EU-27 average, accounting for 17% in each case. The proportion also varies relatively little between the member states, even if the top countries tend to have slightly lower proportions of the population with low digital *skills* (e.g. Finland 13%).

The other skill levels, which indicate that *at least* a *basic level of digital skills* has not been achieved, are significantly lower. These people lack skills in several areas. Seven percent of the Austrian population have *narrow skills*, three percent have *limited skills* and two percent have *no skills*. A similar pattern can be observed in the EU-27 average, even if the percentages are slightly higher. Nine percent of the EU population have *narrow skills*, five percent have *limited skills* and three percent have *no digital skills*.

Figure 3 also shows the proportion of people who have not used the internet in the last three months. This population group is not assigned a skill level by the DSI. In Austria, this group accounts for seven percent; the EU-27 average is eleven percent. The proportion of non-users varies considerably between member states, ranging from one percent in Ireland to 25% in Bulgaria. Member states with a high level of digital skills tend to have fewer non-users and member states with a low level of digital skills have more non-users. Historical data is also available for this rate. The proportion of people who have used the internet in the last three months is one of the main indicators of the ICT household survey and has been collected annually since 2002.

Figure 4 shows the development in Austria and the EU-27 average. The time series for Finland, the Netherlands, Ireland, Denmark, and Sweden are also shown. The five member states are the top five group that lead the ranking of the overall indicator. A comparison with these five best-practice countries promises to be particularly revealing. In this report, comparisons at the level of individual indicators will therefore also be made with this top five group.

At the beginning of the series of measurements in 2002, the proportion of people who had used the internet in the last three months differed quite significantly between the countries included. Even then, almost all of the top five member states had significantly higher rates than Austria (Austria: 37%; Netherlands: 61%; Finland: 62%; Denmark: 64%; Sweden: 71%). Ireland is the only exception. Ireland's measurement series begins in 2003, when the proportion of internet users

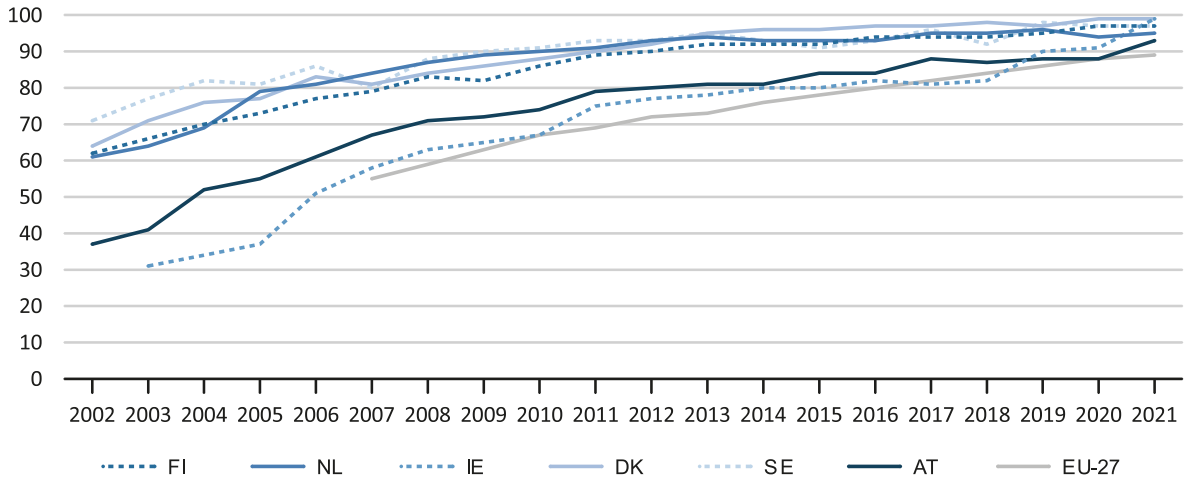
[3] The design principle of the DSI is described in detail in Chapter 1.

[4] The areas in which people with *low digital skills* lack knowledge are listed in chapter 2.2.6.

was 31%. The EU-27 average can be formed from 2007 onwards. In 2007, it was 55% and therefore lower than in all other countries shown.

Over time, the proportion of internet users increased steadily in all member states and the EU-27 average, with the greatest momentum and highest growth rates at the beginning of the time series up to the early 2010s. Although the best-practice countries remained in the lead, the differences to the other countries narrowed as the internet usage rate became more saturated. In 2021, the proportion of internet users in Ireland and Denmark was 99%. In Finland and Sweden, the proportion was only slightly lower at 97%. In the Netherlands, 95% of the population used the internet; in Austria, this figure is 93%. The EU-27 average was 89%.

Figure 4: Internet usage in the last three months 2002 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

2.2 Results of the sub-indicators in an EU comparison

The DSI is a composite indicator. In total, internet and software activities from five competence areas are surveyed for it. In addition to the overall indicator, a sub-indicator is provided for each area, which provides information on skills in the individual areas. To be categorised as a person with *at least basic digital skills* overall, at least a basic skill level must be achieved in each competence area. The level of skills in the individual competence areas is in turn derived from the individual indicators, which record whether specific internet and software activities have been carried out or not.

Since the results of the overall indicator have already been presented in the previous section, the following analysis is dedicated to the sub-indicators of the DSI. First, the results of the sub-

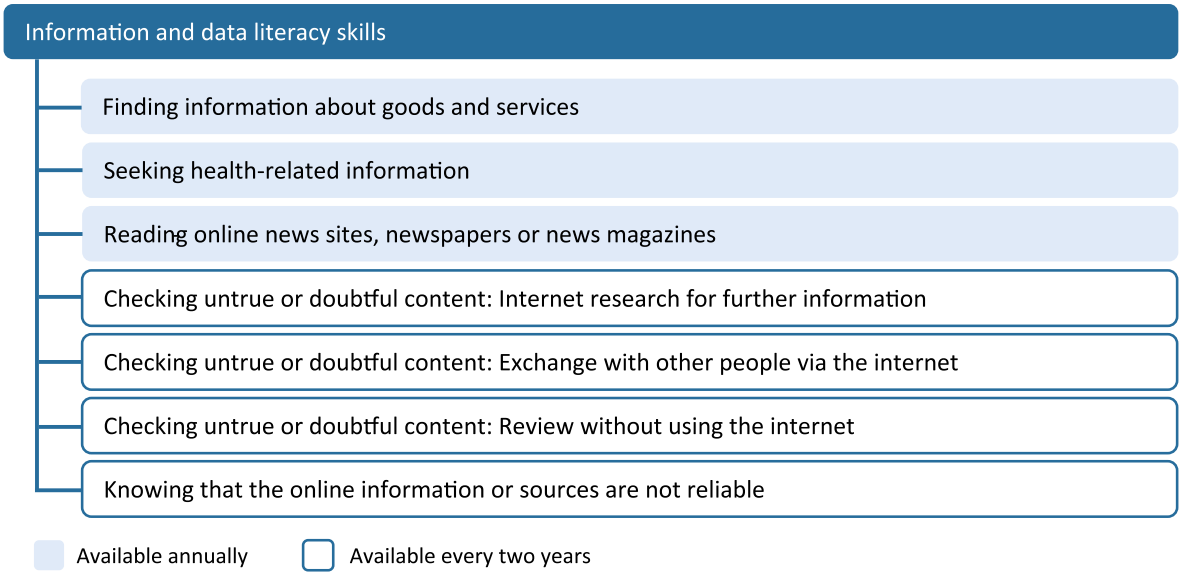
indicators are presented in each case before continuing with the indicators on which they are based. Where a time series is available, a retrospective is also provided at the level of individual indicators. Due to the vast amount of data, the text describing the specific internet and software activities is limited to the most important aspects in each case.

2.2.1 Information and data literacy

The DSI was operationalised using the competence areas of the *Digital Competence Framework for Citizens* (DigComp 2.0). The reference framework contains a list of skills for each competence area, which are summarised to describe the area as briefly and concisely as possible. The following activities are listed for the competence area of *information and data literacy* (European Commission 2023d): articulating information needs; searching for data, information and content in digital environments; evaluating the credibility and reliability of sources of data; organising, storing and managing data, information and digital content.

The following indicators were surveyed for the DSI sub-indicator of the same name, *information and data literacy skills: finding information about goods or services*; *seeking health-related information; reading online news sites, newspapers or news magazines;* and four *activities related to fact-checking online information and its sources*. A comparison of the definitions provided by the Competence Framework and the activities surveyed for the DSI once again illustrates the proxy concept of the measuring instrument. Although a complete operationalisation of the competence area cannot be achieved, differences in the skill level can certainly be made visible.

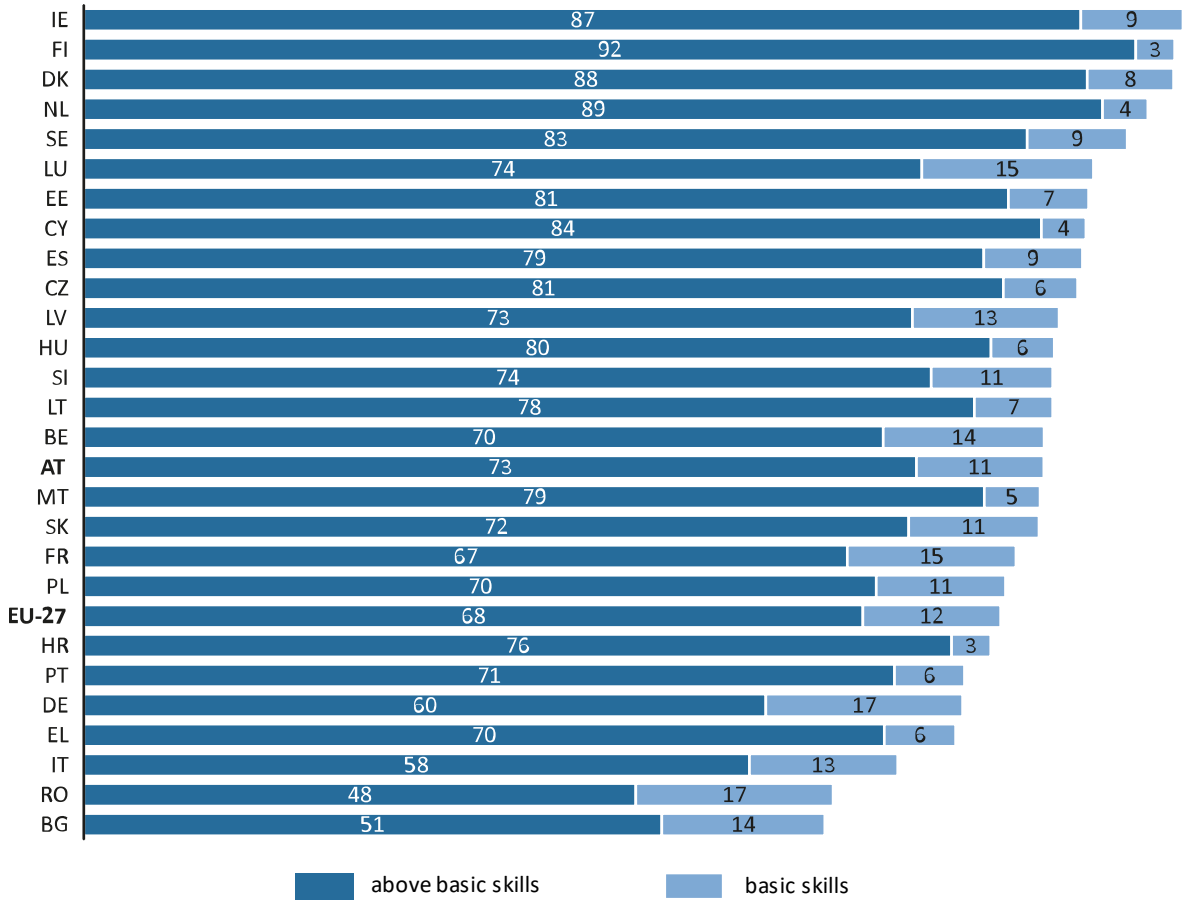
Figure 5: Information and data literacy skills



Source: Statistics Austria — own illustration

Figure 6 shows the distribution of skill levels in *information and data literacy* for 2021 in a European comparison. The member states were again ranked according to the proportion of people with *at least basic digital skills.* In Austria, 84% of the population have *at least basic skills*. Austria therefore ranks slightly lower than the overall indicator (and the other sub-indicators). However, the EU-27 rate of 80% is slightly exceeded and the gap to the member states with the best results in this area is no greater than for some of the other sub-indicators. The five best-practice member states also lead the field here (Ireland, Finland and Denmark: 96% each; Netherlands: 93%; Sweden: 92%). Overall, saturation in this competence area is relatively high and the differences between the member states are rather small. The majority of peopfle with *at least basic digital skills* have *above basic digital skills*. In contrast, the proportion of people with only *basic skills* is relatively small. In Austria, for example, 73% have *above basic digital skills* and 11% have *basic digital skills*. This means that people who use the internet for activities that belong to the competence area of *information and data literacy* usually carry out several activities in this area.

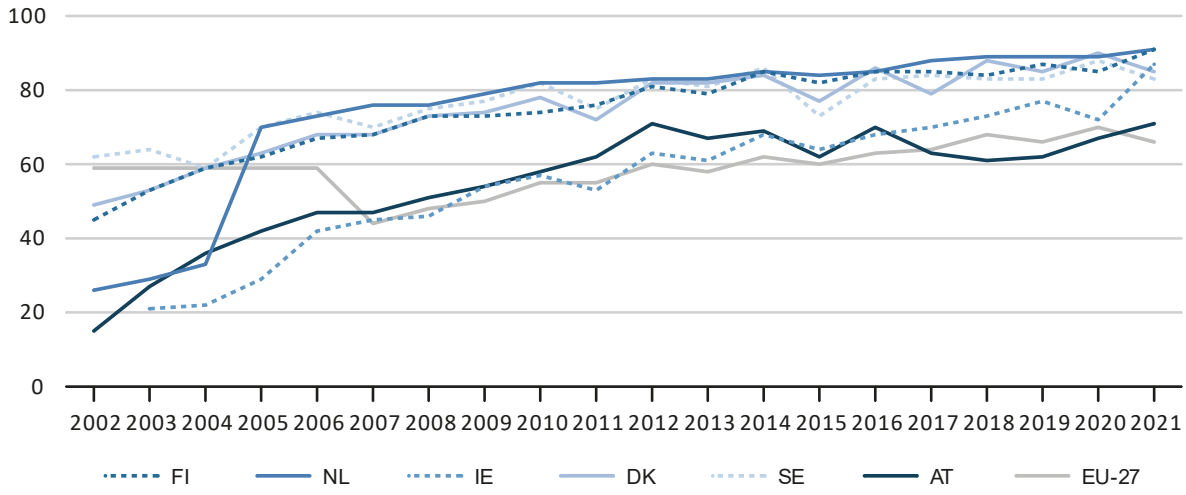
Figure 6: Basic and above basic digital skills in information and data literacy in an EU comparison 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

Figure 7 shows how many people use the internet to *find information about goods and services*. Finland and the Netherlands recorded the highest shares in 2021 (91% each). Ireland (87%), Denmark (85%) and Sweden (83%) have slightly lower results. Austria is significantly below the leaders at 71%, but above the EU-27 average of 66%. Since the start of the survey on ICT usage in households in 2002, the proportion of people finding information about goods and services on the internet has risen significantly in all European countries. In some cases, however, fluctuations and temporarily lower rates can be observed over time. Austria, for example, is now back at its peak value of 71% from 2012. Sweden saw a decline of 13 percentage points in 2017, which was made up for in subsequent years. Despite some isolated national exceptions, a trend towards the use of the internet as a source of information is clearly recognisable over time. Especially at the beginning of the time series in 2002, the proportion of people who used the internet to find information was still low. At 15%, Austria was still the weakest of the five best-practice countries at that time. A similar, albeit somewhat stronger, development can also be observed for Ireland in recent years, particularly with its strong increase of 15 percentage points from 2020 to 2021. Regarding the EU-27 rate, it can be seen that more and more EU citizens have been finding information about goods and services online since the start of the ICT survey. While 44% found information about goods and services online in 2007, 66% are using the internet for this purpose today.

Figure 7: Finding information about goods and services 2002 to 2021 (in percent)

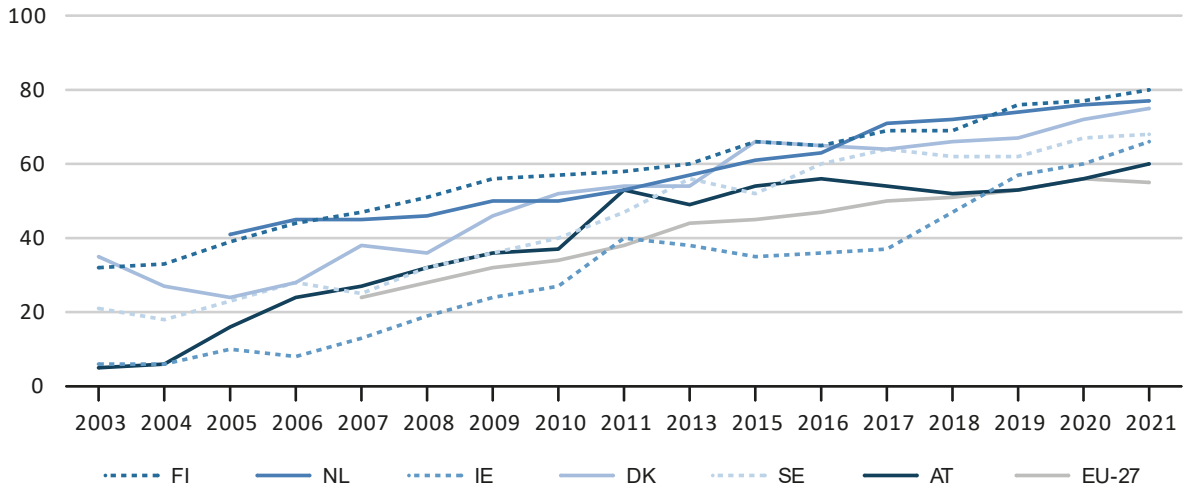


Source: Eurostat, European survey on ICT usage in households 2002-2021.

Seeking health-related information is another indicator that is included in the DSI sub-indicator on *information and data literacy.* This activity has been surveyed since 2003. Its development is illustrated in **Figure 8**. In Finland (80%), the Netherlands (77%) and Denmark (75%), the internet is by far the most frequently used for this purpose. Usage is lower in Sweden (68%) and Ireland (66%). Austria performs worst in comparison to these countries with 60% but exceeds the EU-27 rate of 55%. Over time, a continuous upward trend can be observed for all the countries mentioned, with

only isolated episodes of short-term declines. Seeking health-related information appears to have become more important as a result of the COVID-19 pandemic. From 2019 to 2021, the proportion of people who sought health-related information online increased significantly, particularly in Ireland (by nine percentage points), Denmark (by eight percentage points) and Austria (by seven percentage points).

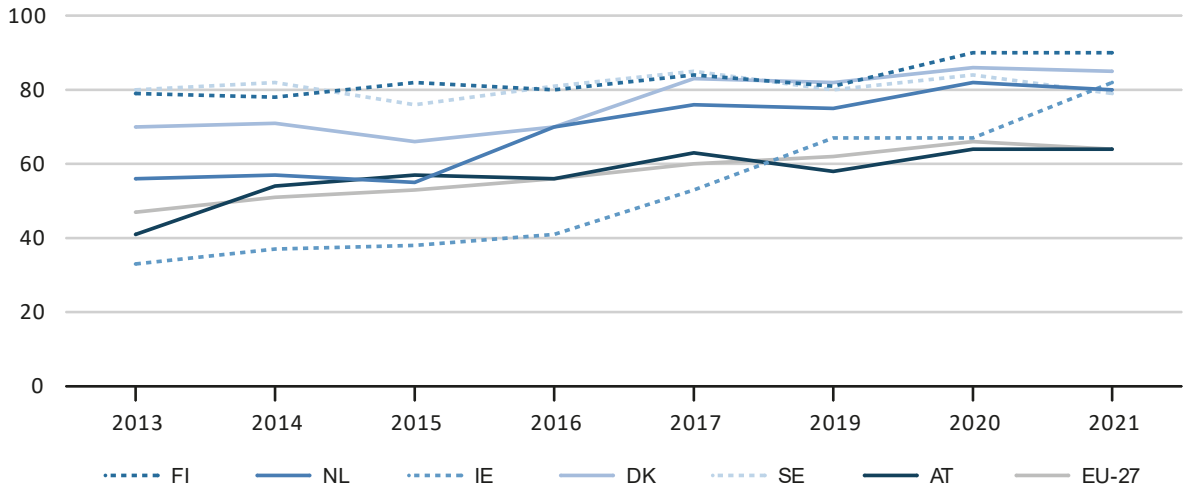
Figure 8: Seeking health-related information 2003 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2003-2021. The indicator was not surveyed in 2012 and 2014.

Reading online news sites, newspapers or news magazines is also included in the *information and data literacy* area. **Figure 9** shows the results for the best-practice member states, Austria and the EU average. The data is available from 2003 onwards. For 2021, the proportion of people who have read online news sites, newspapers or news magazines is highest in Finland (90%). The rate is slightly lower in Denmark (85%), Ireland (82%), the Netherlands (80%) and Sweden (79%). At 64%, Austria is on a par with the EU-27 average, but well behind the best-practice countries. The time series shows that the countries mentioned have undergone quite different developments. While the proportion of people who read online news sites, newspapers and news magazines has always been high in Finland and Sweden, the proportion has risen in Ireland and to a lesser extent in the Netherlands.

Figure 9: Reading online news sites, newspapers or news magazines 2013 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2013-2021. The indicator was not surveyed in 2018.

The four activities related to the indicator *fact-checking online information and its sources are* key indicators of *information and data literacy*. They were surveyed for the first time in 2021 as part of the ICT survey and are aimed at contact with misinformation and how to deal with it (see **Figure 10**). Specifically, skills were attributed to all those people who discovered and subsequently fact-checked untrustworthy content on the internet in the three months prior to the survey date. In addition, people who discovered untrustworthy content on the internet but did not check it because they already knew that the content or sources were untrustworthy were also included.

