

Towards Digital Decade targets for Europe

Statistics Explained

Data extracted in September 2023

Planned article update: September 2024

" In 2021, 54% of EU citizens aged 16-74 had at least basic overall digital skills, 26 percentage points below the 2030 target set in the Digital Compass. "

" In 2022, 9.4 million people were employed in ICT specialist occupations in the EU, over 10 million short of the 2030 goal set in the Digital Compass. "

" In 2022, 69 % of EU small and medium-sized enterprises reached basic digital intensity, 21 percentage points shy of the ambition set in the Digital Compass for 2030. "

Digital technologies have pervaded almost all spheres of people's lives. They transform business models, jobs and production, and stimulate growth and innovation. The COVID-19 pandemic has increased the digital transformation even further, highlighting its potential for society and the economy: supporting employment, health and education, improving the economic resilience of businesses, and contributing to sustainability. Digital transformation is high on the European policy agenda, being one of the [European Commission](#)'s main political priorities for the coming years. On 9 March 2021, the Commission presented the [Digital Decade](#) Communication, which sets a vision and targets for a successful digital transformation of Europe by 2030. The Commission proposed a Digital Compass, which sets out concrete targets for achieving the EU's digital ambitions, evolving around four cardinal points: skills, digital transformation of businesses, secure and sustainable digital infrastructures and digitalisation of public services. Progress towards these 2030 targets is measured by a monitoring system based on the [Digital Economy and Society Index \(DESI\)](#). This article presents the results of two surveys: one on ICT (information and communication technologies) usage and e-commerce in enterprises and one on the use of ICT in households and by individuals, which among others, largely feed into DESI. Additionally, data on broadband internet coverage comes from the Broadband Coverage in Europe study, based on a survey of national regulatory authorities and operators.

Digitally skilled citizens and professionals

The ambitions set for the area of skills in the Digital Compass are that, by 2030, at least 80 % of all adults should have at least basic digital skills, and that there should be 20 million employed ICT specialists in the EU, with increased women's participation.

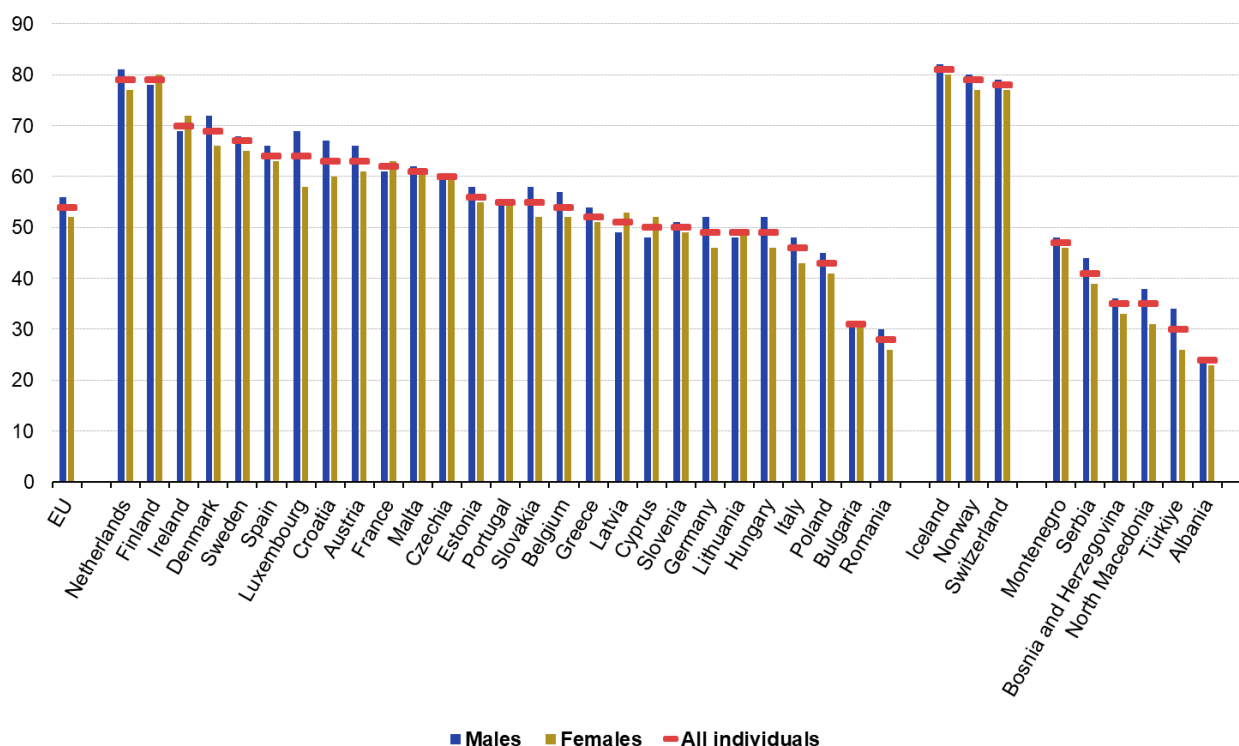
In 2021, 54 % of EU citizens aged 16-74 had at least basic overall digital skills.