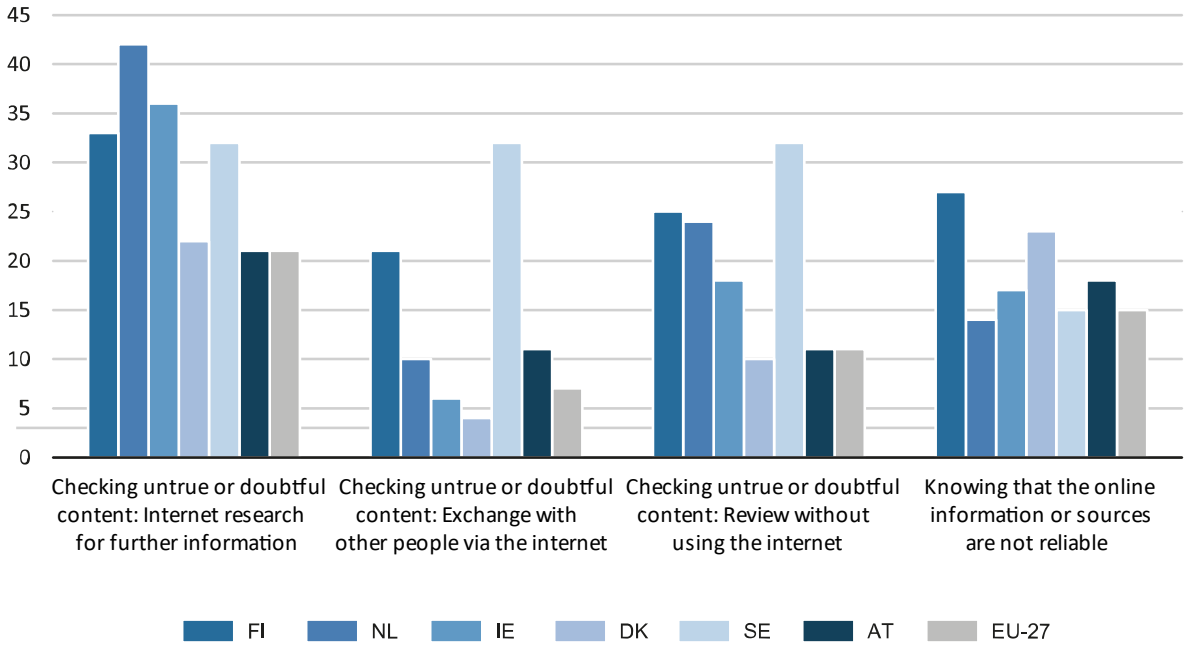
Untrustworthy content was checked most frequently in the Netherlands (42%). The proportion is lower in Ireland (36%), Finland (33%) and Sweden (32%). In Austria and Denmark, around a fifth of respondents used the internet to check and further research untrustworthy information, which is also in line with the EU-27 rate (21%).

Another way to check false content and untrustworthy sources is to *exchange information with other people via the internet*. In Sweden, one in three people (32%) used this option, making it by far the most popular option in a country comparison. While around one in five people in Finland (21%) chose digital dialogue, use of this fact-checking option is relatively low in Austria (11%), the Netherlands (10%), Ireland (6%) and Denmark (4%), which is also reflected in the EU average (7%).

An offline method for checking untrustworthy content, i.e. *reviewing without using the internet,* is most frequently chosen in Sweden (32%). The proportion is significantly lower in Finland (25%), the Netherlands (24%) and Ireland (18%). This option is used least frequently in Austria and Denmark, where only around one in ten people use this option, in line with the EU-27 average of 11%.

Finally, people who did not fact-check untrustworthy content or reports were asked whether they did not fact-check it because they already knew that the content was not trustworthy. In Finland, just over a quarter (27%) ruled out checking such content for this reason. The rate is slightly lower in Denmark (23%), followed by around a fifth in Austria (18%) and Ireland (17%). Awareness of the untrustworthiness of content and sources is only slightly lower in Sweden (15%) and the Netherlands (14%), with the average for the EU-27 being 15%.

Figure 10: Activities related to fact-checking online information and its sources 2021 (in percent)



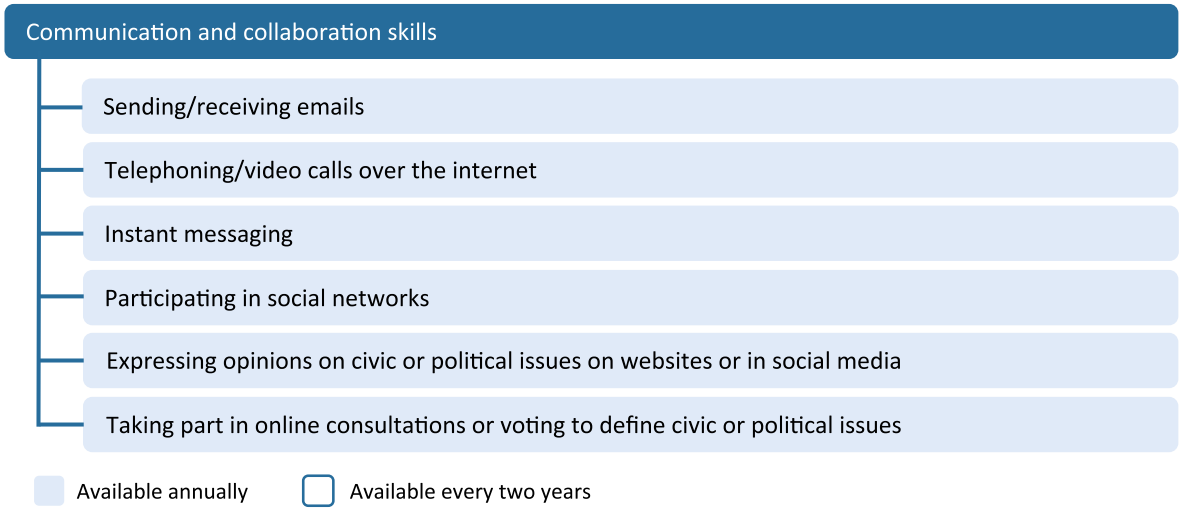
Source: Eurostat, European survey on ICT usage in households 2021.

2.2.2 Communication and collaboration

The *Digital Competence Framework for Citizens* (DigComp 2.0) describes the competence area *communication and collaboration* based on the following activities (European Commission 2023d): interacting, communicating and collaborating using digital technologies, while being aware of cultural and generational diversity; participating in society through the use of public and private digital services and participatory citizenship; managing one's own reputation and digital identities.

The competence area was operationalised as part of the DSI using the following activities: *Sending/receiving emails*, *telephoning/video calls over the internet*, *instant messaging*, *participating in social networks*, *expressing opinions on civic or political issues on websites or in social media*, and *taking part in online consultations or voting to define civic or political issues*.

Figure 11: Communication and collaboration skills

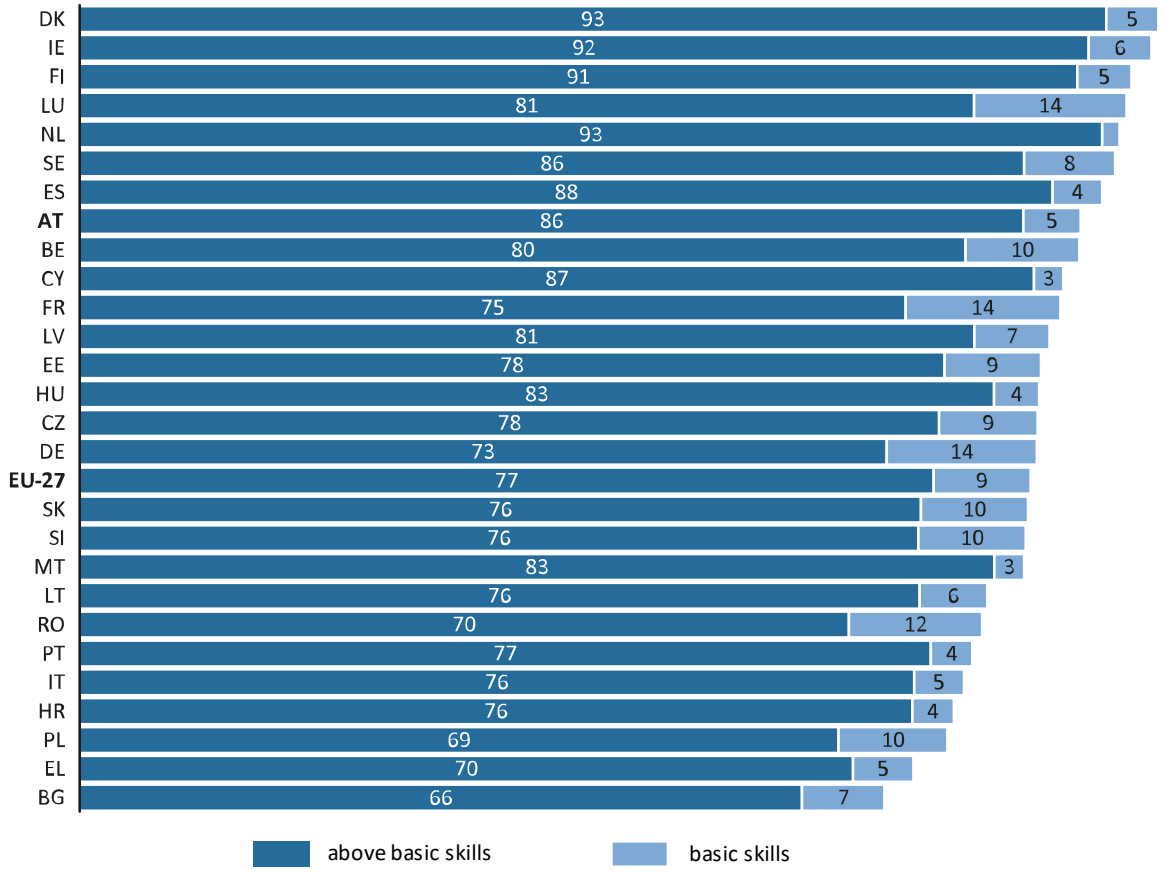


Source: Statistics Austria — own illustration

With regard to the sub-indicator *communication and cooperation skills, the* EU comparison for 2021 as presented in **Figure 12** shows that Austria is in the top third of member states with a share of 91% of people with *at least basic digital skills.* For this sub-indicator, too, the group is predominantly made up of people with *above basic skills*. 86% have *above basic digital skills* and 5% have *basic digital skills in communication and collaboration*.

Overall, the sub-indicator shows a remarkably high degree of saturation and is also the highest of the five sub-indicators. At the same time, the results of the member states vary relatively little. There are only 25 percentage points between Denmark (98%) at the top and Bulgaria (73%) at the bottom. The EU average is 86%.

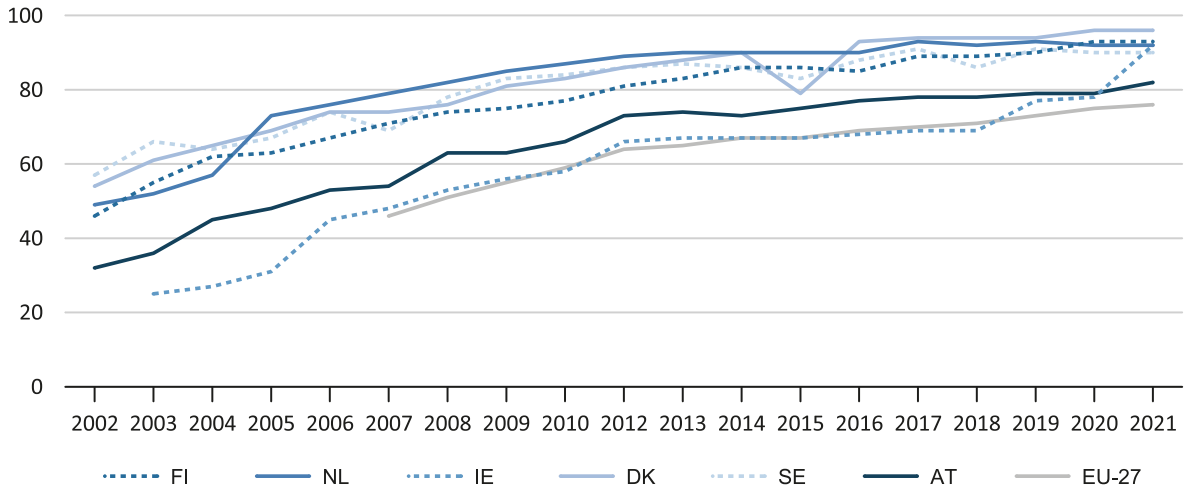
Figure 12: Basic and above basic digital skills in communication and collaboration in an EU comparison 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

Using the internet to *send/receive emails* is one of the most fundamental elements of digital communication and information technologies. Therefore, usage in 2021 is widespread, as can be seen in **Figure 13**. In Denmark (96%), Finland (93%), Ireland (92%), the Netherlands (92%) and Sweden (90%), at least nine out of ten people use email. Austria scores slightly lower (82%), although the internet is still used more frequently for email than the EU average (76%). Over time, there has been a clear trend towards more frequent use of email as a communications technology in all countries since the start of the time series in 2002. Due to the already very widespread usage, the use of email in the best-practice countries has increased only slightly in recent years. The exception is Ireland, which for years recorded values around the EU-27 average but showed a strong increase from 78% to 92% from 2020 to 2021. In comparison, the increase in sending and receiving emails in Austria has been weak in recent years, but the number has increased continuously since 2014.

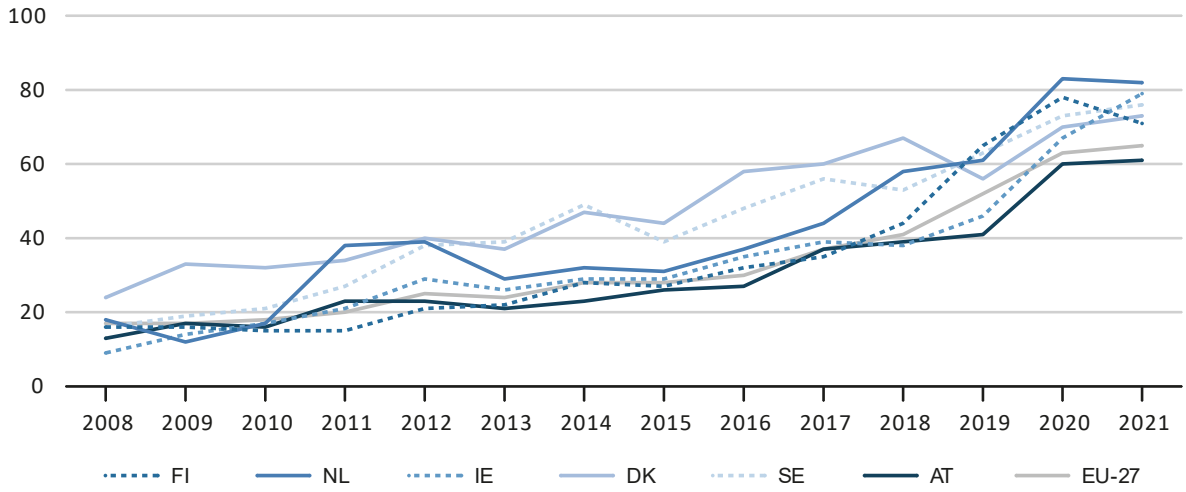
Figure 13: Sending/receiving emails 2002 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2002-2021. The indicator was not surveyed in 2011.

Telephoning/video calls over the internet appears to be relatively widespread in a country comparison; see **Figure 14**. The time series shown goes back to 2008. Calls over the internet are made most frequently in the Netherlands (82%), closely followed by Ireland (79%), Sweden (76%), Denmark (73%) and Finland (71%). While these countries are all above the EU-27 average of 65%, only 61% of Austrians say they use the internet for telephoning or video calls. However, the COVID-19 pandemic has helped to boost telephoning and video calls over the internet in Austria. Within one year (2019: 41%, 2020: 60%), the proportion rose by almost 20 percentage points. In other words, instead of four out of ten people using the internet to make calls, six out of ten are doing so now. In general, a trend towards telephoning and video calls over the internet can be seen over the course of time.

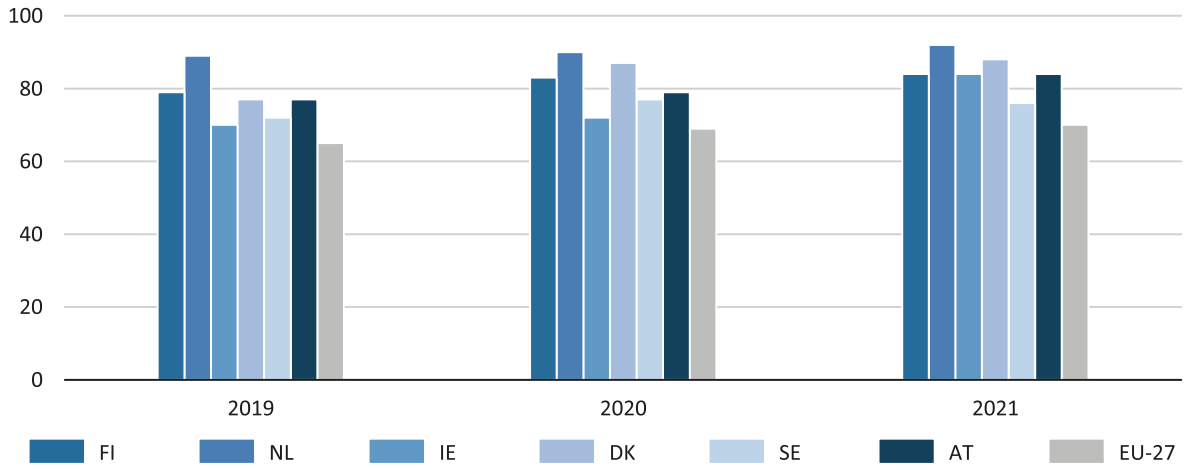
Figure 14: Telephoning/video calls over the internet 2008 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2008-2021.

Another activity related to *communication and collaboration skills* is *instant messaging;* see **Figure 15**. The time series for this indicator begins in 2019. In general, the rates in 2021 are relatively high. The share of people using instant messaging is highest in the Netherlands (92%), followed by Denmark (88%) and Austria, Finland and Ireland (84% each). Only in Sweden (76%) is usage slightly lower, but all of the countries compared are above the EU-27 average of 70%. The use of instant messaging was already relatively high in 2019, which is why only slight increases can be seen.

Figure 15: Instant messaging 2019 to 2021 (in percent)

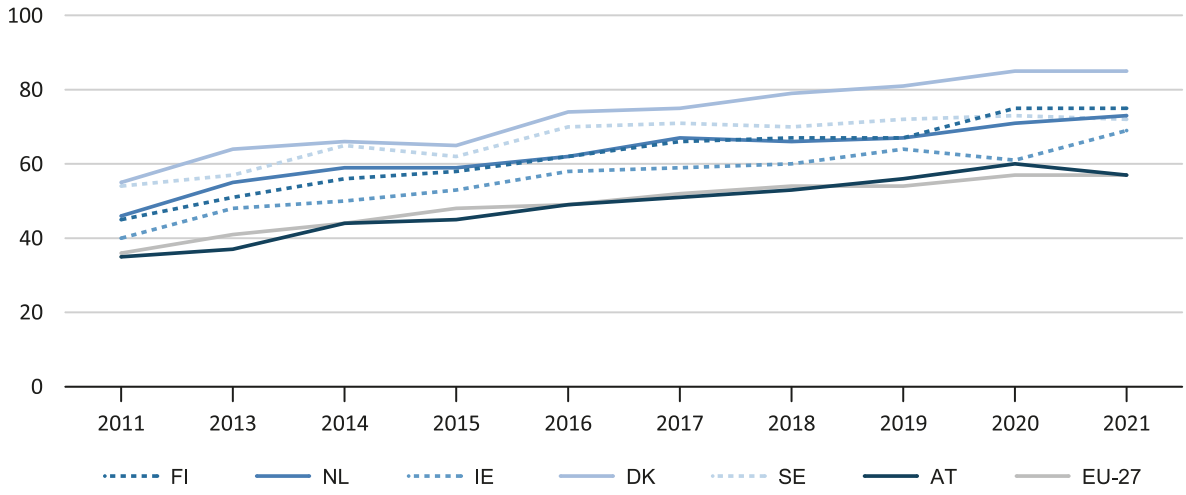


Source: Eurostat, European survey on ICT usage in households 2019-2021.

Participating in social networks is included as a further indicator for the sub-indicator *communication and collaboration skills.* **Figure 16** presents it in a time series going back to 2011. While Austria

is roughly on a par with the EU-27 average in 2021 (57%), participation in social networks is significantly higher in Ireland (69%), Sweden (72%), the Netherlands (73%), Finland (75%) and Denmark (85%). The time series shows an almost uniform increase. In Austria, the trend towards participation in social networks has developed somewhat more slowly than in the best-practice countries but is still almost identical to the EU-27 average.

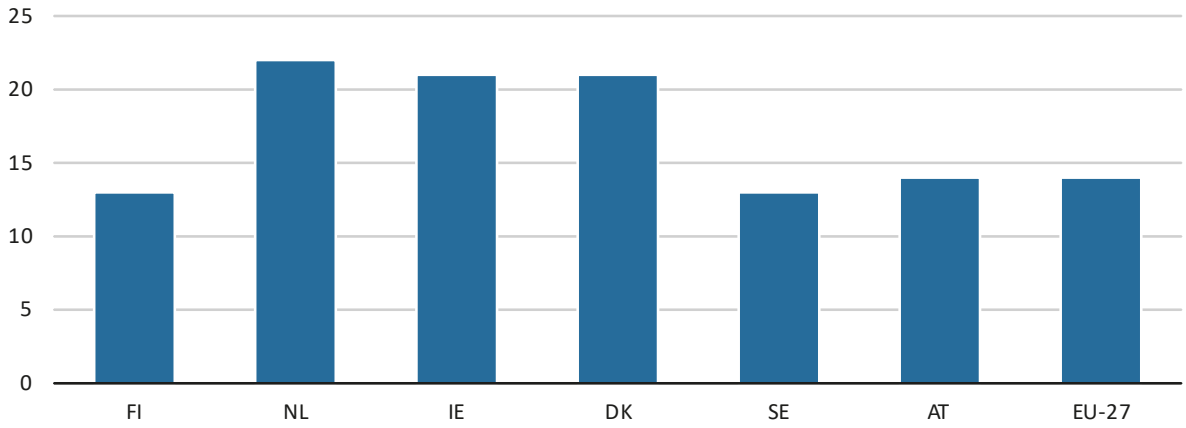
Figure 16: Participation in social networks 2011 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2011-2021. The indicator was not surveyed in 2012.

For the sub-indicator *communication and collaboration skills,* the 2021 survey also asked about *online activities in relation to expressing opinions on civic or political issues on websites or in social media.* The data for this individual indicator is only available for 2021. **Figure 17** shows that the use of the internet expressing opinions on civic or political issues on websites is significantly lower than for social media. For example, one in five people in the Netherlands (22%), Ireland and Denmark (21% each) used the internet to express opinions on civic or political issues. This was even less common in Austria (14%), Finland and Sweden (13% each). Austria is on a par with the EU-27 average.