Digital literacy is crucial for people to benefit from the ongoing digital transformation and the vast variety of services available online, thus preventing them from being digitally excluded. Having digital skills is also critical to protect oneself from cyber threats stemming from the increasingly digitalised world.

The digital skills indicator (DSI) is a composite indicator covering five areas: information and data literacy skills; communication and collaboration skills; digital content creation skills; safety skills; and problem-solving skills. These reflect the five competence areas of the revised [Digital Competence Framework \(DIGCOMP 2.0\)](#). It is assumed that individuals who have performed certain activities have the corresponding skills, hence the indicator can be considered as a proxy of individuals' digital skills. To have at least basic overall digital skills (derived as a sum of basic and above basic levels), people must know how to do at least one activity related to each area. For more information on DSI levels and the types of activities related to each skill, consult the [metadata file](#).

In 2021, 54 % of people aged 16-74 in the EU had at least basic overall digital skills, 26 percentage points (pp) below the 2030 target set in the Digital Compass. The highest proportions of people aged 16-74 who had at least basic overall digital skills were found in the Netherlands and Finland (both 79 %), followed by Ireland (70 %), Denmark (69 %) and Sweden (67 %). On the other hand, the lowest were recorded in Romania (28 %) and Bulgaria (31 %). In most Member States, the shares of people with at least basic digital skills were higher among men than among women, with Luxembourg recording the highest difference of 11 pp. In 6 Member States, the situation was reversed, with higher shares of women with at least basic digital skills, with the biggest difference in Latvia and Cyprus (4 pp in both) (Figure 1).

Individuals with at least basic overall digital skills, by sex, 2021 (% of individuals aged 16-74)



Source: Eurostat (online data code: isoc_sk_dskl_i21)

eurostat

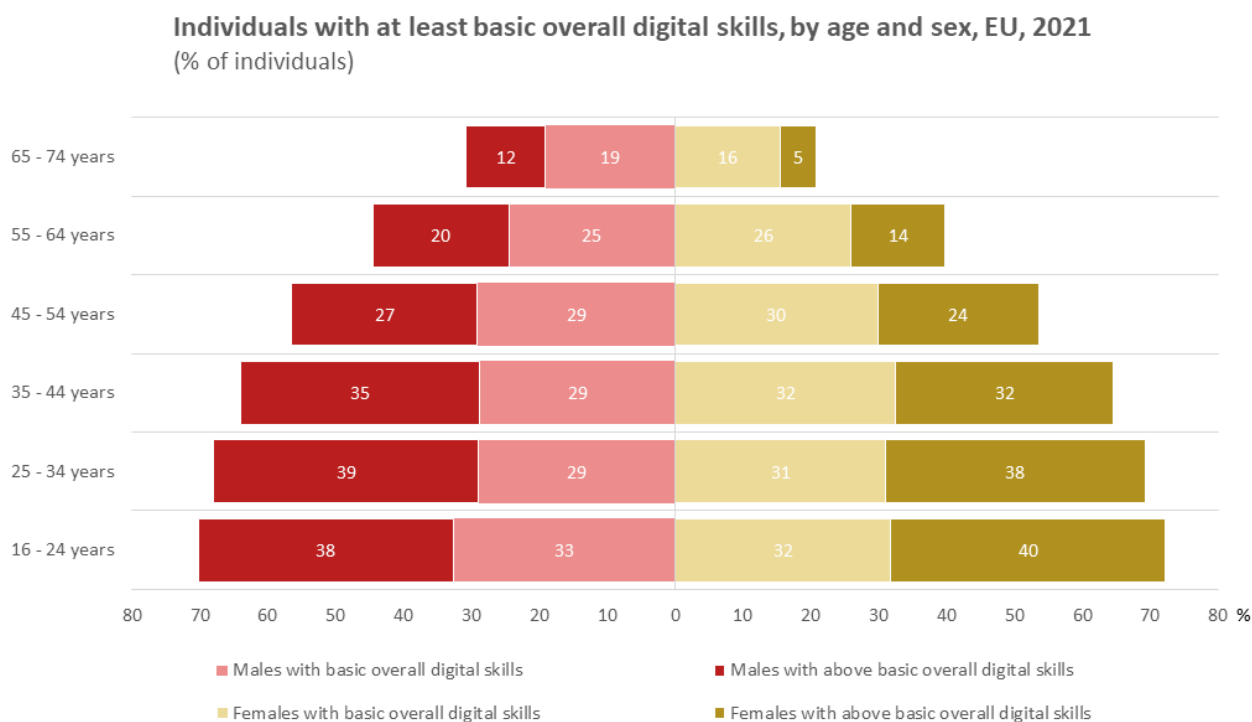
Figure 1: Individuals with at least basic overall digital skills, by sex, 2021 (% of individuals aged 16-74)
Source: Eurostat (isoc_sk_dskl_i21)