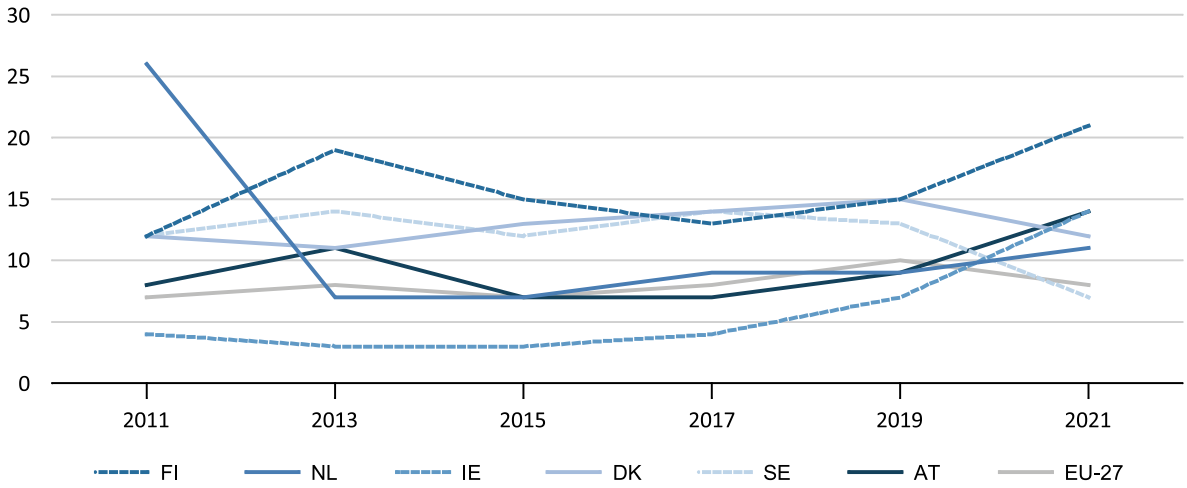
Figure 17: Expressing opinions on civic or political issues on websites or in social media 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

Taking part in online consultations or voting to define civic or political issues is the last indicator included in the sub-indicator *communication and collaboration skills.* The ICT time series goes back to 2011, with the survey taking place every two years; see **Figure 18**. Finland has by far the highest rate in 2021 (21%), while Austria (14%), Ireland (14%), Denmark (12%), the Netherlands (11%) and Sweden (7%) score significantly lower. The average for the EU-27 (8%) is just as low. If we focus on the development of the time series, a relatively mixed pattern emerges for most countries. Due to the event-related nature of this indicator, it can be assumed that it is dependent on current socio-political events at the time of the respective survey. Only the EU-27 average has remained largely stable between 7% and 10% over the last ten years.

Figure 18: Taking part in online consultations or voting to define civic or political issues 2011 to 2021 (in percent)



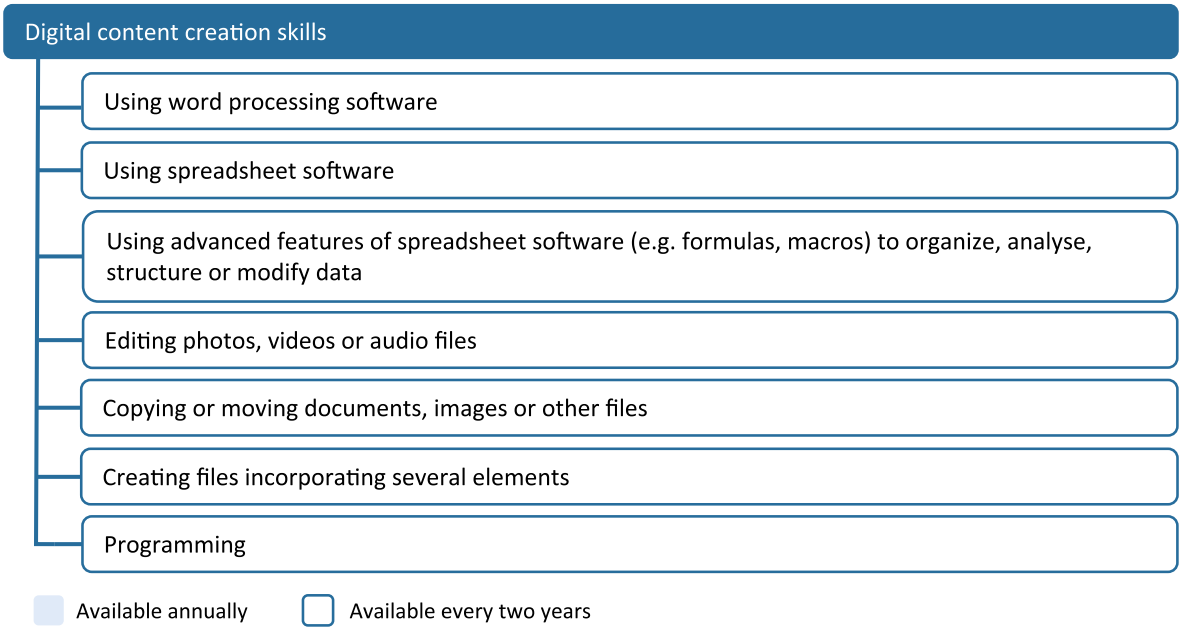
Source: Eurostat, European survey on ICT usage in households 2011-2021. The indicator was not surveyed in 2012, 2014, 2016, 2018 and 2020.

2.2.3 Digital content creation

The *Digital Competence Framework for Citizens* (DigComp 2.0) specifies the following competences for the third competence area of *digital content creation* (European Commission 2023d): creating and editing digital content; modifying, refining and integrating new information and content into an existing body of knowledge, while identifying and applying rules of copyright and licenses; developing understandable instructions for a computing system.

All seven indicators of this competence area were surveyed in this form for the first time in 2021. Respondents were asked whether they had carried out certain activities for private, professional or educational purposes in the last three months. In detail, the following activities were asked for: *using word processing software*; *using spreadsheet software*; *using advanced features of spreadsheet software to prepare and analyse data (e.g. formulas, macros)*; *editing photos, videos or audio files; copying or moving documents, images or other files*; *creating files incorporating several elements* and *programming*.

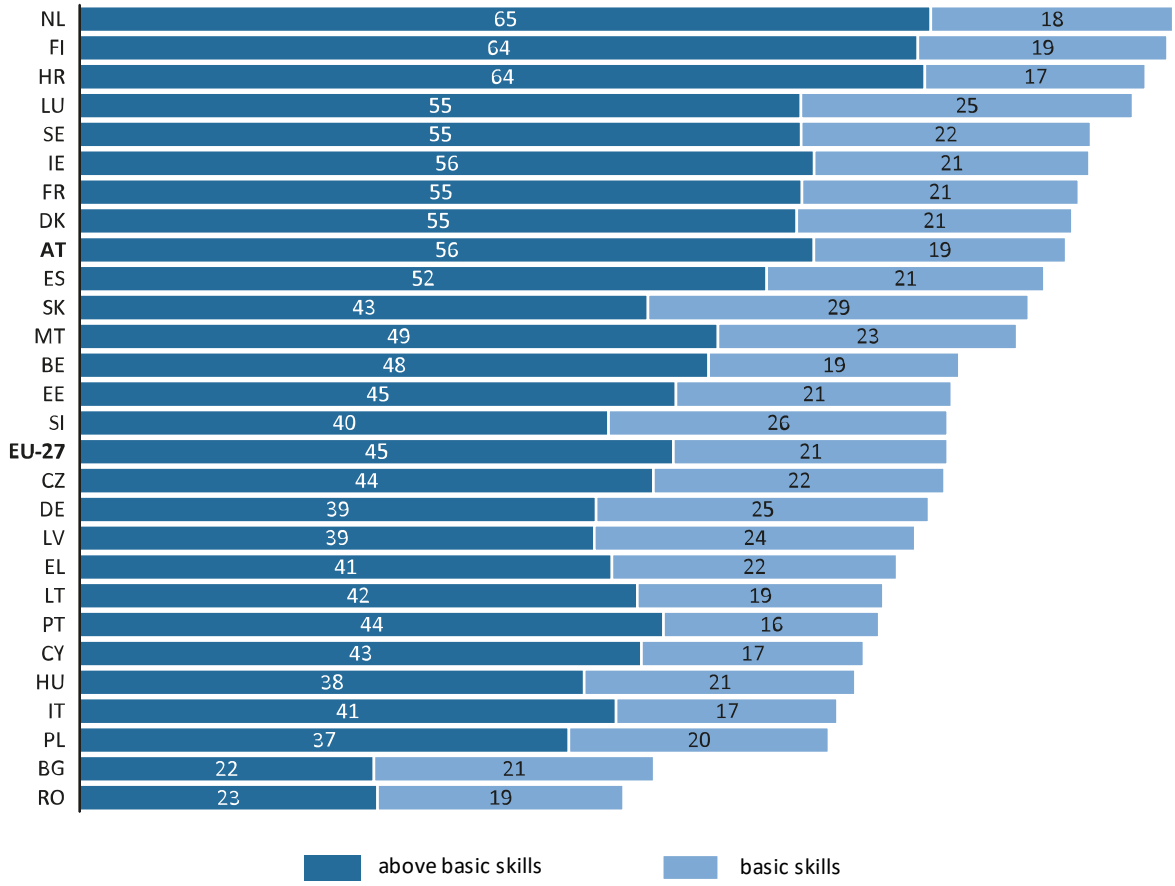
Figure 19: Digital content creation skills



Source: Statistics Austria — own illustration

Figure 20 shows the sub-indicator *digital content creation* in an European comparison. The level of expertise in this area is lower than in the sub-indicators presented so far and also lower than in the following sub-indicators. However, Austria performs relatively well and ranks ninth, same as in the overall indicator. In Austria, three quarters of the population have *at least basic digital content creation skills*. Once again, the proportion of people who carry out several activities predominates, albeit less clearly than in the sub-indicators presented so far. 56% have *above basic digital skills* and 19% have *basic digital skills.* The highest level of *at least basic digital content creation skills* in the EU is found in Finland and the Netherlands (83% each).

Figure 20: Basic and above basic digital skills for digital content creation in an EU comparison 2021 (in percent)

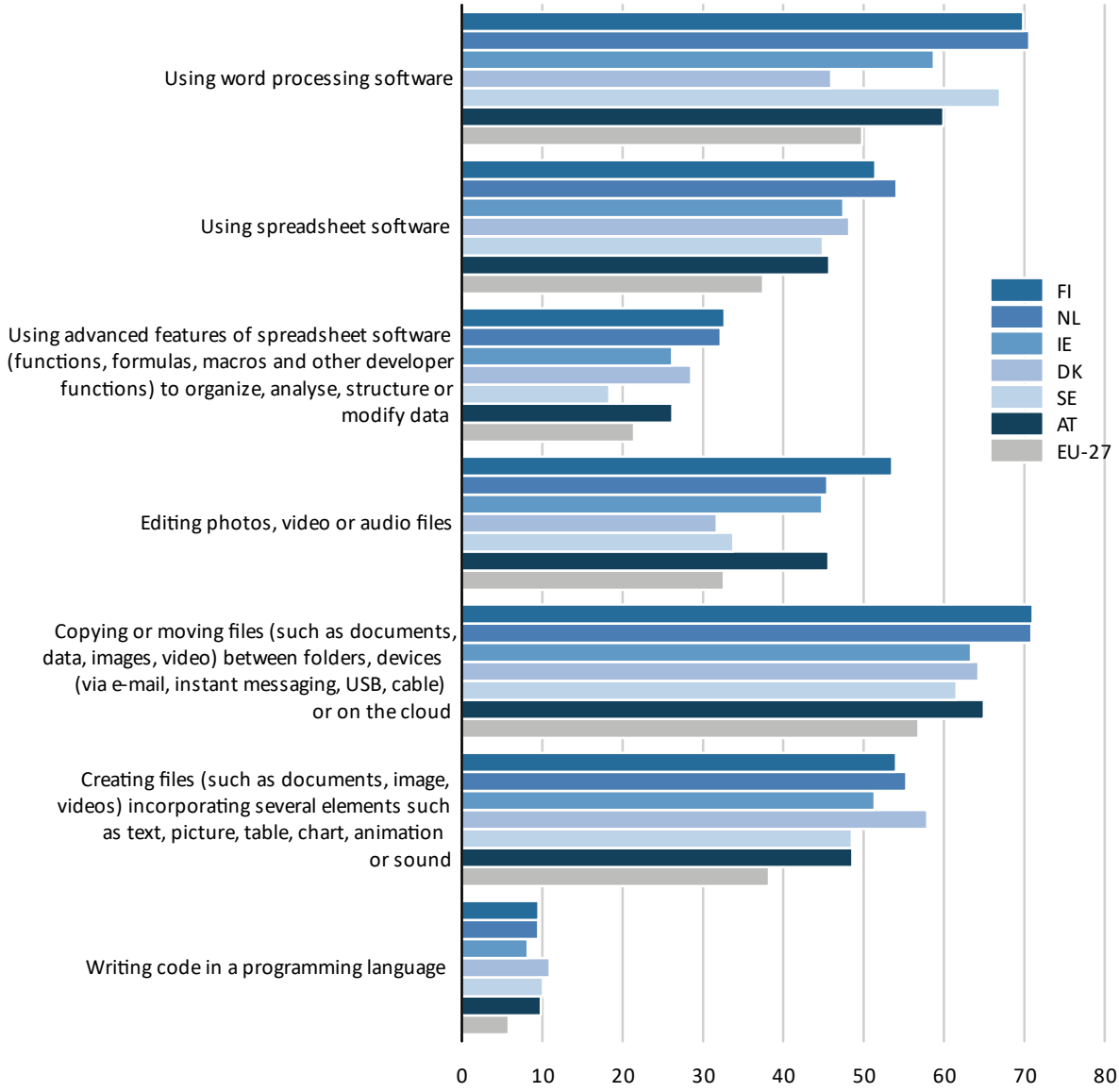


Source: Eurostat, European survey on ICT usage in households 2021.

Figure 21 summarises the internet and software activities of the sub-indicator *digital content creation.* For the indicator *using word processing software, the* proportion is highest in the Netherlands (71%) and Finland (70%). The proportion of the population using word processing software is slightly lower in Sweden (67%). Compared to the best-practice countries, Austria is in the middle with 60%, just ahead of Ireland (59%) but well ahead of Denmark (46%). On average, every second person in the EU stated that they used word processing software (50%).

Another individual indicator is the *use of spreadsheet software*. In the Netherlands (54%) and Finland (51%), more than half of the population uses spreadsheet software. In Denmark (48%), Ireland (47%), Austria (46%) and Sweden (45%), on the other hand, slightly less than half of the 16- to 74-year-olds surveyed reported using spreadsheet software. While the differences between Austria and the EU countries used for comparison here are relatively small, the EU average is significantly lower at 38%.

Figure 21: Activities related to digital content creation 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

People who used spreadsheet software were also asked whether they also *use advanced features of spreadsheet software (e.g. formulas, macros) to organise, analyse, structure or modify data.* For 2021, the share of people who used advanced features is largest in Finland (33%) and the Netherlands (32%). In Denmark (29%), Ireland (26%) and Austria (26%), the rates are slightly lower, but they are still above the EU-27 average (21%). In Sweden, however, only one in five people (18%) use advanced features of spreadsheet software.

Another indicator covered in the DSI by the sub-indicator *digital content creation skills* is *editing photos, videos or audio files*. Considering the data of best-practice countries, this activity was carried out by half of the people surveyed in Finland (54%). This rate is slightly lower in Austria (46%),

the Netherlands and Ireland (45% each). In Sweden (34%) and Denmark (32%), on the other hand, editing photos, videos or audio files was reported much less frequently, in line with the EU average (33%).

The indicator *copying or moving documents, images or other files* was reported by seven out of ten people (71%) in the Netherlands and Finland. In Austria, Denmark, Ireland and Sweden, the activity differs only slightly and is at a very similar level between 62% and 65%. This means that Austria and the five best-practice countries all exceed the EU-27 average of 57%.

Another indicator included in *digital content creation skills* is *creating files incorporating several elements.* This activity was most common in Denmark (58%), the Netherlands (55%), Finland (54%) and Ireland (51%). Slightly less than half created such files in Sweden and Austria (49% each). In contrast, the EU-27 average is significantly lower at 38%.

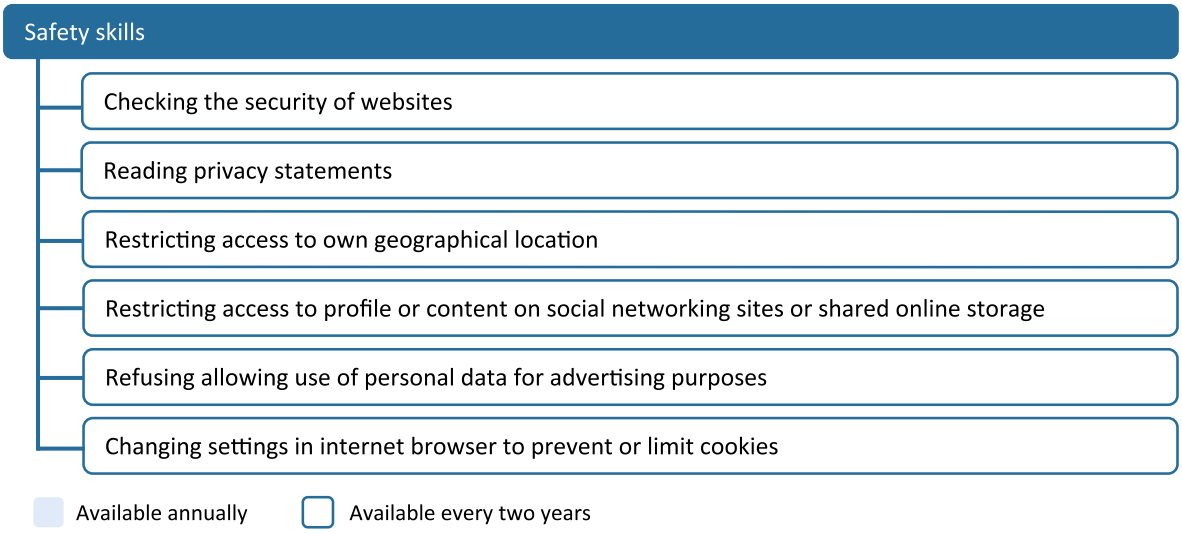
The last indicator of the DSI sub-indicator *digital content creation skills* is the activity of *programming.* In both the best-practice countries and Austria, only a small proportion of the population programmes. Around one in ten people stated that they had programmed in 2021. The exact proportion is 11% in Denmark, 10% in Austria, Sweden, the Netherlands and Finland and 8% in Ireland. The proportions therefore differ only slightly from the EU-27 rate, which is 6%.

2.2.4 Safety

The *Digital Competence Framework for Citizens* (DigComp 2.0) summarises the following competences to define *safety skills* (European Commission 2023d): protecting devices, digital content, personal data and privacy in digital environments; protecting one's own physical and psychological well-being while being aware of digital technologies for social well-being and social inclusion; being aware of the environmental impact of digital technologies and their use.

The following individual indicators were collected as part of the DSI: *checking the security of websites*, *reading privacy statements*, *restricting access to own geographical location*, *restricting access to profile or content on social networking sites or shared online storage*, *refusing allowing use of personal data for advertising purposes and changing settings in internet to prevent or limit cookies*. These indicators were included in the survey for the first time in 2020.

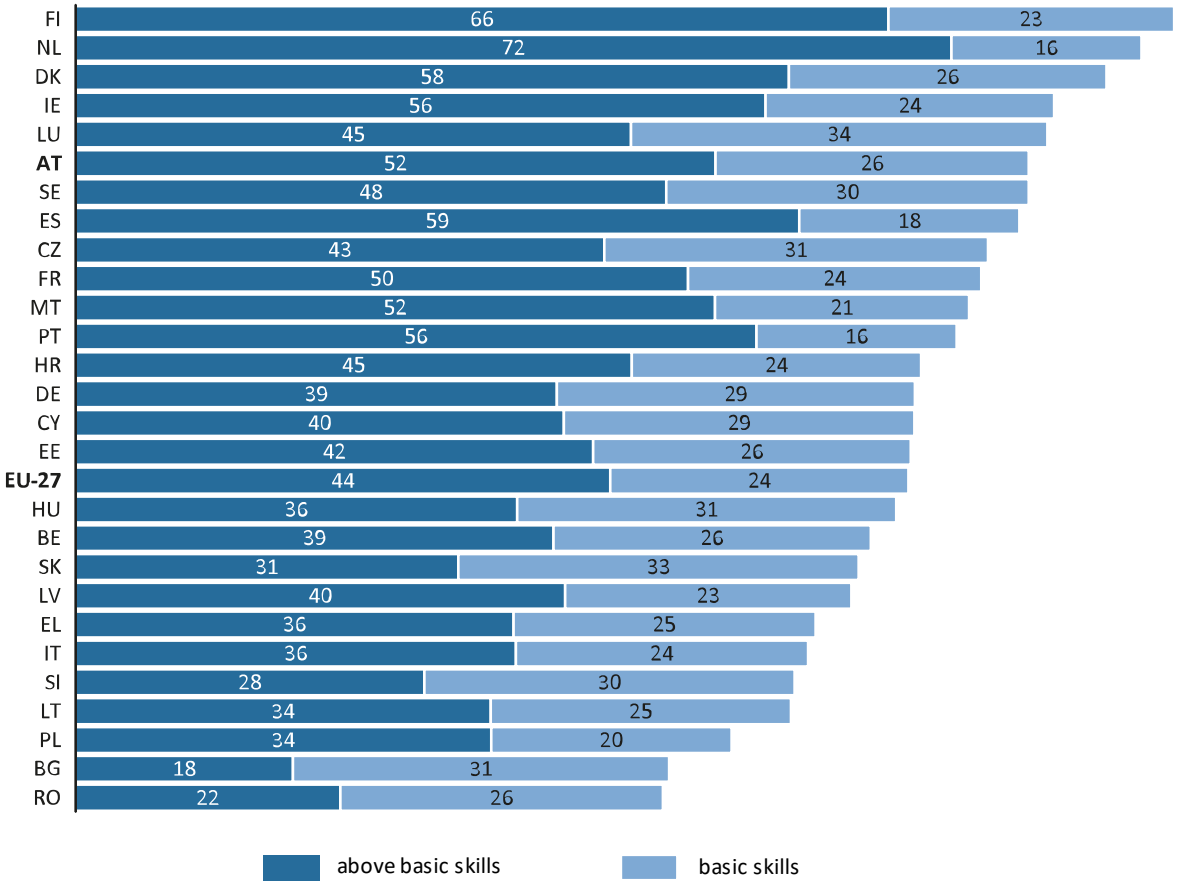
Figure 22: Safety skills



Source: Statistics Austria — own illustration

Figure 23 shows the sub-indicator *safety skills* in the European ranking. Similar to the previous sub-indicator, the level of competence is lower than in the other competence areas. In Austria, the proportion of people with *at least basic digital skills* is 78%. The ratio between people with *above basic digital skills* (52%) and *basic digital skills* (26%) is again slightly lower. In the EU-27 average, around two in three people have *at least basic skills* in *internet safety* (68%). Austria is therefore ten percentage points above the EU-27 average and around twelve percentage points behind Finland, the country with the highest proportion for this sub-indicator (90%).