In 2021, in the EU, 52 % of women and 56 % of men demonstrated at least basic digital skills. The level of digital skills varies not only by gender, but also among different age groups. The highest shares of people with at least basic digital skills were recorded in younger age groups for both women and men, in particular among 16-24-year-olds, with 72 % of women and 70 % of men of this age having at least basic digital skills. Slightly lower proportions were recorded for 25-34-year-olds, where 69 % of women and 68 % of men demonstrated basic or above basic digital skills. The lowest shares were observed among 65–74-year-olds, where 31 % of men and 21 % of women had at least basic digital skills.

Interestingly, the biggest gender gap is visible in the older age groups, where among 65-74-year-olds the share of women with at least basic digital skills was 10 pp points lower than among men in this age group. However, the younger the age group, the smaller the gender gap, with almost no difference between men and women of the youngest generation. Moreover, in the younger age groups – below 45 years of age – the proportions of people with

at least basic digital skills were higher among women than among men. Among people aged 45 or more, the situation is reversed and the shares are higher among men.

Looking even more in detail at the level of digital skills, there are also some differences in the proportions of people with basic or above basic digital skills. Among women aged 34 or less, more than half of those with at least basic digital skills had above basic digital skills, with the highest share of women in the youngest age group – 40 %. Among men, the share of people with above basic digital skills was higher than the share of people with basic digital skills in age groups younger than 45. The highest share of men with above basic digital skills was in the age group 25-34 (Figure 2).



Source: Eurostat (online data code: isoc_sk_dskl_i21)

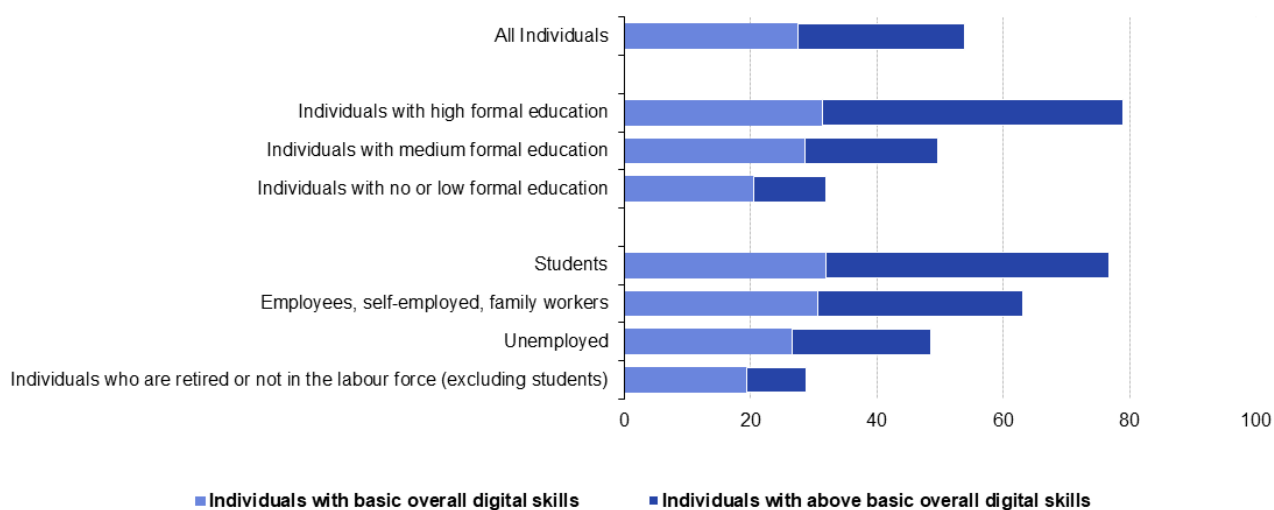


Figure 2: Individuals with at least basic overall digital skills, by age and sex, EU, 2021 (% of individuals)
Source: Eurostat (isoc_sk_dskl_i21)

In 2021, 54 % of EU citizens had at least basic digital skills, with 27 % of people aged 16-74 having basic overall digital skills and 26 % demonstrating above basic overall digital skills. Among people with different levels of education, the higher the level of education attained, the higher the share of people with at least basic overall digital skills. The highest share was among individuals with higher education (79 %), with 31 % having basic and 48 % having above basic overall digital skills. The proportions of people with at least basic overall digital skills also varied quite significantly depending on their status in the labour market. Students and working people (employees, self-employed, family workers) were the groups with the highest shares (77 % and 63 % respectively). Among unemployed people, and those retired or not active in the labour force (excluding students), the shares of people with at least basic digital skills were lower (49 % and 29 % respectively) (Figure 3).

Individuals with at least basic overall digital skills, by education attainment level and by status in labour market, EU, 2021

(% of individuals aged 16-74)



Source: Eurostat (online data code: isoc_sk_dskl_i21)

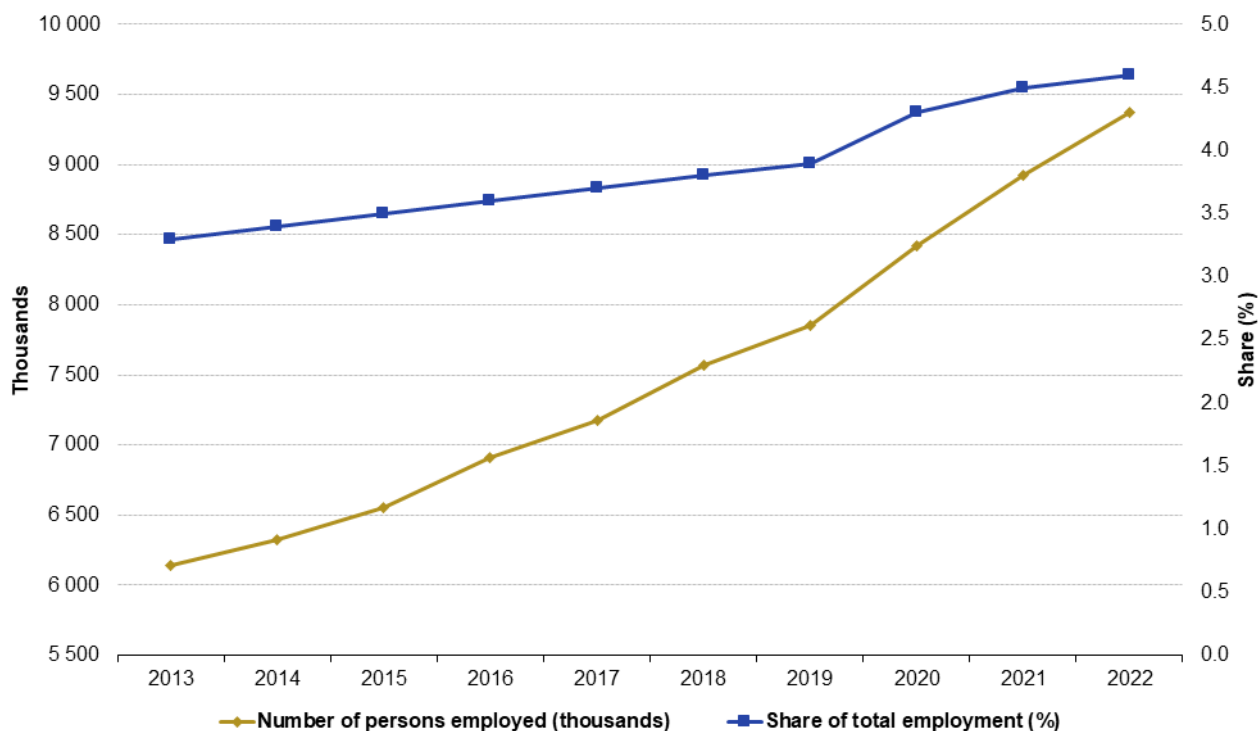
eurostat

Figure 3: Individuals with at least basic overall digital skills, by education attainment level and by status in labour market, EU, 2021 (% of individuals aged 16-74) Source: Eurostat (isoc_sk_dskl_i21)

In 2022, more than 9 million people worked as ICT specialists across the EU.