Figure 23: Basic and above basic digital skills in safety in an EU comparison in 2021 (in percent)

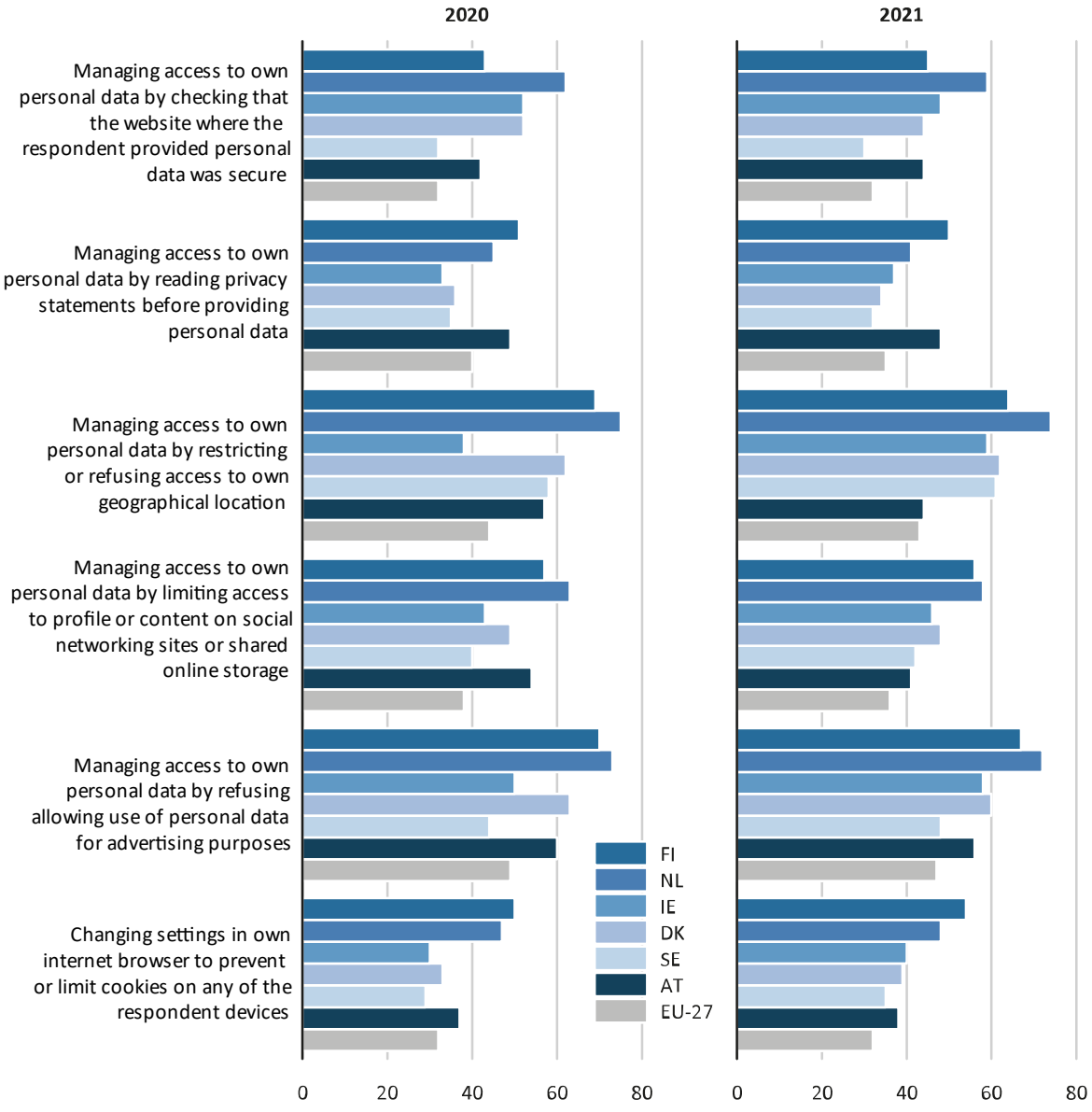


Source: Eurostat, European survey on ICT usage in households 2021.

The indicators are shown for both survey years for which they are available in **Figure 24**. The first activity is checking the security of websites. In 2021, most people in the Netherlands carried out this activity (59%). Ireland (48%), Finland (45%), Austria and Denmark (44% each) are slightly behind at a relatively similar level. Just under one in three people in Sweden (30%) stated that they check the security of websites, which is slightly below the EU rate of 32%.

The next activity in the area of *safety is reading privacy statements*. In 2021, around one in two people in Finland (50%) and Austria (48%) stated that they had read privacy statements. While this activity was carried out slightly less in the Netherlands (41%) and Ireland (37%), significantly fewer people in Denmark (34%) and Sweden (32%) said they had read privacy policies. The EU average is 35%.

Figure 24: Activities related to internet safety in 2020 and 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2020 and 2021.

The Netherlands has a particularly high proportion of people who *restrict access to their own geographical location* in 2021 (74%). For the other best-practice countries, the numbers are somewhat lower, but still relatively similar (Finland: 64%; Denmark: 62%; Sweden: 61%; Ireland: 59%). Austria scores significantly lower (44%), although the rate is almost exactly the same as the EU average (43%).

Another indicator for safety is *restricting access to profile or content on social networking sites or shared online storage*. In the countries compared, people in the Netherlands (58%) and Finland (56%) were the most likely to restrict this access in 2021. This also applies to slightly less than half

of people in Denmark (48%) and Ireland (46%). The rate is lowest in Sweden (42%) and Austria (41%), where four out of ten respondents state that they have recently restricted such access. All best-practice countries and Austria are therefore above the EU-27 average of 36%.

Another indicator for *safety* is *refusing allowing the use of personal data for advertising purposes*. In 2021, among the best-practice countries, the Netherlands (72%) and Finland (67%) are the most likely to refuse allowing the use of personal data for advertising purposes. In Denmark (60%), Ireland (58%) and Austria (56%), this rate is slightly lower, but still exceeds half of the population. Only in Sweden (48%) just under half of the population state that they have recently refused allowing the use of personal data for advertising purposes. The EU-27 average ranks similarly at 47%.

The last indicator of the DSI sub-indicator safety addresses *changing settings in the internet browser to prevent or limit cookies*. In the countries compared, this is done most frequently in Finland (54%), followed by the Netherlands (48%). Browser settings were changed to prevent or limit cookies slightly less frequently in Ireland (40%), Denmark (39%) and Austria (38%). Sweden (35%) is only slightly above the EU average of 32%.

If these results are compared with the results of the initial survey, the relatively strong fluctuations in some indicators are striking for a year-on-year comparison. The strongest fluctuations were observed for the indicator *restricting access to own geographical location.* While the proportion of people who restricted access to their own location increased by more than 20 percentage points in Ireland (2020: 38%; 2021: 59%), the proportion in Austria fell by 13 percentage points (2020: 57%; 2021: 44%). There was also a sharp decline in Austria for the indicator *restricting access to profile or content in social networking sites or shared online storage (*2020: 54%; 2021: 41%). Even though the Netherlands, which was ahead in many individual indicators of the *safety* area, showed more stable results, there were more frequent fluctuations overall than in other competence areas. It is difficult to pinpoint the causes of these fluctuations. Short-term temporary trends, for example due to information campaigns, cannot be ruled out. Technological change may play a greater role in *safety skills* than in other competence areas. In this context, an OECD report on evidence-based digitalisation strategies points out that measuring tools operationalising digital security based on the use of specific technologies must be continuously reviewed and further developed (OECD 2019). Against this backdrop, it remains to be seen how the time series will develop and whether a revision of the sub-indicator will be necessary.

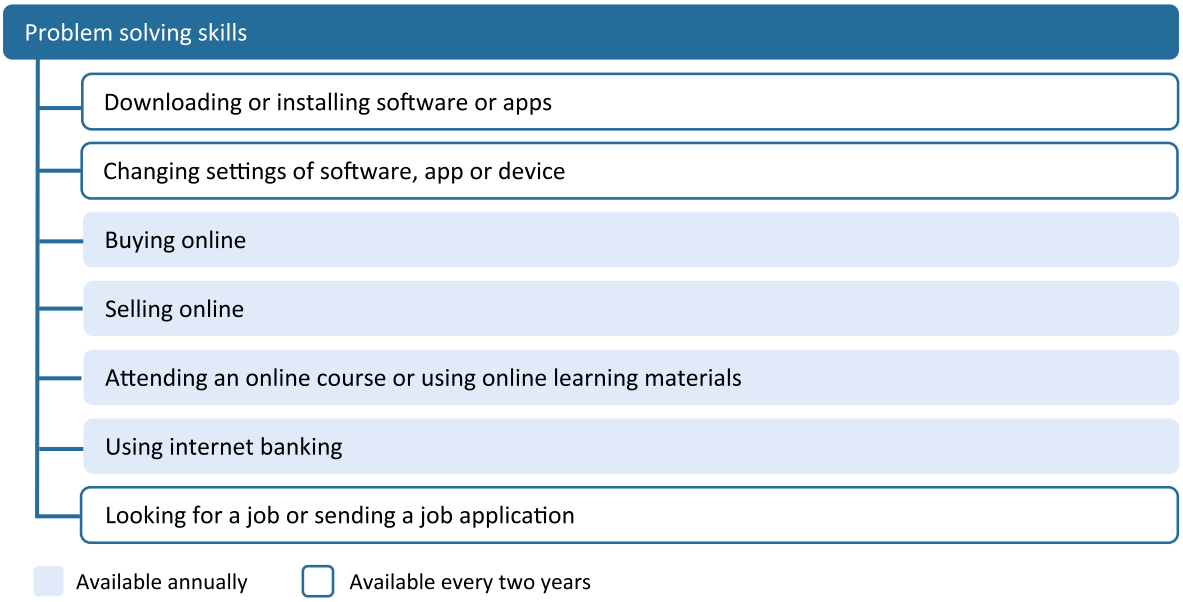
2.2.5 Problem solving

The *Digital Competence Framework for Citizens* (DigComp 2.0) lists the following competences for the last competence area *problem solving* (European Commission 2023d): identifying technical problems and assessing needs when using digital environments and solving them; using digital

tools and technologies to innovate processes and products; keeping up-to-date with the digital evolution.

The DSI sub-indicator of the same name is based on the following seven indicators*: downloading or installing software or apps*; *changing or personalising the settings of software, app or device*; *buying online*; *selling online*; *attending an online course or using online learning materials*; *using internet banking* and *looking for a job or sending a job application.*

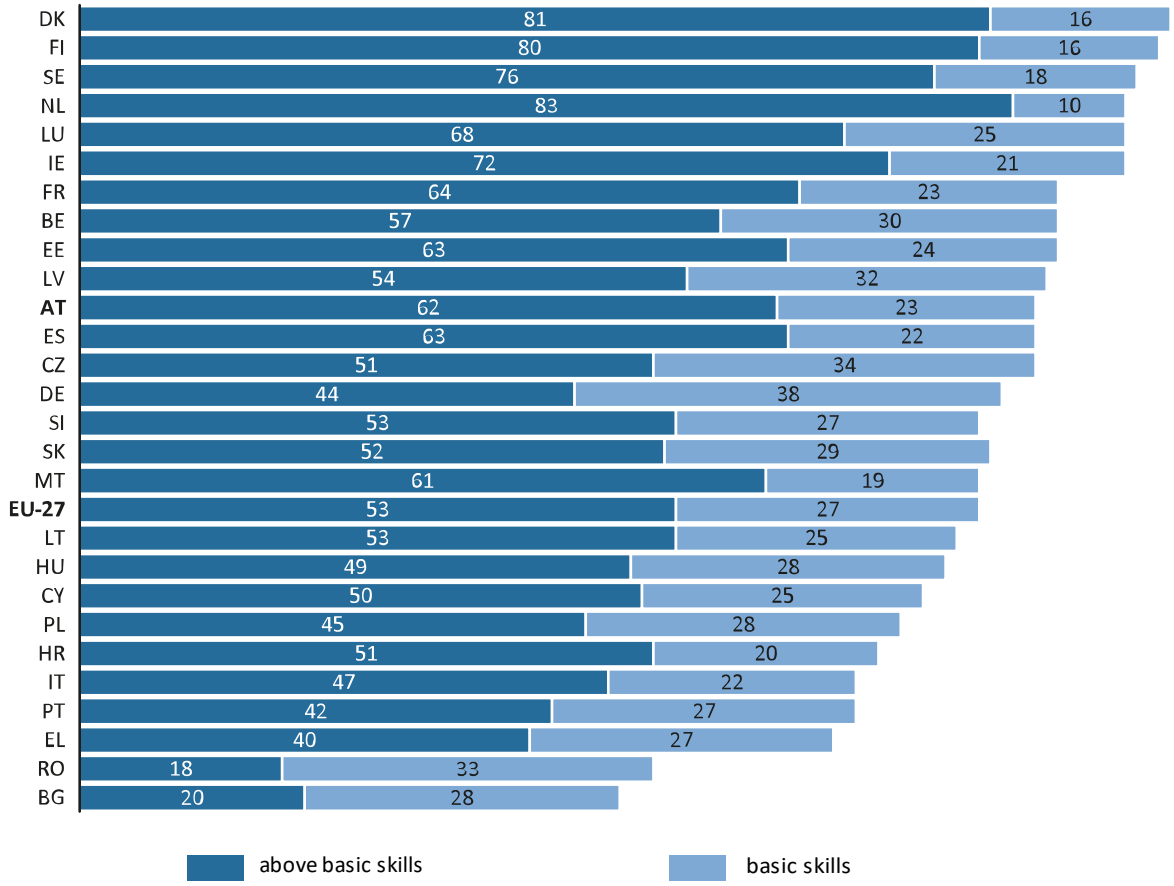
Figure 25: Problem-solving skills



Source: Statistics Austria — own illustration

Figure 26 shows the European results of the sub-indicator for the survey year 2021. The level of competence is again higher than in the two previous sub-indicators presented. Austria is in eleventh place in the ranking. In the EU-27 average, around four out of five people (79%) have *at least basic digital problem-solving skills*. In Austria, the figure is only slightly higher at 85%. This skill level is divided into 62% of people with *above basic digital skills* and 23% of people with *basic digital skills*. The proportion of people with *at least basic* skills is highest in Denmark (98%). The gap to Austria is twelve percentage points.

Figure 26: Basic and above basic digital problem-solving skills in an EU comparison in 2021 (in percent)

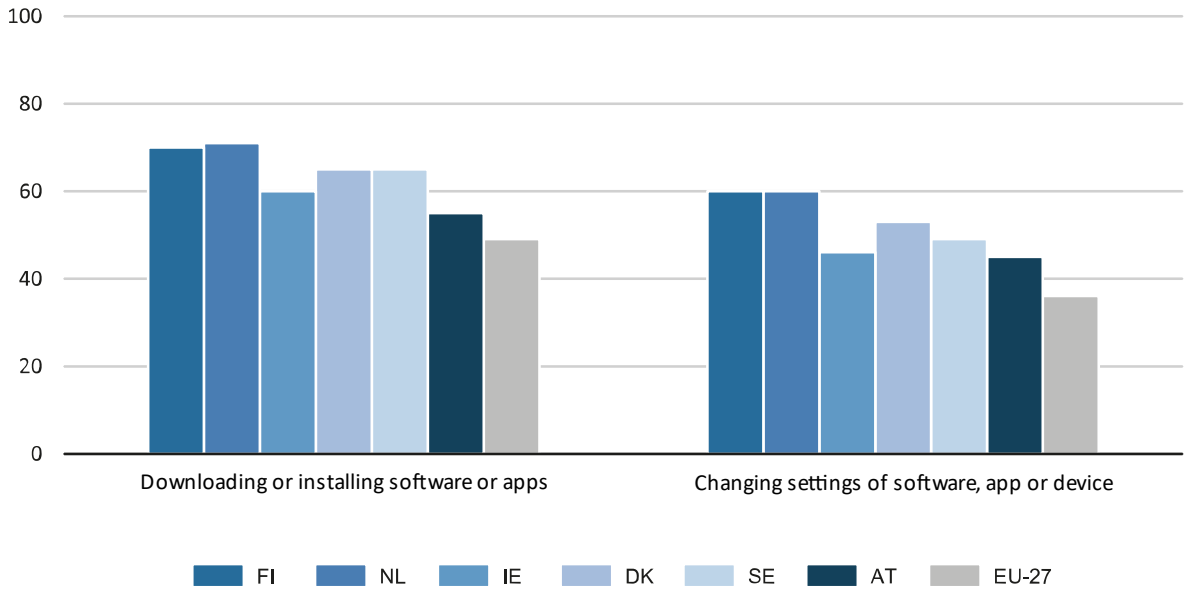


Source: Eurostat, European survey on ICT usage in households 2021.

The first indicator of the DSI sub-indicator *problem solving* is collected by asking for the activity *downloading or installing software or apps.* This description is limited exclusively to 2021, as ICT data has only been available for this activity since then. Among the best-practice countries, most people in the Netherlands (71%) and Finland (70%) installed software or apps on their computer, smartphone or other mobile device. In the other countries – Sweden (65%), Denmark (65%), Ireland (60%) and Austria (55%) – more than half of the population have also downloaded or installed software or apps, all slightly above the EU average of 49%, as shown in **Figure 27**.

In addition, the DSI for *problem solving* includes the indicator *changing or personalising settings of software, app or device.* Here too, the data relates exclusively to the year 2021 due to a change in the survey instrument. This is also evident from **Figure 27**. In the Netherlands and Finland, 60% of people have changed or personalised software settings. The proportion is just over half in Denmark (53%) and just under half in Sweden (49%), Ireland (46%) and Austria (45%). The best-practice countries and Austria are therefore well above the EU-27 average of 36%.

Figure 27: Selected software activities 2021 (in percent)

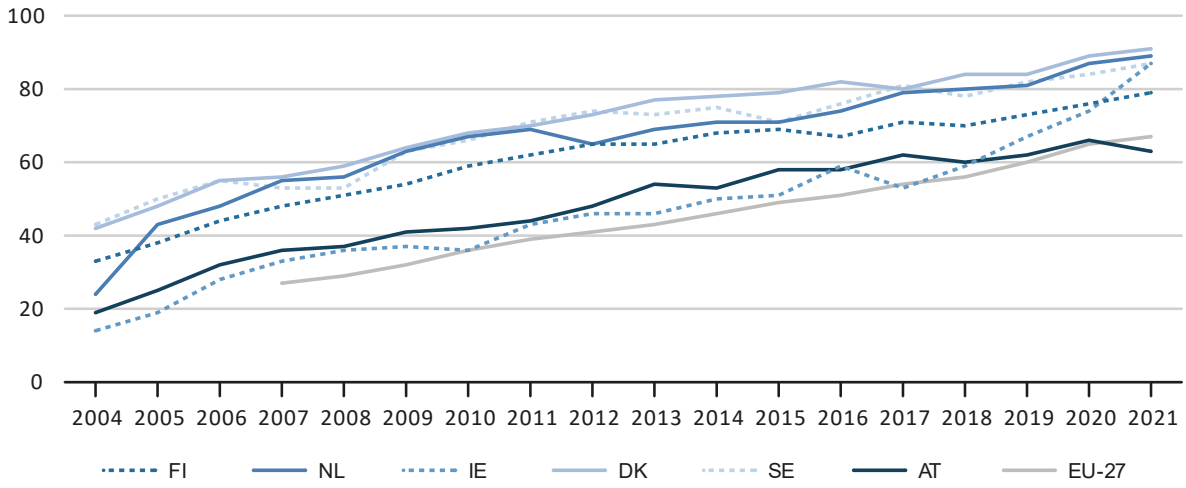


Source: Eurostat, European survey on ICT usage in households 2021.

The indicator *buying online* is surveyed annually as part of the ICT survey and is another online activity for the sub-indicator *problem-solving skills*. The time series extends from 2004 to 2021. **Figure 28** shows that the proportion of people who bought something online is highest in Denmark (91%) for the reference year 2021. The Netherlands (89%), Sweden and Ireland (87% each) also exhibit similarly high levels. By comparison, slightly fewer people in Finland (79%), but still around eight out of ten, bought something online. In contrast, online purchases are made less frequently than in the best-practice countries in both Austria (63%) and the EU-27 average (67%).

The time series shows a similar trend in the best-practice countries. With the increasing importance of digitalisation and the internet, buying and paying online has gained significant momentum over the years. In Austria, for example, the number of people buying online has tripled in the last 20 years (2004: 19%, 2021: 63%). In comparison, Denmark (2004: 42%) and Sweden (2004: 43%) already had relatively high rates at the beginning of the time series. The development in Austria and the best-practice countries thus starts from a different level and then follows a similar course. It can also be observed that the proportion of people who bought something online has stagnated in Austria in recent years. The strongest development was recently observed in Ireland. From 2018 to 2021, there was an increase of 28 percentage points from 59% to 87%.

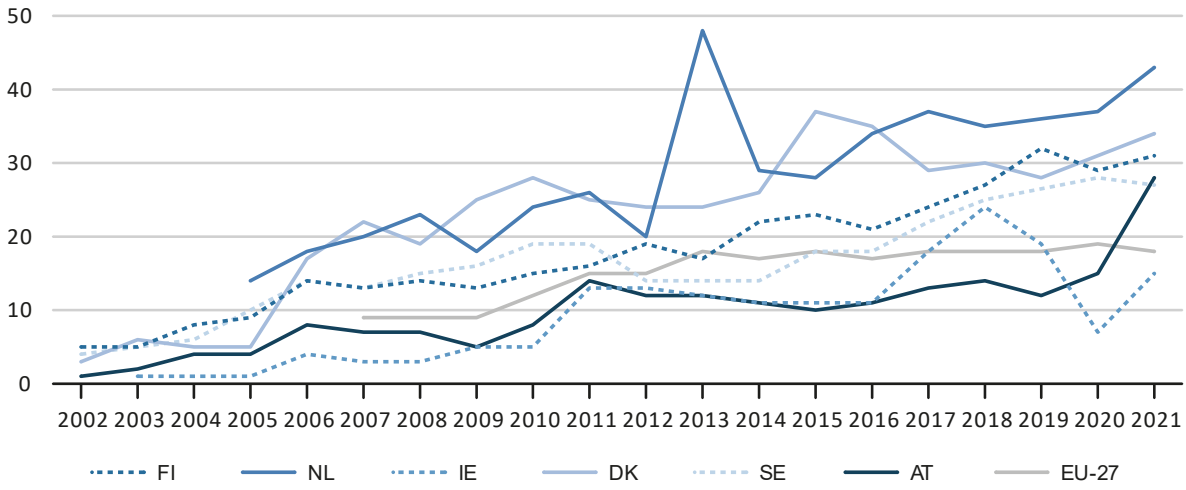
Figure 28: Buying online 2004 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2004-2021.

In addition to buying, *selling online* is also an indicator for *problem-solving skills* in the DSI. This activity has been asked about annually since the start of the ICT surveys, which means that the time series in **Figure 29** goes back to the year 2002. For the most recent survey year 2021, the proportion of people who sold something online among the best-practice countries and Austria is highest in the Netherlands (43%). In comparison, the figures for Denmark (34%), Finland (31%), Sweden (27%) and Austria (28%) are slightly lower, but still significantly higher than the EU average (18%). Only in Ireland (15%), the rate of people selling something online is slightly lower among the countries compared. In Austria, the share of people selling something online almost doubled from 2020 to 2021, whereas this share had only changed slightly each year in the last ten years before that. In general, a trend towards increased online purchases can be seen over the entire period, although there are also some major fluctuations.

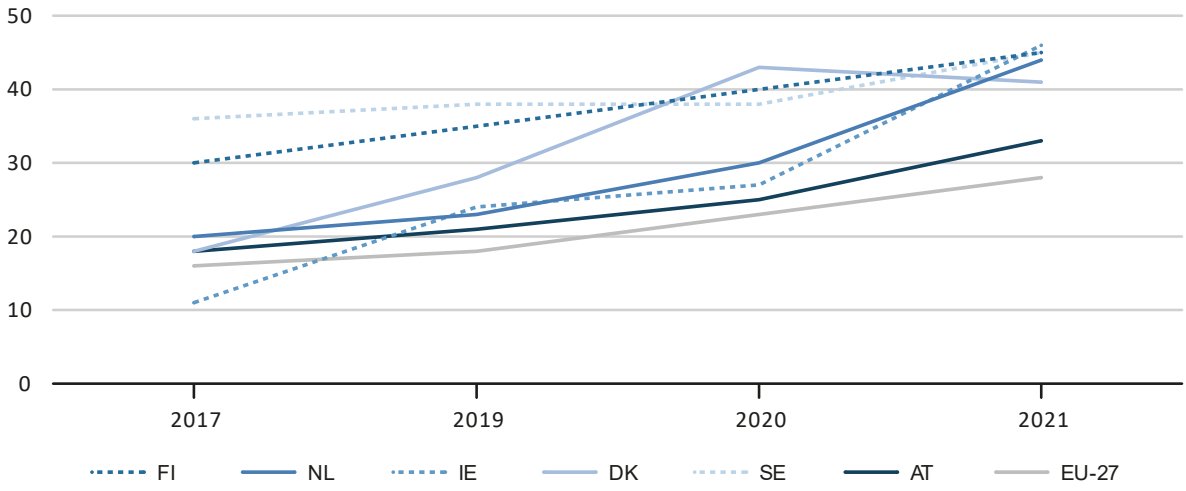
Figure 29: Selling online 2002 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2002-2021.

An active opportunity to acquire *problem-solving skills* on the internet is provided by the indicator *attending an online course or using online learning materials*. The time series shown begins in a two-year rhythm in 2017. **Figure 30** shows for the most recent reference year 2021 that the proportion of people who attended an online course or used online learning materials is almost the same in Ireland (46%), Sweden and Finland (45% each) and the Netherlands (44%). While this rate is slightly lower in Denmark (41%), Austria is well behind the best practice countries (33%). On average, in the EU only 28% of people state that they have learnt online. The time jump from 2020 to 2021 generally shows a sharp increase in all countries in the comparison. It can be assumed that there is a connection with a pandemic-related shift to e-learning. In Austria, the proportion of people who used an online learning activity increased by eight percentage points (2020: 25%; 2021: 33%) and by five percentage points on average in the EU (2020: 23%; 2021: 28%). If the entire time series is considered, a steady increase in online learning activities can be observed for all countries in the comparison.

Figure 30: Attending an online course or using online learning materials 2017 to 2021 (in percent)

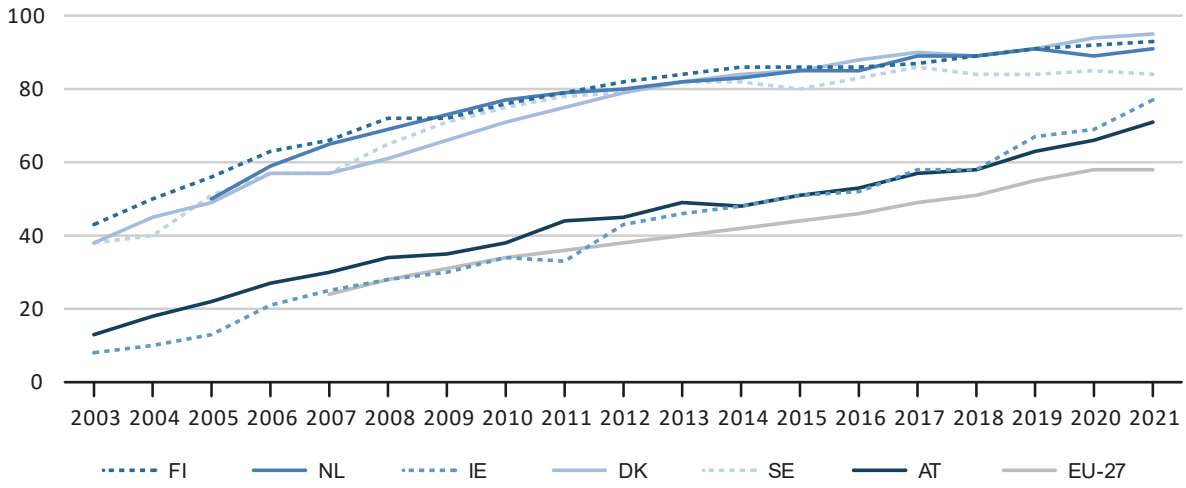


Source: Eurostat, European survey on ICT usage in households 2017-2021. The indicator was not surveyed in 2018.

Another key internet activity of the *problem-solving skills* sub-indicator in the DSI is the indicator *using internet banking*, which has been an annual part of the ICT survey since 2003. For the current reference year 2021, the proportion of people who use online banking is highest among the best-practice countries in Denmark (95%), Finland (93%) and the Netherlands (91%), as shown in **Figure 31**. The rate is slightly lower in Sweden (84%) and Ireland (77%). In Austria, seven out of ten people (71%) used online banking, which is significantly higher than the EU average (58%).

There are very similar patterns between the countries used for the EU comparison and Austria, differing only in terms of the initial level. In 2005, around half of the population in Finland (56%), Sweden (51%), the Netherlands (50%) and Denmark (49%) already used online banking, while in Austria only around one in five people (22%) did so. Only in Ireland (13%), even fewer people used the internet for banking among the current best-practice countries. Since 2015, the proportion has remained above 50% in all of these countries and in Austria and is rising slowly but steadily. For Denmark, Finland, the Netherlands and Sweden, where the use of internet banking has been above 80% since 2013, a flattening trend can be observed in recent years. In contrast, the use of internet banking in Austria and Ireland is increasing even more strongly in relative terms. An increasing importance of internet banking activities can also be observed on average in the EU.

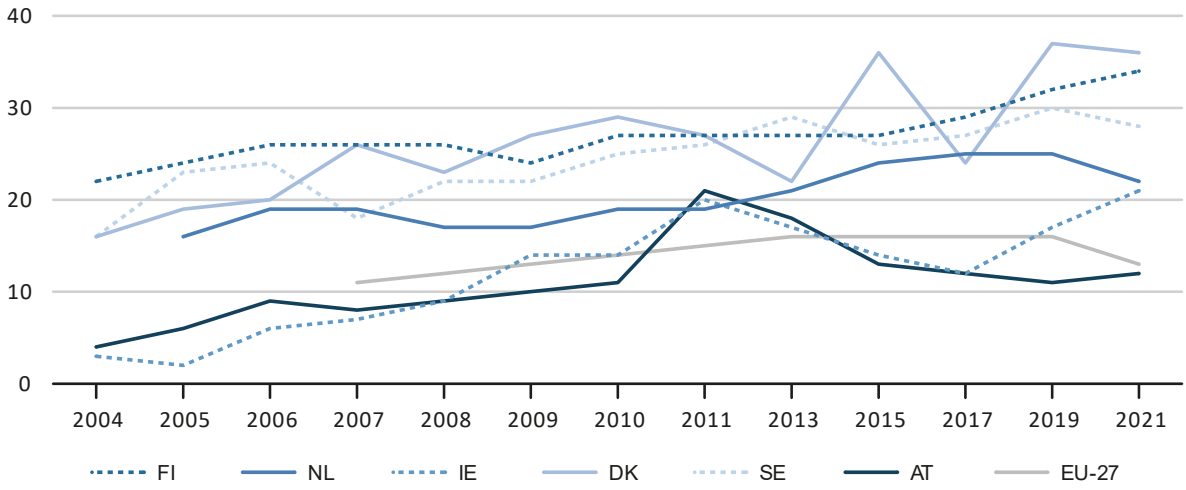
Figure 31: Internet banking 2003 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2003-2021.

In the sub-indicator problem-solving skills of the DSI, the last indicator is looking for a job or sending a job application. The time series goes back to 2004, although the survey was only conducted every second year from 2011 onwards, as shown in **Figure 32**. In 2021, more than one in three people in Denmark (36%) and Finland (34%) used the internet to look for and apply for jobs. This is followed by Sweden (28%), the Netherlands (22%) and Ireland (21%). In Austria, only just under one in eight people (12%) looked for a job or sent a job application online. The rate is therefore also marginally lower than the EU average (13%). Compared to other indicators, the time series shows relatively large fluctuations.

Figure 32: Looking for a job or sending a job application 2004 to 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2004-2021. The indicator was not surveyed in 2012, 2014, 2016, 2018 and 2020.

2.2.6 Summary and outlook: Digital skills by competence area

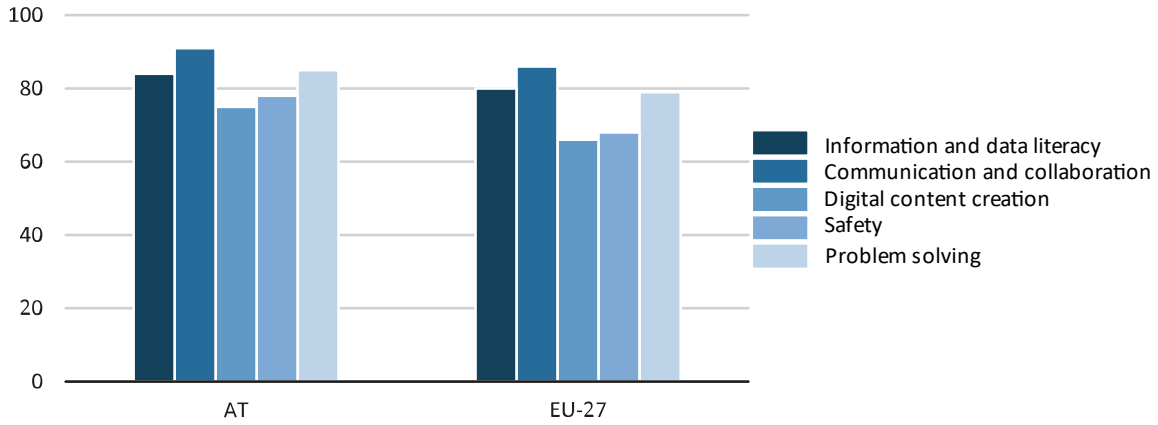
Now that the results of the sub-indicators and their indicators have been analysed in detail, the key results will be summarised again below.

The DSI provides a comprehensive database on the digital skills of 16- to 74-year-olds in the EU-27 member states. A total of 33 internet and software activities are surveyed as indicators in five areas of competence. For some of these indicators, time series are available dating back to 2002. The historical data shows that the best-practice countries not only have a high level of digital skills in the present, but that this trend was already apparent in the past. Finland and the Netherlands stand out. These two countries generally have the highest shares of individual internet and software activities over the entire period. Ireland also deserves a special mention. The island state has recorded strong growth in many indicators, particularly in recent years, even if a positive trend was already recognisable beforehand. A closer look at the indicators also confirms Austria's good position in comparison to the EU-27 average. Austria's digital skills are below the European Union average for only three indicators. More specifically, these are *making telephoning/video calls over the internet* (Austria: 61%; EU-27: 65%), *buying online* (Austria: 63%; EU: 67%) and *looking for a job or sending a job application* (Austria: 12%; EU: 13%).

Due to a revision of the DSI, no historical data is available for the sub-indicators that provide information on skills in the individual competence areas. **Figure 33** shows the proportion of people with *at least basic digital skills* in the individual competence areas in Austria and the EU-27 average in 2021. Austria was ahead of the EU-27 average in all areas, but apart from this, very similar patterns emerged at national and European level. Both in Austria and in the EU-27 comparison,

most people achieved *at least basic digital skills* in the competence area of *communication and collaboration* (Austria: 91%; EU-27: 86%). The competence areas of *information and data literacy* (Austria: 84%; EU-27: 80%) and *problem solving* (Austria: 85%; EU-27: 79%) were on a par behind the first one.

Figure 33: Basic and above basic digital skills by competence area in Austria and the EU-27 average 2021 (in percent)



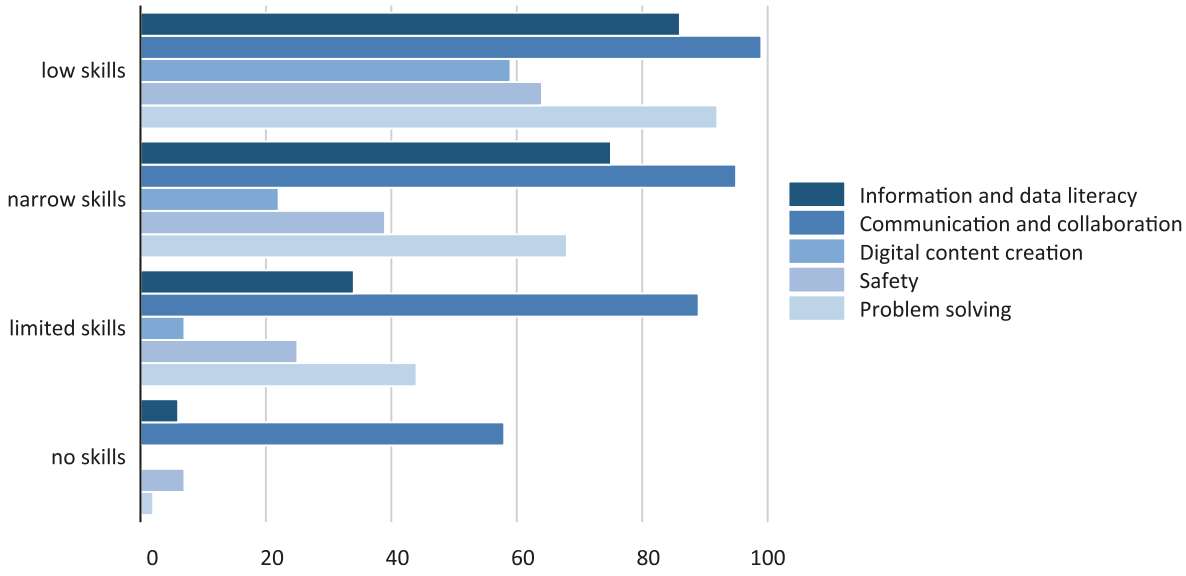
Source: Eurostat, European survey on ICT usage in households 2021.

However, the percentage of people with *at least basic skills* was significantly lower in both Austria and the EU-27 average for the competence areas *digital content creation* and *safety*. In the EU-27 average, around two thirds of 16- to 74-year-olds achieved at least a basic *skill level* in each area (*digital content creation*: 66%; *safety*: 68%). Although Austria was clearly above the EU-27 average in these two competence areas (by around 10 percentage points in each case), the analysis also shows that the skill level in these two areas is significantly lower than in the other competence areas (*digital content creation*: 75%; *safety*: 78%).

In this context, the concept of the DSI is to be considered again: In order to be considered a person with *at least basic digital skills* overall, at least a basic skill level must also be achieved in each competence area. If, on the other hand, skills are lacking in one or more competence areas, the person is categorised at a lower skill level overall[5] . This means that competence areas with relatively low skill levels are particularly important, as the overall skill level shown by the DSI can only be improved if skills can be acquired in areas that are still relatively weak. Against this background, it is also worth taking a look at the skills profile of people who do not achieve at least a basic level of skills overall.

[5] For a more detailed description of the design principle, see chapter 1.2.

Figure 34: Basic and above basic digital skills of people at low skill levels by competence area in Austria 2021 (in percent)



Source: Statistics Austria, Survey on ICT usage in households 2021.

Figure 34 shows the proportion of people at low skill levels who had *at least basic knowledge* in the individual competence areas. According to this figure, 86% of people with *low skills* who lacked skills in only one sub-indicator achieved *at least basic skills* in the area of *information and data literacy*. In the area of *communication and collaboration,* the rate was almost 100% (99%). *Problem-solving* skills were also relatively good at 92%. However, significantly lower percentages were recorded for the sub-indicators *digital content creation* (59%) and *safety* (64%). Conversely, this means that a lack of skills in these two areas was responsible for the majority of people with low overall digital skills failing to achieve at least a basic level of digital competence.

A similar picture emerges at the even lower skill levels. Skills in the areas of *communication and collaboration* are comparatively good, while the greatest deficits are found in the areas of *digital content creation* and *safety.* People at the lowest skill level (*no digital skills*) also display hardly any problem-solving skills (2%).

3 Digital skills by socio-demographic background

Differences in the digital literacy level of the population can be observed not only between EU member states, but also between different groups of the population within the individual EU member states. The following section is dedicated to analysing socio-demographic factors influencing the digital literacy level of 16- to 74-year-olds. In detail, the following characteristics are included in the analysis:

- Gender
- Age
- Education
- Employment status
- Degree of urbanisation

The first approximation is based on a bivariate descriptive analysis. For this purpose, the percentage of people with *at least basic digital skills* is calculated and compared for each characteristic of the socio-demographic background variables listed above. The differences in skills observed in Austria are also compared with the European pattern that can be determined from the EU-27 averages. The subsequent multivariate analysis makes it possible to trace the correlation or dependency between socio-demographic variables and digital skills in more detail.

In order to limit the scope of the report, the following descriptions are mainly limited to the overall indicator. However, the validity of the results was also checked for the other sub-indicators of the DSI, and similar patterns were found throughout. The results of the sub-indicators are summarised at the end of the chapter.

3.1 Gender- and age-specific differences

The significance of gender and age for the acquisition of digital skills has often been the subject of scientific analyses (Scheerder et al. 2019; Punter et al. 2017). The results usually suggest that significant differences in skills can be expected between younger and older population groups as well as between men and women. Gender-specific differences have found their way into public discourse as the buzzword *digital gender gap.* Intergenerational differences are often described with terms such as *digital natives* (people who have grown up with digital technology) and *digital immigrants* (people who have only learnt about digital technologies as adults).

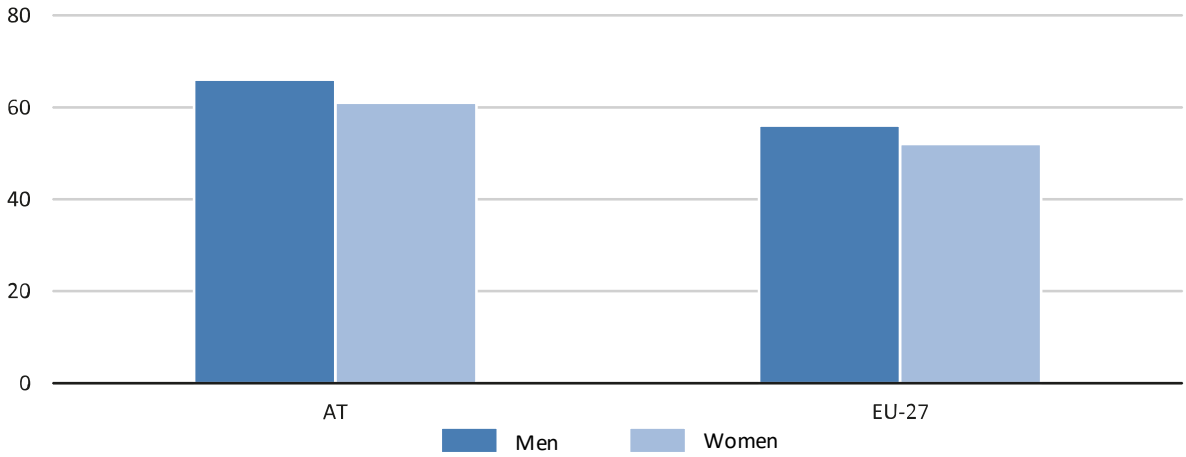
The following section is dedicated to the question of whether these differences in skills can also be observed in very basic digital skills, as measured by the DSI. First, the characteristics of gender and age are analysed separately before gender-specific differences are presented by age group.

3.1.1 Gender-specific differences

A comparison of the percentages of men and women with *at least basic digital skills* paints a very similar picture for Austria and the EU-27 average (see **Figure 35**). In Austria, 66% of men and 61% of women have *at least basic digital skills*, while in the EU-27 average, 56% of men and 52% of women have *at least basic skills*. The observable gender-specific differences in Austria and the EU-27 average are therefore of the same direction and magnitude, at five and four percentage points respectively, and can be described as moderate.

Interestingly, despite the very similar pattern that can be observed for Austria and the EU-27 average, the picture is not homogeneous for the individual EU member states. For example, if we focus on the five countries that lead the ranking according to the DSI overall indicator, we see that while Finland (men: 78%; women: 80%) and Ireland (men: 69%; women: 72%) have slight advantages for women, the Netherlands (men: 81%; women: 77%), Denmark (men: 72%; women: 66%) and Sweden (men: 68%; women: 65%) have slightly more men than women with *at least basic digital skills* on average . Overall, however, gender-specific differences are likely to play a subordinate role with regard to achieving at least a *basic level of digital competence.*

Figure 35: Basic and above basic digital skills by gender in Austria and the EU-27 average 2021 (in percent)



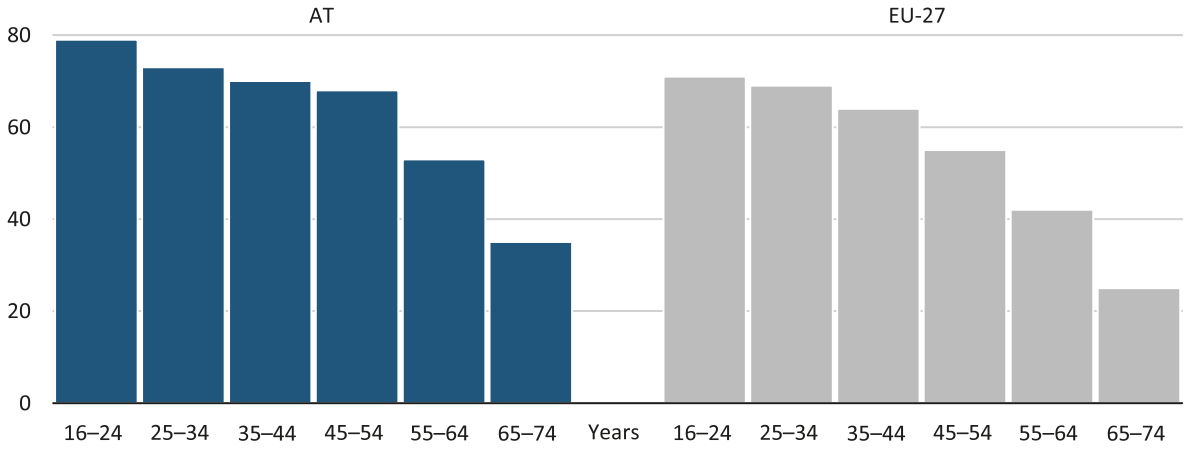
Source: Eurostat, European survey on ICT usage in households 2021.

3.1.2 Age-specific differences

Figure 36 shows the proportion of people with *at least basic digital skills* by age in Austria and the EU-27 average. Once again, relatively similar patterns emerge at national and European level. The proportion of people with *at least basic digital skills* decreases continuously with increasing age in both Austria and the EU-27 average. The overall higher proportion in Austria is reflected in all six age cohorts analysed. The difference varies between five and 13 percentage points and is most pronounced in the 45 to 54 age group (Austria: 68%; EU-27: 55%).

It is also noticeable that the lead in digital skills for the youngest age group (16- to 24-year-olds) compared to the next oldest group (25- to 34-year-olds) is slightly greater in Austria than in the EU-27 average. While the proportion of people with *at least basic digital skills* falls by three percentage points at EU level (16- to 24-year-olds: 71%; 25 to 34-year-olds: 69%), the decline in Austria was six percentage points (16- to 24-year-olds: 79%; 25 to 34-year-olds: 73%). In the subsequent age groups of 35- to 44-year-olds (Austria: 70%; EU-27: 64%) and 45- to 54-year-olds (Austria: 68%; EU-27: 55%), however, the decline in Austria is significantly lower than the EU-27 average. Only from the age of 55 does the proportion of people in the Austrian population with *at least a basic level of digital skills* fall significantly (55- to 64-year-olds: 53%; 65- to 74-year-olds: 35%). Nevertheless, the lead over the EU-27 average (55- to 64-year-olds: 42%; 65- to 74-year-olds: 25%) is most pronounced among the two oldest age cohorts. Overall, the skills gap that can be observed with increasing age in Austria can therefore be described as somewhat smaller than in the overall European comparison.

Figure 36: Basic and above basic digital skills by age in Austria and the EU-27 average in 2021 (in percent)



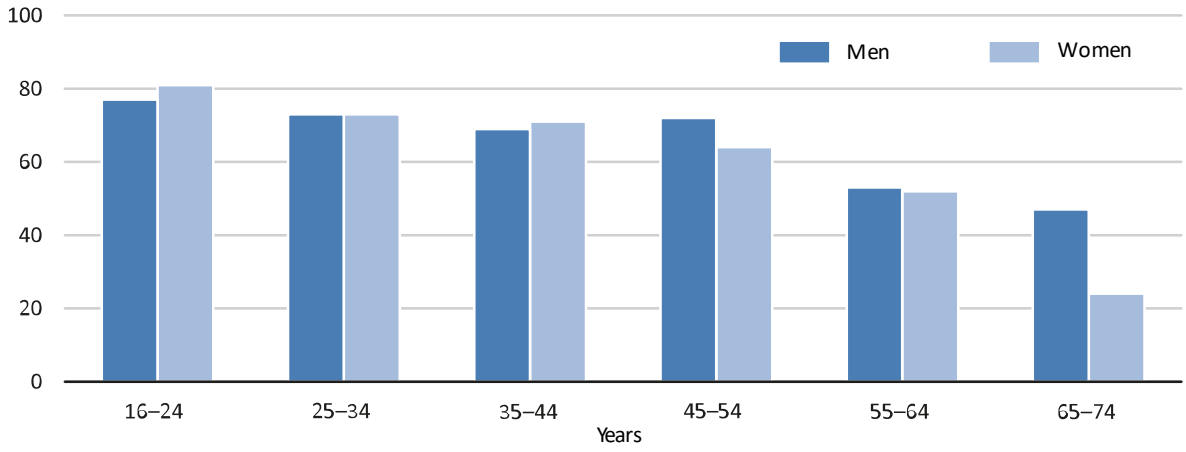
Source: Eurostat, European survey on ICT usage in households 2021.

3.1.3 Gender-specific differences in age comparison

At national level, the data situation allows for a more detailed analysis of gender-specific differences in the attainment of *at least a basic level of digital skills*. **Figure 37** shows the proportion of people with *at least basic digital skills* by gender in an intergenerational comparison[6] . It can be seen from the chart that the five percentage points of gender difference that can be observed overall are by no means evenly distributed across all age groups.

Among younger people, slightly more women than men achieved *at least a basic level of digital skills*. Among 16- to 24-year-olds, the figure is 77% of men versus 81% of women; 73% of both men and women for 25- to 34-year-olds; and 69% of men versus 71% of women among 35- to 44-year-olds. From the age of 45, the picture is reversed. In the 45 to 54 age group, 72% of men and 64% of women have at least a basic level of digital skills. For the 55 to 64 age group, the figures are again almost identical (men: 53%; women: 52%). Only for the oldest age group of 65- to 74-year-olds is there a clear gender difference. Here, almost twice as many men as women had *at least a basic level of digital competence* (men: 47%; women: 24%). To summarise, it can therefore be said that the five percentage points of gender difference are almost exclusively due to a clear advantage for men in the oldest age group of 65- to 74-year-olds.

Figure 37: Basic and above basic digital skills by age and gender in Austria in 2021 (in percent)



Source: Statistics Austria, Survey on ICT usage in households 2021.

[6] At European level, only aggregated data is available, which does not allow a detailed presentation by age and gender.

3.2 Differences according to education

Both basic literature and empirical findings point to a strong correlation between educational qualifications and digital skills (Hunsaker & Hargittai 2018). At first glance, this may come as little surprise, as the education system primarily serves to teach skills. On the other hand, the proportion of people who have been taught content that explicitly serves to build digital skills during their educational career is likely to be small[7] . The correlation should therefore not be reduced to a simple cause and effect according to which the education system shapes digital skills. Rather, the connection is primarily indirect. Theoretical approaches such as signalling or screening theories (Arrow 1973; Spence 1974) suggest that educational qualifications in connection with digital skills should be understood as a proxy for general skills. It is not the education system per se that shapes digital skills, but rather formal educational attainment signals higher general skills, which are associated with a greater willingness to engage in lifelong learning and thus also have a positive impact on people's digital skills. It should also be noted in the analysis that the data comes from a cross-sectional survey of 16- to 74-year-old residents in Austria. This means that the time between obtaining the highest educational qualification and when skills are measured varies considerably. While some of the people in the youngest age group in particular are still in their (initial) education, some of the oldest people completed their education over 50 years ago. Their educational qualifications are therefore only comparable to a limited extent. On the one hand, some people will still acquire higher educational qualifications as they have not yet reached the end of their educational career. On the other hand, the education system and the way in which skills are taught have also changed over the years. Another aspect that has been increasingly discussed recently, which makes the data even more difficult to interpret, is that digital skills are increasingly becoming an educational requirement (Pagani et al. 2015). For many educational programmes, a minimum level of familiarity with digital technologies is a prerequisite for being able to engage with them in a meaningful way.

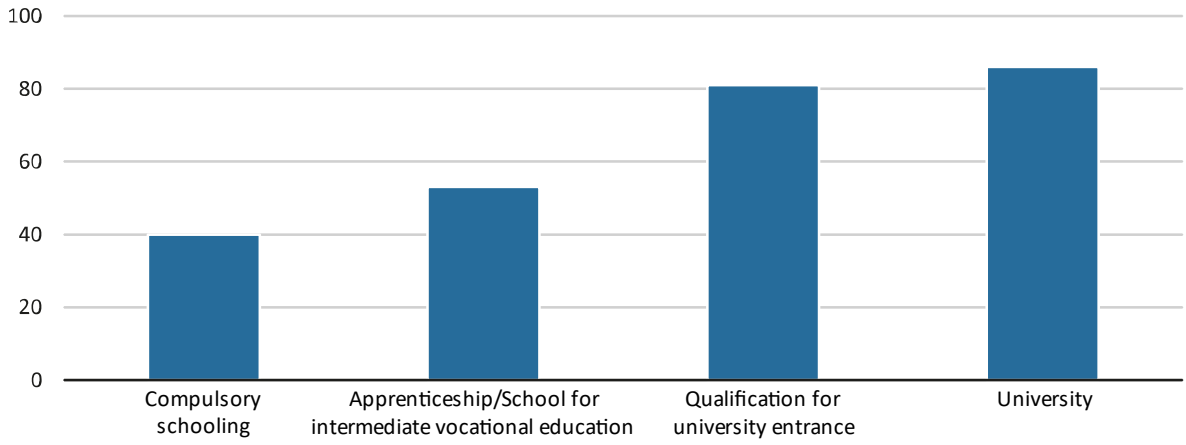
The following bivariate analysis provides an insight into the relationship between the highest level of education and basic digital skills. As the educational systems of the various EU member states differ greatly, the presentation is initially limited to Austria using national education categories. The international education classification ISCED-8 is then used for a comparison with the EU-27 average.

Figure 38 shows the proportion of people in Austria with *at least basic digital skills* according to national education categories (four levels: compulsory schooling – apprenticeship/school for intermediate vocational education – qualification for university entrance – university). It shows that the proportion of people with *at least basic digital skills* increases steadily in line with the level of education. 40% of people with compulsory schooling have *at least basic digital skills*, while the figure

[7] In Austria, the new compulsory subject *Basic Digital Education* was introduced in lower secondary schools and lower secondary general education (AHS) in the 2022/23 school year.

for those who completed an apprenticeship or school for intermediate vocational education is already 53%, which is just over half. A particularly strong increase of almost 30 percentage points to 81% can be observed among people with a qualification for university entrance. At 86%, university graduates are even more likely to have basic digital skills. In Austria, whether or not *at least a basic level of digital skills* is achieved therefore depends crucially on the level of education. Above all, attaining a qualification for university entrance plays a decisive role. People with the highest educational qualification of a qualification for university entrance and university graduates are more than twice as likely to have *at least basic digital skills* than people who have only completed compulsory schooling.

Figure 38: Basic and above basic digital skills by education (national) in Austria 2021 (in percent)



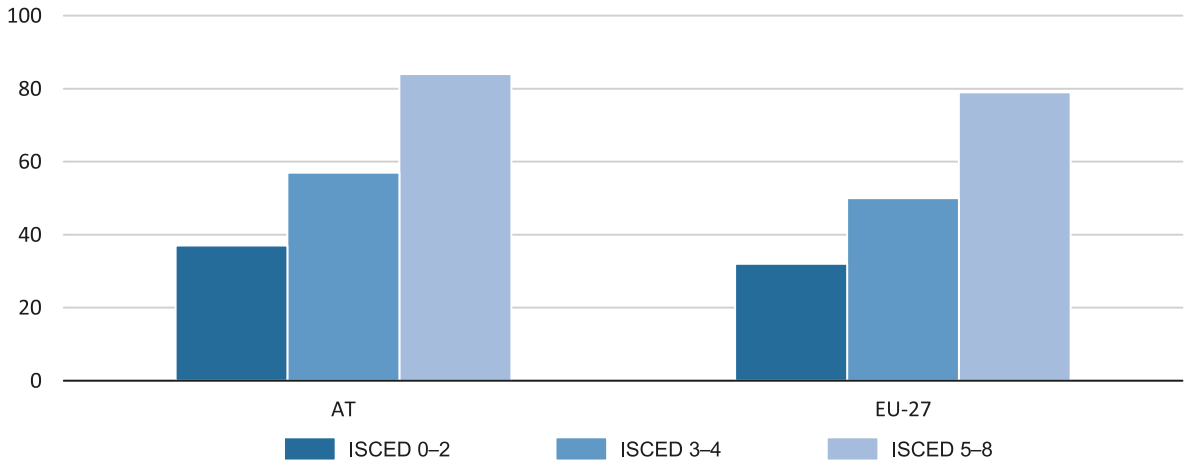
Source: Statistics Austria, Survey on ICT usage in households 2021.

A comparison with the EU-27 average was made using the international education classification ISCED-8 (three levels: ISCED 0-2 – ISCED 3-4 – ISCED 5-8). The classification system is somewhat coarser than the one used for the national presentation. People with a qualification for university entrance are included here in the middle education category together with graduates of an apprenticeship or of schools for intermediate vocational education[8] . This means that the education categories are less clear-cut. However, a clear correlation between basic digital skills and education is also evident here (see **Figure 39**). At the national level, a very similar pattern to the EU-27 average can be observed, apart from a consistent level difference of five to seven percentage points in favour of Austria.

[8] In addition, ISCED 3-4 also includes other educational qualifications such as the completion of a polytechnic school. A list of the ISCED 8 classification with the Austrian educational qualifications can be found in the appendix.

At the lowest level of education (ISCED 0-2), slightly more than a third of people in Austria have *at least basic digital skills*; this figure is just under a third at a European level (Austria: 37%; EU-27: 32%). In the medium education level (ISCED 3-4), a basic level of competence is achieved by 57% of 16- to 74-year-olds, compared to an EU-27 average of 50%. Once again, the highest percentage values are evident for the highest education level (ISCED 5-8) (Austria: 84%; EU-27: 79%). It is worth noting that the skills advantage over the middle education level is almost 30 percentage points both in Austria and at EU level and that the proportion of people with basic digital skills more than doubles across the education levels.

Figure 39: Basic and above basic digital skills by education (international) in Austria and the EU-27 average 2021 (in percent)



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Source: Eurostat, European survey on ICT usage in households 2021.

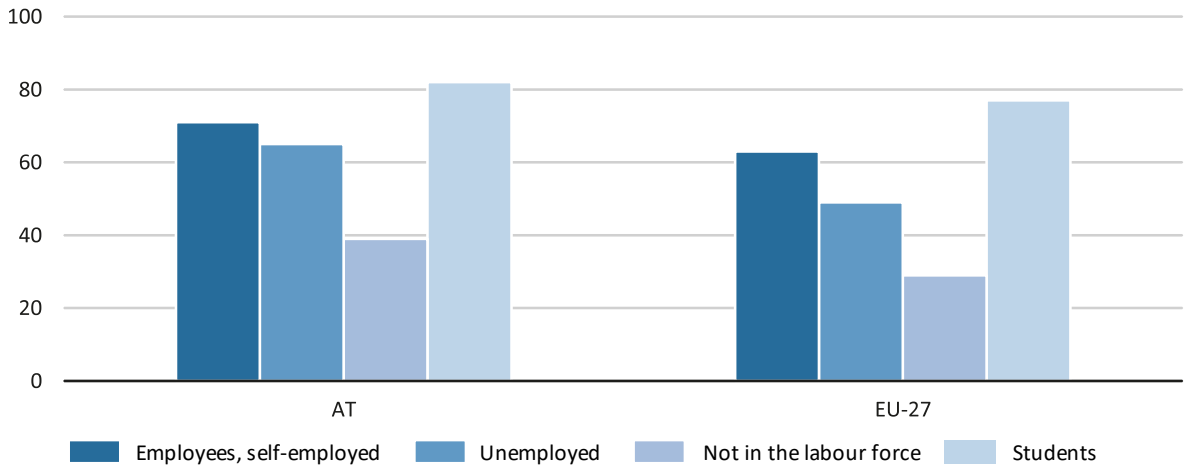
3.3 Differences according to employment status

Digital skills are increasingly seen as an important prerequisite for successful participation in working life (van Laar et al. 2017). After all, more and more job profiles require a minimum level of digital skills. Here, too, the connection between employment status and digital skills is not a simple cause and effect. On the one hand, digital skills are indispensable for certain professions, while on the other hand, company training programmes and learning on the job also play an important role in the acquisition of digital skills.

The following table shows *at least basic digital skills* in Austria and the EU-27 by employment status. **Figure 40** indicates a similar distribution in Austria and the EU-27 average. In general, digital skills are highest among students (Austria: 82%, EU-27: 77%), followed by employees and the self-

employed (Austria: 71%, EU-27: 63%) and the unemployed (Austria: 65%, EU-27: 49%), while people not in the labour force (Austria: 39%, EU-27: 29%) have the lowest skills. The detailed EU-27 comparison nevertheless reveals some differences. Once again, all of the percentages reported for Austria are higher than the corresponding values for the EU-27 average. Compared to the EU-27 average, the differences in attaining *at least a basic level of digital skills* between employees and the self-employed, and the unemployed in Austria are smaller. While the difference in Austria is only six percentage points, the difference in skills at a European level is 14 percentage points and therefore more than twice as large.

Figure 40: Basic and above basic digital skills by employment status in Austria 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

3.4 Differences according to degree of urbanisation

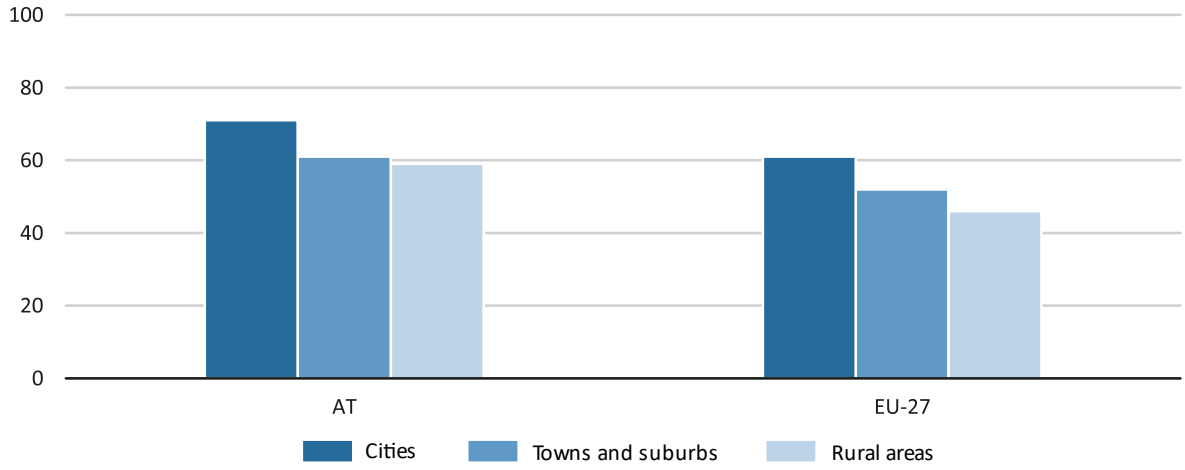
Urban centres often act as drivers of innovation and are therefore also seen as drivers of digitalisation. Thus, it is reasonable to assume a connection between the acquisition of digital skills and regional circumstances. In this context, there is also talk of a *digital divide* between cities and rural areas (OECD 2018). Against this backdrop, the following section addresses the question of whether differences can be identified between rural and urban areas in terms of basic digital skills. A classification system based on the degree of urbanisation of the European Commission[9] was used for

[9] In Austria, only Vienna, Graz, Linz, Salzburg, Innsbruck, and Klagenfurt are categorised as cities according to this classification system. Examples of towns and suburbs are, for example, the region surrounding Vienna, the central area of Upper Austria or the conurbation around Innsbruck. Less densely populated areas are categorised as rural areas. A detailed overview can be found at: https://ec.europa.eu/eurostat/de/web/degree-of-urbanisation/background

the analysis, according to which the regions are assigned to three types (cities – towns and suburbs – rural areas) depending on population density.

The bar chart in **Figure 41** shows that the proportion of people with *at least basic digital skills* increases with increasing urbanisation. However, the influence of the degree of urbanisation is less clear than with the previously presented socio-demographic characteristics. People living in cities are most likely to have *basic digital skills* (Austria: 71%; EU-27: 61%). In towns and suburbs, the percentages fall to 61% and 52% respectively, both in Austria and at EU level. There is hardly any difference between rural areas (59%) and towns and suburbs (61%) in Austria. At EU level, however, the advantage of towns and suburbs (52%) over rural areas (46%) is somewhat more pronounced.

Figure 41: Basic and above basic digital skills by degree of urbanisation in Austria 2021 (in percent)



Source: Eurostat, European survey on ICT usage in households 2021.

3.5 Multivariate analysis of the influencing factors

The subsequent multivariate analysis makes it possible to simultaneously analyse the influence of the socio-demographic characteristics described in the previous section on the digital skill level. In this way, the effects of individual characteristics can be quantified, taking into account the other socio-demographic influencing factors, and spurious correlations can be identified.

Specifically, multiple logistic regression models were used for the multivariate analysis. This involves estimating the influence of several independent variables on a dependent variable. Mathematically, the structure of the models can be described as follows:

$$y = ß_0 + ß_1 * x_1 + ß_2 * x_2 + \cdots + ß_p * x_p$$

The dependent variables in the regression models were indicators showing whether or not a person achieves a certain skill level (in a certain competence area). The socio-demographic characteristics described in the previous section were used as independent variables. The logistic regression provides odds ratios (OR) as a result to quantify the strength of the correlation. The odds ratio is therefore a measure of the strength of the effect of an independent variable on the dependent variable. It indicates the odds ratio of a certain event (in this case, achieving a skill level) in relation to the reference category. Odds ratios are not a symmetrical measure. A value between zero and one indicates a negative effect; a value between one and infinity indicates a positive effect.

Table 4: Results of the logistic regression model (dependent variable: basic and above basic digital skills, without interaction)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.83	0.09	*
Age (Reference: 16-24 years)			
25-34 years	0.42	0.27	**
35-44 years	0.41	0.26	**
45-54 years	0.42	0.25	**
55-64 years	0,29	0.25	**
65-74 years	0.19	0.29	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for Intermediate Vocational Education	2.35	0.15	**
Qualification for university entrance	6.52	0.18	**
University	11.46	0.20	**

Independent variable	Odds	SE	Significance
Employment status (Reference: Employees, self-employed)			
Unemployed	1.02	0.27	
Not in the labour force	0.55	0.16	**
Students	1.42	0.35	
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.83	0.13	
Rural areas	0.85	0.14	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 4 shows the model coefficients of the main model. In the main model, the overall DSI indicator (person has *at least basic digital skills*: yes/no) was used as the dependent variable. In addition, further models were estimated to check whether the results of the main model are also reflected in a similar form in the sub-indicators of the DSI. Due to the different base probabilities of the indicators used as dependent variables, it is difficult to compare the models directly with each other, but the results were very similar. The following explanations are therefore limited to the main model. Chapter 3.6 briefly discusses the differences that can be identified for the other models.

The largest effect sizes were found in the model for the education variable. People with at most compulsory schooling served as the reference category. Even graduates of an apprenticeship/school for intermediate vocational education were more than twice as likely to achieve *at least a basic level of digital skills* compared to people at the lowest level of education (2.35). Significantly higher effect sizes were observed for people with a qualification for university entrance and university graduates. The chance of people with a qualification for university entrance having *at least basic digital skills* was almost seven times (6.52) as high as for people with at most compulsory schooling. For university graduates, the chance was even more than eleven times (11.46) as high.

Age also had a relatively strong effect. Compared to the reference category, 16- to 24-year-olds, the chance of having *at least basic digital skills* falls by almost 60% in the middle age categories (25-34 years; 35-44 years and 45-54 years). A further decline can be seen among the over 55-year-olds. For 55- to 64-year-olds, the chance of having *at least basic digital skills* is reduced by more than 70%; for 65- to 74-year-olds, it is even reduced by more than 80%.

In terms of employment status, a distinction was made between employees and the self-employed, the unemployed, people not in the labour force, and students. Only people not in the

labour force differed significantly from the reference category, employees and the self-employed. They had a 45% lower chance of having *at least basic digital skills*.

A moderate gender effect was also observed. However, the effect size was considerably smaller than for the other significant influencing variables (0.83). The chance of women having *at least basic digital skills* was reduced by 17% compared to men. Due to the preceding descriptive analysis, which gave strong indications that gender-specific effects are not distributed evenly across the age groups, a further model was estimated in which interaction effects between age and gender were included in the model (**Table 7**). The model coefficients hardly differed from the coefficients of the model just presented. The main effect of gender was close to one and was not significant. The interaction effects between age and gender were also not significant, with one exception: a relatively strong effect of 0.37 was observed for the oldest age group of 65- to 74-year-old women. As a result, the chance of achieving *at least a basic level of digital skills* in this age group is reduced by almost two thirds for women compared to men. The results of the descriptive analysis, according to which the gender-specific effect on basic digital skills is to be attributed almost exclusively to the oldest age group, were thus confirmed by the multivariate analysis.

The degree of urbanisation had no significant effect on achieving *at least* a *basic level of digital skills*. The model coefficients tend to show slight advantages for people in cities compared to the population of towns and suburbs or rural areas. However, the effects were not statistically significant.

3.6 Outlook: Competence areas and skill levels according to socio-demographic background

The results presented in the previous section relate to the overall indicator of the DSI (*at least basic digital skills*). To check whether the results are also valid for the sub-indicators of the DSI, the analysis was repeated for the five competence areas of the DSI. In each case, the skill levels *above basic digital skills* and *at least basic digital skills* (which includes the skill levels *basic digital skills* and *above basic digital skills*) were analysed. **Table 5** and **Table 6**, which are included in the appendix, show the results of the descriptive analysis. Except for a difference in the level of the percentage values, which varied depending on the sub-indicator, patterns comparable to the overall indicator were found throughout. Regression models were also calculated for all the sub-indicators mentioned to further analyse the correlation between competence areas and socio-demographic background. The results can also be found in the appendix as **Table 7** to **Table 18**.

A comparison of the confidence intervals of the model coefficients of the various models with the main model also revealed hardly any differences[10]. It can therefore be assumed that the results for the overall indicator can be generalised well to the sub-indicators of the DSI. Some of the differences that tended to emerge will be briefly discussed below.

If the analysis is restricted to the highest level of competence (*above basic digital skills*), gender effects tended to be somewhat greater. Age and education, on the other hand, played a slightly smaller role compared to the main model. When comparing the various competence areas, the extremely high degree of saturation in the *communication and collaboration* sub-indicator is striking. Overall, 91% of 16- to 74-year-olds had *at least basic digital skills in* this area. In the younger age groups, the figure was almost 100%. Employment was more important for the sub-indicator of *digital content creation* than for the overall indicator. The differences according to socio-demographic characteristics tended to be more moderate in the dimensions of *information and data literacy* and *communication and collaboration* than in the other sub-indicators. Overall, however, the differences between competence areas and skill levels were limited.

[10] The confidence intervals of the model coefficients only did not overlap in exceptional cases where the base probabilities in individual subgroups were extreme. For example, the base probability of the youngest age group in the *communication and collaboration* sub-indicator of having *at least basic digital skills* is close to 100%. As a result, extremely low odds ratios are estimated in this case.

4 Summary and outlook

The *Digital Skills Indicator* is the most comprehensive database on basic digital skills of the population of the European Union. It has been published by Eurostat every two years since 2015. Following a revision of the methodology (DSI 2.0), it was last collected in 2021. So far, reporting has only taken place as part of the DESI annual reports and has been limited to a few pages (European Commission 2023e). A detailed analysis of the results from an Austrian perspective was not previously available. However, this gap has now been closed with the present report.

The DSI is based on information about selected internet and software activities carried out by 16- to 74-year-olds. It is assumed that people who state that they have carried out specific activities also have the corresponding skills. The data is therefore used as a proxy for the population's digital skills in the following five areas, which correspond to the dimensions of the *Digital Competence Framework for Citizens* (DigComp 2.0):

- Information and data literacy
- Communication and collaboration
- Digital content creation
- Safety
- Problem solving

The focus here is on relatively basic digital skills. These are, for example, skills that are required for activities such as buying online and internet banking or using the internet for communication purposes. These skills are already mastered by a large proportion of the population in Austria and the European Union. At the same time, these are also skills that are increasingly becoming a prerequisite for full participation in society as digitalisation progresses.

Against this background, the DSI provides an overall indicator and five sub-indicators on the population's basic digital skills. The sub-indicators relate to the skill level in the aforementioned areas. Only people who have *at least basic digital skills* in all five areas are assigned *at least a basic level of digital skills* overall.

In an EU-27 comparison, the overall indicator for Austria shows an above-average result. While around 63% of 16- to 74-year-olds in Austria have *at least basic digital skills*, the EU-27 average is only 54%. Just as clearly as the EU-27 average is exceeded, however, is Austria's gap to the frontrunners Finland (79%) and the Netherlands (79%), which is 16 percentage points in each case. Furthermore, only Ireland (70%), Denmark (69%) and Sweden (67%) achieved results that were more than one percentage point ahead of the Austrian results.

A similar picture emerges in the individual competence areas. Austria was always ahead of the EU-27 average but was mostly surpassed by the aforementioned best-practice countries. Apart from this, very similar patterns were observed at national and European level. Most people achieved at least basic skills in the competence area *communication and collaboration.* The competence areas *information and data literacy* and *problem solving* were on a par behind the first one. For the competence areas *digital content creation* and *safety*, significantly lower percentages of people with *at least basic digital skills* were recorded.

The time series available for some of the activities included in the DSI showed a consistent upward trend. The best-practice countries were relatively consistently ahead of Austria over the entire period. One exception is Ireland, where significant increases in some activities have only recently been recorded, placing the country among the leaders.

The comprehensive database on which the DSI is based also makes it possible to correlate the population's level of digital skills with socio-demographic background information. In detail, the following characteristics were analysed:

- Gender
- Age
- Education
- Employment status
- Degree of urbanisation

The first approximation was carried out using a bivariate descriptive analysis. Once again, very similar patterns emerged at European level and in Austria. The subsequent multivariate analysis made it possible to indicate the influence of each socio-demographic characteristic on the digital skill level, taking into account the other characteristics. Education, age and employment status were identified as the most important predictors for digital skills. Gender and degree of urbanisation, on the other hand, hardly played a role.

While the results of the bivariate analysis still suggested similarly pronounced age and education effects, the multivariate model showed the dominant influence of the education variable. The chance of having *at least basic digital skills* differed between the youngest and oldest age groups (16- to 25-year-olds vs. 65- to 74-year-olds) by a factor of around three. People with a qualification for university entrance were more than ten times as likely to have *at least basic digital skills* compared to people who had only completed compulsory schooling. There were also clear differences in terms of employment status. Employees and the self-employed were almost twice as likely to have *at least basic skills* as those not in the labour force.

Among younger people, the *digital natives,* basic digital skills are very widespread. In the 16 to 24 age group, four out of five people have *at least basic skills*. A relatively large number of people in

this group are not yet at the end of their educational career, which is why differences according to the level of education are less pronounced. However, the level of education has the strongest effect on older people, the *digital immigrants.* These people have not yet grown up with today's digital infrastructure. They can therefore only achieve *basic digital skills* if they acquire new skills. This appears to be less successful at lower educational levels than at higher ones.

At the time this report was written, the year's field phase of the survey on information and communication technology in households was coming to an end. It forms the data basis for the 2023 DSI. Eurostat will publish the data in the course of 2024. Most recently, there has been an increase in internet use among older people in Austria. It remains to be seen whether this will also have an impact on the digital skill level of the population.

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List of abbreviations

CAPI	Computer Assisted Personal Interviewing
CATI	Computer Assisted Telephone Interviewing
CAWI	Computer Assisted Web Interviewing
CC	Communication and collaboration
DCC	Digital content creation
DESI	Digital Economy and Society Index
DG CNECT	Directorate-General for Communication Networks, Content and Technologies
DigComp	European Digital Competence Framework for Citizens
DSI	Digital Skills Indicator
ICT	Information and communication technologies
IL	Information and data literacy
ISCED	International Standard Classification of Education
JRC	Joint Research Centre
OR	Odds ratio
PAPI	Paper and Pencil Interviewing
PS	Problem solving

SE	Standard error
SF	Safety

Appendix

Table 5: Basic and above basic digital skills in Austria 2021 (overall and sub-indicators in percent)

Characteristic	DSI	IL	CC	DCC	SF	PS
In total	63	84	91	75	68	85
Gender						
Men	66	86	92	78	80	88
Women	61	82	90	73	76	82
Age						
16-24 years	79	94	100	89	88	99
25-34 years	73	90	99	84	85	98
35-44 years	70	91	97	84	83	95
45-54 years	68	89	95	81	82	90
55-64 years	53	80	86	65	73	75
65-74 years	35	56	62	44	51	49
Education						
Compulsory schooling	40	68	77	54	58	70
Apprenticeship/School for intermediate vocational education	53	80	88	66	72	79
Qualification for university entrance	81	94	98	90	90	96
University	86	95	99	95	92	98
Employment status						
Employees, self-employed	71	91	97	83	84	93
Unemployed	65	86	95	76	80	92
Not in the labour force	39	66	73	49	59	59
Students	82	95	100	95	89	100
Degree of urbanisation						
Cities	71	89	93	79	82	89
Towns and suburbs	61	84	92	76	75	86
Rural areas	59	80	88	71	76	82

Source: Statistics Austria, survey on ICT usage in households 2021 - DSI = Digital Skills Indicator. IL = Information and data literacy, CC = Communication and collaboration, DCC = Digital content creation, SF =Safety, PS = Problem solving.

Table 6: More than basic digital skills in Austria 2021 (total and sub-indicators in percent)

Characteristic	DSI	IL	CC	DCC	SF	PS
In total	33	73	86	56	52	62
Gender						
Men	38	76	86	61	55	68
Women	29	70	85	51	50	57
Age						
16-24 years	43	78	100	76	58	84
25-34 years	44	82	97	65	60	80
35-44 years	39	83	93	61	58	74
45-54 years	35	77	90	61	56	65
55-64 years	24	68	77	46	47	44
65-74 years	13	45	52	27	32	27
Education						
Compulsory school	16	49	72	35	31	44
Apprenticeship/School for intermediate vocational education	21	66	81	40	45	49
Qualification for university entrance	48	87	96	77	65	80
University	57	91	97	84	69	86
Employment status						
Employees, self-employed	39	80	93	64	58	70
Unemployed	28	77	91	46	48	69
Not in the labour force	13	53	63	28	36	33
Students	53	85	100	89	67	90
Degree of urbanisation						
Cities	43	79	89	64	58	70
Towns and suburbs	30	72	86	55	50	63
Rural areas	28	69	82	50	49	56

Source: Statistics Austria, Survey on ICT usage in households 2021. - DSI = Digital Skills Indicator. IL = Information and Data, CC = Communication and Collaboration, DCC = Digital Content Creation, SF = Security, PS = Problem Solving.

Table 7: Results of the logistic regression model (dependent variable: basic and above basic digital skills, with interaction)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	1.08	0.37	
Age (reference: 16-24 years)			
25-34 years	0.43	0.37	*
35-44 years	0.44	0.34	*
45-54 years	0.50	0.33	*
55-64 years	0.30	0.32	**
65-74 years	0.32	0.37	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.29	0.15	**
Qualification for university entrance	6.35	0.19	**
University	10.98	0.20	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.00	0.28	
Not in the labour force	0.53	0.16	**
Students	1.36	0.35	
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.83	0.13	
Rural areas	0.84	0.14	
Interaction: Gender x age (Reference: Men. 16-24 years)			
Women (25-34 years)	0.94	0.49	
Women (35-44 years)	0.85	0.43	
Women (45-54 years)	0.70	0.40	
Women (55-64 years)	0.93	0.40	
Women (65-74 years)	0.37	0.43	*

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * $p<0.05$ ** $p<0.01$.

Table 8: Results of the logistic regression model (dependent variable: above basic digital skills)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.61	0.11	**
Age (Reference: 16-24 years)			
25-34 years	0.78	0.24	
35-44 years	0.74	0.24	
45-54 years	0.68	0.24	
55-64 years	0.54	0.24	*
65-74 years	0.41	0.32	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	1.74	0.21	**
Qualification for university entrance	4.63	0.22	**
University	7.51	0.22	**
Employment status (Reference: Employees, self-employed)			
Unemployed	0.71	0.26	
Not in the labour force	0.43	0.17	**
Students	1.64	0.26	
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.77	0.14	
Rural areas	0.76	0.13	*

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * $p<0.05$ ** $p<0.01$.

Table 9: Results of the logistic regression model (dependent variable: above basic digital skills in information and data literacy)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.76	0.10	**
Age (Reference: 16-24 years)			
25-34 years	0.96	0.31	
35-44 years	1.18	0.27	
45-54 years	0.90	0.25	
55-64 years	0.72	0.25	
65-74 years	0.37	0.28	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.32	0.14	**
Qualification for university entrance	6.04	0.22	**
University	9.84	0.23	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.17	0.31	
Not in the labour force	0.63	0.16	**
Students	1.93	0.33	*
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.83	0.16	
Rural areas	0.79	0.15	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 10: Results of the logistic regression model (dependent variable: basic and above basic digital skills in information and data literacy)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.78	0.11	*
Age (Reference: 16-24 years)			
25-34 years	0.334	0.45	*
35-44 years	0.41	0.39	*
45-54 years	0.35	0.36	**
55-64 years	0.24	0.37	**
65-74 years	0.11	0.40	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.42	0.13	**
Qualification for university entrance	6.73	0.30	**
University	9.32	0.35	**
Employment status (Reference: Employees, self-employed)			
Unemployed	0.80	0.39	
Not in the labour force	0.50	0.20	**
Students	1.19	0.64	
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.79	0.20	
Rural areas	0.65	0.20	*

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 11: Results of the logistic regression model (dependent variable: above basic digital skills in communication and collaboration)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	1.03	0.11	
Age (Reference: 16-24 years)			
25-34 years	0.10	2.60	
35-44 years	0.04	2.55	
45-54 years	0.03	2.55	
55-64 years	0.01	2.55	
65-74 years	0.00	2.56	
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.45	0.16	**
Qualification for university entrance	7.51	0.28	**
University	13.90	0.25	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.08	0.33	
Not in the labour force	0.49	0.18	**
Students	1740112.28	1.69	**
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	1.00	0.18	
Rural areas	0.81	0.15	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * $p<0.05$ ** $p<0.01$.

Table 12: Results of the logistic regression model (dependent variable: basic and above basic digital skills in communication and collaboration)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.90	0.13	
Age (Reference: 16-24 years)			
25-34 years	0.00	0.98	**
35-44 years	0.00	2.39	**
45-54 years	0.00	2.36	**
55-64 years	0.00	2.38	**
65-74 years	0.00	2.40	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	3.14	0.18	**
Qualification for university entrance	9.97	0.43	**
University	36.09	0.45	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.04	0.40	
Not in the labour force	0.47	0.21	**
Students	1102696.73	2.23	**
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	1.05	0.22	
Rural areas	0.80	0.20	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 13: Results of the logistic regression model (dependent variable: above basic digital skills for digital content creation)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.60	0.09	**
Age (Reference: 16-24 years)			
25-34 years	0.46	0.29	**
35-44 years	0.46	0.26	**
45-54 years	0.55	0.26	*
55-64 years	0.43	0.27	**
65-74 years	0.31	0.31	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.02	0.18	**
Qualification for university entrance	7.78	0.21	**
University	14.87	0.22	**
Employment status (Reference: Employees, self-employed)			
Unemployed	0.62	0.26	
Not in the labour force	0.38	0.17	**
Students	4.75	0.35	**
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.97	0.14	
Rural areas	0.89	0.14	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 14: Results of the logistic regression model (dependent variable: basic and above basic digital skills in digital content creation)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.76	0.09	**
Age (Reference: 16-24 years)			
25-34 years	0.50	0.30	*
35-44 years	0.55	0.28	*
45-54 years	0.51	0.29	*
55-64 years	0.33	0.28	**
65-74 years	0.21	0.31	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.23	0.15	**
Qualification for university entrance	7.88	0.23	**
University	18.25	0.28	**
Employment status (Reference: Employees, self-employed)			
Unemployed	0.91	0.33	
Not in the labour force	0.44	0.18	**
Students		0.60	*
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	1.10	0.15	
Rural areas	1.01	0.15	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * $p<0.05$ ** $p<0.01$.

Table 15: Results of the logistic regression model (dependent variable: above basic digital skills in safety)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.81	0.08	**
Age (Reference: 16-24 years)			
25-34 years	0.88	0.23	
35-44 years	0.91	0.23	
45-54 years	0.91	0.22	
55-64 years	0.76	0.23	
65-74 years	0.53	0.27	*
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.05	0.15	**
Qualification for university entrance	3.78	0.18	**
University	4.94	0.19	**
Employment status (Reference: Employees, self-employed)			
Unemployed	0.81	0.26	
Not in the labour force	0.68	0.14	**
Students	1.71	0.27	*
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.84	0.13	
Rural areas	0.89	0.12	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 16: Results of the logistic regression model (dependent variable: basic and above basic digital skills in safety)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.80	0.10	*
Age (Reference: 16-24 years)			
25-34 years	0.46	0.35	*
35-44 years	0.43	0.35	*
45-54 years	0.46	0.33	*
55-64 years	0.35	0.34	**
65-74 years	0.18	0.35	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.33	0.14	**
Qualification for university entrance	5.89	0.22	**
University	8.94	0.22	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.04	0.24	
Not in the labour force	0.63	0.18	**
Students	1.21	0.45	
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	0.80	0.16	
Rural areas	0.98	0.16	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 17: Results of the logistic regression model (dependent variable: above basic digital skills in problem solving)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.58	0.10	**
Age (Reference: 16-24 years)			
25-34 years	0.60	0.31	
35-44 years	0.51	0.28	*
45-54 years	0.35	0.26	**
55-64 years	0.18	0.27	**
65-74 years	0.12	0.31	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	1.96	0.16	**
Qualification for university entrance	5.79	0.20	**
University	11.74	0.23	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.32	0.28	
Not in the labour force	0.58	0.17	**
Students	2.89	0.40	**
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	1.04	0.14	
Rural areas	0.88	0.15	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 18: Results of the logistic regression model (dependent variable: basic and above basic problem-solving skills)

Independent variable	Odds	SE	Significance
Gender (Reference: Men)			
Women	0.68	0.11	**
Age (Reference: 16-24 years)			
25-34 years	0.57	1.40	
35-44 years	0.22	1.27	
45-54 years	0.12	1.25	
55-64 years	0.06	1.26	*
65-74 years	0.03	1.27	**
Education (Reference: Compulsory schooling)			
Apprenticeship/School for intermediate vocational education	2.39	0.15	**
Qualification for university entrance	9.87	0.30	**
University	25.48	0.27	**
Employment status (Reference: Employees, self-employed)			
Unemployed	1.24	0.36	
Not in the labour force	0.44	0.17	**
Students	3224024.75	0.82	**
Degree of urbanisation (Reference: Cities)			
Towns and suburbs	1.04	0.19	
Rural areas	0.91	0.17	

Source: Statistics Austria, Survey on ICT usage in households 2021. Calculation and presentation: Statistics Austria. * p<0.05 ** p<0.01.

Table 19: Austrian education system according to the International Standard Classification of Education (ISCED)

International Standard Classification in education (ISCED)	Description
ISCED 0-2	People who have successfully completed no more than the first four years of a secondary school or the lower secondary level in general education (AHS).
ISCED 3-4	People who have completed an upper secondary level in general education, a higher vocational school (BHS), a school for intermediate vocational education or polytechnic school, as well as people who completed further education after a secondary school leaving certificate, such as schools for higher service in healthcare and nursing or an apprenticeship including a qualification for university entrance.
ISCED 5-8	Persons who have successfully completed a higher vocational school from the 4th year onwards, advanced courses, a school for professionals, a foreman's, building tradesman's or master craftsman's school or a college, as well as people with a bachelor's or master's degree from a university, university of applied sciences, university of teacher education or equivalent educational institution. People with one of the highest forms of higher education, such as a doctorate or PhD, also fall into this category.

Data tables

Data table Figure 1: Cartogram of the overall DSI indicator

Country code	People with basic and above basic digital skills (in percent)
FI	79
NL	79
IE	70
DK	69
SE	67
ES	64
LU	64
HR	63
AT	63
FR	62
MT	61
CZ	60
EE	56
PT	55
SK	55
BE	54
EL	52
LV	51
CY	50
SI	50
HU	49
EN	49
LT	49
IT	46
PL	43
BG	31
RO	28

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 2: Overview of the structure of the DSI 2.0

Information and data literacy	Communication and collaboration	Digital content creation	Safety	Problem solving
Finding information about goods and services *	Sending/receiving emails *	Using word processing software **	Checking the security of websites **	Downloading or installing software or apps **
Seeking health-related information online *	Telephoning/video calls over the internet *	Using spreadsheet software **	Reading privacy statements **	Changing settings of software, app or device **
Reading online news sites, newspapers or news magazines *	Instant messaging *	Using advanced features of spreadsheet software (e.g. formulas, macros) to organize, analyse, structure or modify data **.	Restricting access to own geographical location **	Buying online *
Activities related to fact-checking online information and its sources **	Participating in social networks *	Editing photos, videos or audio files **	Restricting access to profile or content on social networking sites or shared online storage **	Selling online *
	Expressing opinions on civic or political issues on websites or in social media *	Copying or moving documents, images or other files **	Refusing allowing use of personal data for advertising purposes **	Attending an online course or using online learning materials *
	Taking part in online consultations or voting to define civic or political issues *	Creating files incorporating several elements **	Changing settings in internet browser to prevent or limit cookies **	Using internet banking *
		Programming **		Looking for a job or sending a job application **

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 3: Digital skills by skill level in an EU comparison 2021 (in percent)

Country code	Above basic	Basic	Low	Narrow	Restricted	Not availa-ble	No internet use
FI	48	31	13	4	1	0	3
NL	52	27	11	3	0	0	5
IE	40	31	14	8	5	2	1
DK	37	31	20	8	1	1	1
SE	36	31	18	8	3	2	3
ES	38	26	15	7	4	2	6
LU	32	32	20	8	5	1	1
HR	31	32	12	5	1	0	19
AT	**33**	**30**	**17**	**7**	**3**	**2**	**7**
FR	31	31	16	8	4	1	8
MT	35	26	15	6	3	1	13
CZ	24	36	17	8	2	1	11
EE	28	29	19	10	3	2	9
PT	29	27	13	7	5	3	18
SK	21	34	18	9	4	2	11
BE	26	28	19	12	5	3	7
EU-27	**26**	**27**	**17**	**9**	**5**	**3**	**11**
EL	22	31	11	8	5	2	22
LV	24	27	21	12	5	2	9
CY	21	29	21	10	7	3	9
SI	20	30	20	11	5	3	11
HU	22	28	21	12	5	2	11
EN	19	30	21	12	6	4	9
LT	23	26	19	10	6	3	13
IT	23	23	16	10	6	4	18
PL	21	22	19	11	7	5	15
BG	8	23	15	12	12	6	25
RO	9	19	17	14	15	10	16

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 4: Internet usage in the last three months 2002 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2002		62	61		64	71	37
2003		66	64	31	71	77	41
2004		70	69	34	76	82	52
2005		73	79	37	77	81	55
2006		77	81	51	83	86	61
2007	55	79	84	58	81	80	67
2008	59	83	87	63	84	88	71
2009	63	82	89	65	86	90	72
2010	67	86	90	67	88	91	74
2011	69	89	91	75	90	93	79
2012	72	90	93	77	92	93	80
2013	73	92	94	78	95	95	81
2014	76	92	93	80	96	93	81
2015	78	92	93	80	96	91	84
2016	80	94	93	82	97	93	84
2017	82	94	95	81	97	96	88
2018	84	94	95	82	98	92	87
2019	86	95	96	90	97	98	88
2020	88	97	94	91	99	97	88
2021	89	97	95	99	99	97	93

Source: Eurostat, European survey on ICT usage in households 2002-2021.

Data table Figure 5:

Information and data literacy skills
Finding information about goods and services *
Seeking health-related information online *
Reading online news sites, newspapers or news magazines *
Activities related to fact-checking online information and its sources **

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 6: Basic and above basic digital skills in information and data literacy in an EU comparison 2021 (in percent)

Country code	Above basic	Basic
IE	87	9
FI	92	3
DK	88	8
NL	89	4
SE	83	9
LU	74	15
EE	81	7
CY	84	4
ES	79	9
CZ	81	6
LV	73	13
HU	80	6
SI	74	11
LT	78	7
BE	70	14
AT	**73**	**11**
MT	79	5
SK	72	11
FR	67	15
PL	70	11
EU-27	**68**	**12**
HR	76	3
PT	71	6
EN	60	17
EL	70	6
IT	58	13
RO	48	17
BG	51	14

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 7: Finding information about goods and services 2002 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2002		45	26		49	62	15
2003		53	29	21	53	64	27
2004		59	33	22	59	59	36
2005		62	70	29	63	70	42
2006		67	73	42	68	74	47
2007	44	68	76	45	68	70	47
2008	48	73	76	46	73	75	51
2009	50	73	79	54	74	77	54
2010	55	74	82	57	78	82	58
2011	55	76	82	53	72	75	62
2012	60	81	83	63	82	83	71
2013	58	79	83	61	82	81	67
2014	62	85	85	68	84	86	69
2015	60	82	84	64	77	73	62
2016	63	85	85	68	86	83	70
2017	64	85	88	70	79	84	63
2018	68	84	89	73	88	83	61
2019	66	87	89	77	85	83	62
2020	70	85	89	72	90	88	67
2021	66	91	91	87	85	83	71

Source: Eurostat, European survey on ICT usage in households 2002-2021.

Data table Figure 8: Seeking health-related information 2003 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2003		32		6	35	21	5
2004		33		6	27	18	6
2005		39	41	10	24	23	16
2006		44	45	8	28	28	24
2007	24	47	45	13	38	25	27
2008	28	51	46	19	36	32	32
2009	32	56	50	24	46	36	36
2010	34	57	50	27	52	40	37
2011	38	58	53	40	54	47	53
2013	44	60	57	38	54	56	49
2015	45	66	61	35	66	52	54
2016	47	65	63	36	65	60	56
2017	50	69	71	37	64	64	54
2018	51	69	72	47	66	62	52
2019	53	76	74	57	67	62	53
2020	56	77	76	60	72	67	56
2021	55	80	77	66	75	68	60

Source: Eurostat, European survey on ICT usage in households 2003-2021. The indicator was not surveyed in 2012 and 2014.

Data table Figure 9: Reading online news sites, newspapers or news magazines 2013 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2013	47	79	56	33	70	80	41
2014	51	78	57	37	71	82	54
2015	53	82	55	38	66	76	57
2016	56	80	70	41	70	81	56
2017	60	84	76	53	83	85	63
2019	62	81	75	67	82	80	58
2020	66	90	82	67	86	84	64
2021	64	90	80	82	85	79	64

Source: Eurostat, European survey on ICT usage in households 2013-2021. The indicator was not surveyed in 2018.

Data table Figure 10: Activities related to fact-checking online information and its sources 2021 (in percent)

Indicator	EU-27	FI	NL	IE	DK	SE	AT
Checking untrue or doubtful content: Internet research for further information	21	33	42	36	22	32	21
Checking untrue or doubtful content: Exchange with other people via the internet	7	21	10	6	4	32	11
Checking untrue or doubtful content: Review without using the Internet	11	25	24	18	10	32	11
Knowing that the online information or sources are not reliable	15	27	14	17	23	15	18

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 11:

Communication and collaboration skills
Sending/receiving emails *
Telephoning/video calls over the internet *
Instant messaging *
Participating in social networks *
Expressing opinions on civic or political issues on websites or in social media *
Taking part in online consultations or voting to define civic or political issues *

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 12: Basic and above basic digital skills in communication and collaboration in an EU comparison 2021 (in percent)

Country code	Above basic	Basic
DK	93	5
IE	92	6
FI	91	5
LU	81	14
NL	93	2
SE	86	8
ES	88	4
AT	**86**	**5**
BE	80	10
CY	87	3
FR	75	14
LV	81	7
EE	78	9
HU	83	4
CZ	78	9
EN	73	14
EU-27	**77**	**9**
SK	76	10
SI	76	10
MT	83	3
LT	76	6
RO	70	12
PT	77	4
IT	76	5
HR	76	4
PL	69	10
EL	70	5
BG	66	7

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 13: Sending/receiving emails 2002 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2002		46	49		54	57	32
2003		55	52	25	61	66	36
2004		62	57	27	65	64	45
2005		63	73	31	69	67	48
2006		67	76	45	74	74	53
2007	46	71	79	48	74	69	54
2008	51	74	82	53	76	78	63
2009	55	75	85	56	81	83	63
2010	59	77	87	58	83	84	66
2012	64	81	89	66	86	86	73
2013	65	83	90	67	88	87	74
2014	67	86	90	67	90	86	73
2015	67	86	90	67	79	83	75
2016	69	85	90	68	93	88	77
2017	70	89	93	69	94	91	78
2018	71	89	92	69	94	86	78
2019	73	90	93	77	94	91	79
2020	75	93	92	78	96	90	79
2021	76	93	92	92	96	90	82

Source: Eurostat, European survey on ICT usage in households 2002-2021. The indicator was not surveyed in 2011.

Data table Figure 14: Telephoning/video calls over the internet 2008 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2008	17	16	18	9	24	16	13
2009	17	16	12	14	33	19	17
2010	18	15	17	17	32	21	16
2011	20	15	38	21	34	27	23
2012	25	21	39	29	40	38	23
2013	24	22	29	26	37	39	21
2014	28	28	32	29	47	49	23
2015	28	27	31	29	44	39	26
2016	30	32	37	35	58	48	27
2017	37	35	44	39	60	56	37
2018	41	44	58	38	67	53	39
2019	52	65	61	46	56	63	41
2020	63	78	83	67	70	73	60
2021	65	71	82	79	73	76	61

Source: Eurostat, European survey on ICT usage in households 2008-2021.

Data table Figure 15: Instant messaging 2019 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2019	65	79	89	70	77	72	77
2020	69	83	90	72	87	77	79
2021	70	84	92	84	88	76	84

Source: Eurostat, European survey on ICT usage in households 2019-2021.

Data table Figure 16: Participation in social networks 2011 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2011	36	45	46	40	55	54	35
2013	41	51	55	48	64	57	37
2014	44	56	59	50	66	65	44
2015	48	58	59	53	65	62	45
2016	49	62	62	58	74	70	49
2017	52	66	67	59	75	71	51
2018	54	67	66	60	79	70	53
2019	54	67	67	64	81	72	56
2020	57	75	71	61	85	73	60
2021	57	75	73	69	85	72	57

Source: Eurostat, European survey on ICT usage in households 2011-2021. The indicator was not surveyed in 2012.

Data table Figure 17: Expressing opinions on civic or political issues on websites or in social media 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2021	14	13	22	21	21	13	14

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 18: Taking part in online consultations or voting to define civic or political issues 2011 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2011	7	12	26	4	12	12	8
2013	8	19	7	3	11	14	11
2015	7	15	7	3	13	12	7
2017	8	13	9	4	14	14	7
2019	10	15	9	7	15	13	9
2021	8	21	11	14	12	7	14

Source: Eurostat, European survey on ICT usage in households 2011-2021. The indicator was not surveyed in 2012, 2014, 2016, 2018 and 2020.

Data table Figure 19:

Digital content creation skills
Using word processing software **
Using spreadsheet software **
Using advanced features of spreadsheet software (e.g. formulas, macros) to organize, analyse, structure or modify data **.
Editing photos, videos or audio files **
Copying or moving documents, images or other files **
Creating files incorporating several elements **
Programming **

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 20: Basic and above basic digital skills for digital content creation in an EU comparison 2021 (in percent)

Country code	Above basic	Basic
NL	65	18
FI	64	19
HR	64	17
LU	55	25
SE	55	22
IE	56	21
FR	55	21
DK	55	21
AT	**56**	**19**
ES	52	21
SK	43	29
MT	49	23
BE	48	19
EE	45	21
SI	40	26
EU-27	**45**	**21**
CZ	44	22
EN	39	25
LV	39	24
EL	41	22
LT	42	19
PT	44	16
CY	43	17
HU	38	21
IT	41	17
PL	37	20
BG	22	21
RO	23	19

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 21: Activities related to digital content creation 2021 (in percent)

Indicator	EU-27	FI	NL	IE	DK	SE	AT
Using word processing software	50	70	71	59	46	67	60
Using spreadsheet software	38	51	54	47	48	45	46
Using advanced features of spreadsheet software (e.g. formulas, macros) to organize, analyse, structure or modify data	21	33	32	26	29	18	26
Editing photos, videos or audio files	33	54	45	45	32	34	46
Copying or moving documents, images or other files	57	71	71	63	64	62	65
Creating files incorporating several elements	38	54	55	51	58	49	49
Programming	6	10	10	8	11	10	10

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 22:

Safety skills
Checking the security of websites **
Reading privacy statements **
Restricting access to own geographical location **
Restricting access to profile or content on social networking sites or shared online storage **
Refusing allowing use of personal data for advertising purposes **
Changing settings in internet browser to prevent or limit cookies **

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 23: Basic and above basic digital skills in safety in an EU comparison in 2021 (in percent)

Country code	Above basic	Basic
FI	66	23
NL	72	16
DK	58	26
IE	56	24
LU	45	34
AT	**52**	**26**
SE	48	30
ES	59	18
CZ	43	31
FR	50	24
MT	52	21
PT	56	16
HR	45	24
EN	39	29
CY	40	29
EE	42	26
EU-27	**44**	**24**
HU	36	31
BE	39	26
SK	31	33
LV	40	23
EL	36	25
IT	36	24
SI	28	30
LT	34	25
PL	34	20
BG	18	31
RO	22	26

Source: Eurostat, European survey on ICT usage in households 2021.

Data table 1 Figure 24: Activities related to internet safety in 2020 and 2021 (in percent)

Indicator	EU-27	FI	NL	IE	DK	SE	AT
Checking the security of web-sites	32	43	62	52	52	32	42
Reading privacy statements	40	51	45	33	36	35	49
Restricting access to own geo-graphical location	44	69	75	38	62	58	57
Restricting access to profile or content on social networking sites or shared online storage	38	57	63	43	49	40	54
Refusing allowing use of per-sonal data for advertising pur-poses	49	70	73	50	63	44	60
Changing settings in internet browser to prevent or limit cookies	32	50	47	30	33	29	37

Source: Eurostat, European survey on ICT usage in households 2020.

Data table 2 Figure 24: Activities related to internet safety in 2020 and 2021 (in percent)

Feature	EU-27	FI	NL	IE	DK	SE	AT
Checking the security of web-sites	32	45	59	48	44	30	44
Reading privacy statements	35	50	41	37	34	32	48
Restricting access to own geo-graphical location	43	64	74	59	62	61	44
Restricting access to profile or content on social networking sites or shared online storage	36	56	58	46	48	42	41
Refusing allowing use of per-sonal data for advertising pur-poses	47	67	72	58	60	48	56
Changing settings in internet browser to prevent or limit cookies	32	54	48	40	39	35	38

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 25: Problem-solving skills

Problem-solving skills
Downloading or installing software or apps **
Change settings of software, app or device **
Buying online *
Selling online *
Attending an online course or using online learning materials *
Using internet banking *
Looking for a job or sending a job application **

Source: Statistics Austria – own illustration. Annually available indicators marked with *, biannually available indicators marked with **

Data table Figure 26: Basic and above basic digital problem-solving skills in an EU comparison in 2021 (in percent)

Country code	Above basic	Basic
DK	81	16
FI	80	16
SE	76	18
NL	83	10
LU	68	25
IE	72	21
FR	64	23
BE	57	30
EE	63	24
LV	54	32
AT	**62**	**23**
ES	63	22
CZ	51	34
EN	44	38
SI	53	27
SK	52	29
MT	61	19
EU-27	**53**	**27**
LT	53	25
HU	49	28
CY	50	25
PL	45	28
HR	51	20
IT	47	22
PT	42	27
EL	40	27
RO	18	33
BG	20	28

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 27: Selected software activities 2021 (in percent)

Indicator	EU-27	FI	NL	IE	DK	SE	AT
Downloading or installing software or apps	49	70	71	60	65	65	55
Changing settings of software, app or device	36	60	60	46	53	49	45

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 28: Buying online 2004 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2004		33	24	14	42	43	19
2005		38	43	19	48	50	25
2006		44	48	28	55	55	32
2007	27	48	55	33	56	53	36
2008	29	51	56	36	59	53	37
2009	32	54	63	37	64	63	41
2010	36	59	67	36	68	66	42
2011	39	62	69	43	70	71	44
2012	41	65	65	46	73	74	48
2013	43	65	69	46	77	73	54
2014	46	68	71	50	78	75	53
2015	49	69	71	51	79	71	58
2016	51	67	74	59	82	76	58
2017	54	71	79	53	80	81	62
2018	56	70	80	59	84	78	60
2019	60	73	81	67	84	82	62
2020	65	76	87	74	89	84	66
2021	67	79	89	87	91	87	63

Source: Eurostat, European survey on ICT usage in households 2004-2021.

Data table Figure 29: Selling online 2002 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2002		5			3	4	1
2003		5		1	6	5	2
2004		8		1	5	6	4
2005		9	14	1	5	10	4
2006		14	18	4	17	14	8
2007	9	13	20	3	22	13	7
2008	9	14	23	3	19	15	7
2009	9	13	18	5	25	16	5
2010	12	15	24	5	28	19	8
2011	15	16	26	13	25	19	14
2012	15	19	20	13	24	14	12
2013	18	17	48	12	24	14	12
2014	17	22	29	11	26	14	11
2015	18	23	28	11	37	18	10
2016	17	21	34	11	35	18	11
2017	18	24	37	18	29	22	13
2018	18	27	35	24	30	25	14
2019	18	32	36	19	28		12
2020	19	29	37	7	31	28	15
2021	18	31	43	15	34	27	28

Source: Eurostat, European survey on ICT usage in households 2002-2021.

Data table Figure 30: Attending an online course or using online learning materials 2017 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2017	16	30	20	11	18	36	18
2019	18	35	23	24	28	38	21
2020	23	40	30	27	43	38	25
2021	28	45	44	46	41	45	33

Source: Eurostat, European survey on ICT usage in households 2017-2021. The indicator was not surveyed in 2018.

Data table Figure 31: Internet banking 2003 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2003		43		8	38	38	13
2004		50		10	45	40	18
2005		56	50	13	49	51	22
2006		63	59	21	57	57	27
2007	24	66	65	25	57	57	30
2008	28	72	69	28	61	65	34
2009	31	72	73	30	66	71	35
2010	34	76	77	34	71	75	38
2011	36	79	79	33	75	78	44
2012	38	82	80	43	79	79	45
2013	40	84	82	46	82	82	49
2014	42	86	83	48	84	82	48
2015	44	86	85	51	85	80	51
2016	46	86	85	52	88	83	53
2017	49	87	89	58	90	86	57
2018	51	89	89	58	89	84	58
2019	55	91	91	67	91	84	63
2020	58	92	89	69	94	85	66
2021	58	93	91	77	95	84	71

Source: Eurostat, European survey on ICT usage in households 2003-2021.

Data table Figure 32: Looking for a job or sending a job application 2004 to 2021 (in percent)

Year	EU-27	FI	NL	IE	DK	SE	AT
2004		22		3	16	16	4
2005		24	16	2	19	23	6
2006		26	19	6	20	24	9
2007	11	26	19	7	26	18	8
2008	12	26	17	9	23	22	9
2009	13	24	17	14	27	22	10
2010	14	27	19	14	29	25	11
2011	15	27	19	20	27	26	21
2013	16	27	21	17	22	29	18
2015	16	27	24	14	36	26	13
2017	16	29	25	12	24	27	12
2019	16	32	25	17	37	30	11
2021	13	34	22	21	36	28	12

Source: Eurostat, European survey on ICT usage in households 2004-2021. The indicator was not surveyed in 2012, 2014, 2016, 2018 and 2020.

Data table Figure 33: Basic and above basic digital skills by competence area in Austria and the EU-27 average 2021 (in percent)

Competence area (DSI)	AT	EU-27
IL	84	80
CC	91	86
DCC	75	66
SF	78	68
PS	85	79

Source: Eurostat, European survey on ICT usage in households 2021. DSI = Digital Skills Indicator. IL = Information and data literacy, CC = Communication and collaboration, DCC = Digital content creation, SF = Safety, PS = Problem solving.

Data table Figure 34: Basic and above basic digital skills of people at low skill levels by competence area in Austria 2021 (in percent)

Skill level (DSI)	IL	CC	DCC	SF	PS
Low knowledge (LOW)	86	99	59	64	92
Narrow knowledge (NARROW)	75	95	22	39	68
Limited knowledge (LIMITED)	34	89	7	25	44
NO SKILLS	6	58	0	7	2

Source: Statistics Austria, Survey on ICT usage in households 2021. DSI = Digital Skills Indicator. IL = Information and data literacy, CC = Communication and collaboration, DCC = Digital content creation, SF = Safety, PS = Problem solving.

Data table Figure 35: Basic and above basic digital skills by gender in Austria and the EU-27 average 2021 (in percent)

Gender	AT	EU-27
Men	66	56
Women	61	52

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 36: Basic and above basic digital skills by age in Austria and the EU-27 average in 2021 (in percent)

Age	AT	EU-27
16-24 years	79	71
25-34 years	73	69
35-44 years	70	64
45-54 years	68	55
55-64 years	53	42
65-74 years	35	25

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 37: Basic and above basic digital skills by age and gender in Austria in 2021 (in percent)

Age	Men	Women
16-24 years	77	81
25-34 years	73	73
35-44 years	69	71
45-54 years	72	64
55-64 years	53	52
65-74 years	47	24

Source: Statistics Austria, Survey on ICT usage in households 2021.

Data table Figure 38: Basic and above basic digital skills by education (national) in Austria 2021 (in percent)

Education	AT
Compulsory schooling	40
Apprenticeship/School for intermediate vocational education	53
Qualification for university entrance	81
University	86

Source: Statistics Austria, Survey on ICT usage in households 2021.

Data table Figure 39: Basic and above basic digital skills by education (international) in Austria and the EU-27 average 2021 (in percent)

Education	AT	EU-27
ISCED 0-2	37	32
ISCED 3-4	57	50
ISCED 5-8	84	79

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 40: Basic and above basic digital skills by employment status in Austria 2021 (in percent)

Employment status	AT	EU-27
Employees, self-employed	71	63
Unemployed	65	49
Not in the labour force	39	29
Students	82	77

Source: Eurostat, European survey on ICT usage in households 2021.

Data table Figure 41: Basic and above basic digital skills by degree of urbanisation in Austria 2021 (in percent)

Degree of urbanisation	AT	EU-27
Cities	71	61
Towns and suburbs	61	52
Rural areas	59	46

Source: Eurostat, European survey on ICT usage in households 2021.