The number of people employed as ICT specialists in the EU has been steadily increasing over recent years, with their share in total employment growing as well. In 2022, 9.4 million people were employed in ICT specialist occupations in the EU, a little over 10.6 million below the 2030 goal set for the EU in the Digital Compass. In 2022, ICT specialists constituted 4.6 % of the EU's total employed (Figure 4).

ICT specialists in employment, EU, 2013 - 2022



Note: Data for the EU aggregates are estimated by Eurostat.

Break in series: 2021.

Source: Eurostat (online data code: isoc_sks_itspt)

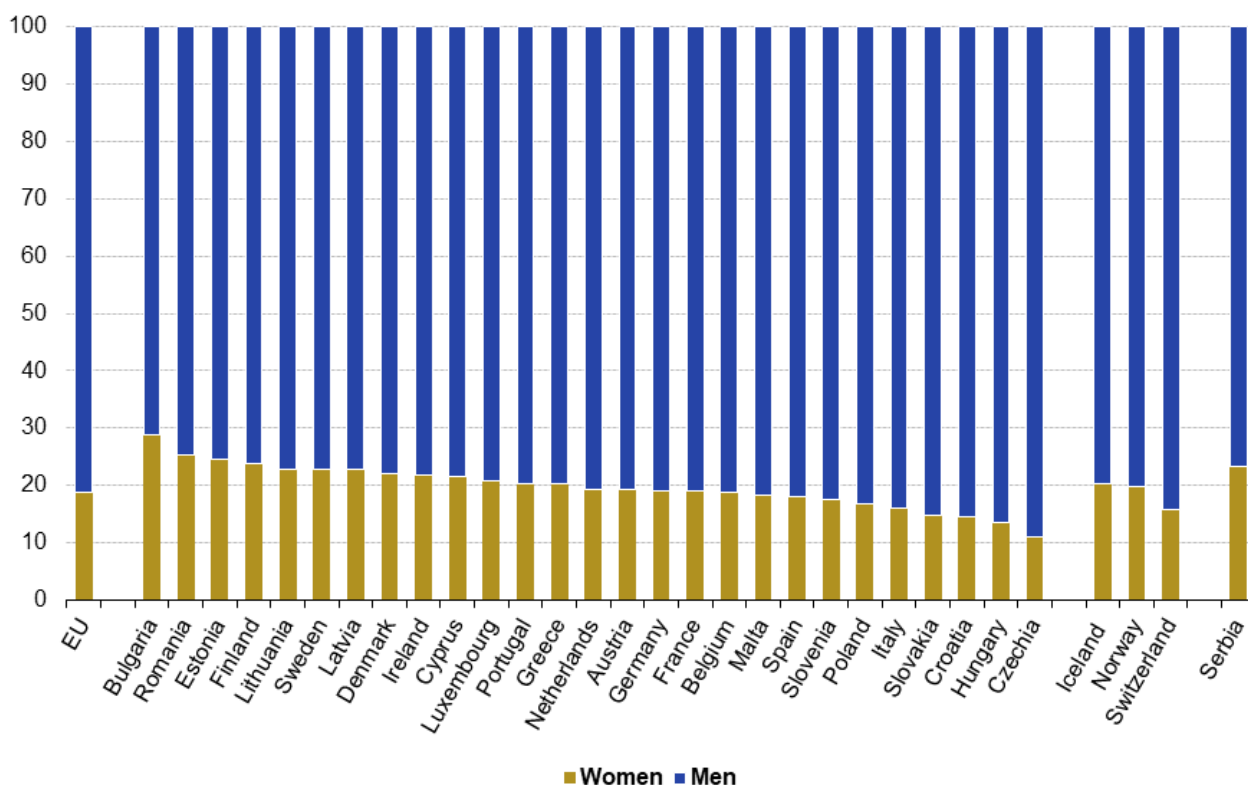
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Figure 4: ICT specialists in employment, EU, 2013-2022 Source: Eurostat (isoc_sks_itspt)

In 2022, most people employed as ICT specialists in the EU were men, with women accounting for only 18.9 % of ICT employment. The highest shares of women in total ICT employment were recorded in Bulgaria (28.9 %), Romania (25.2 %) and Estonia (24.5 %). With the lowest share, Czechia had 10.9 % of women among people employed in ICT occupations (Figure 5).

Distribution of ICT specialists by sex, 2022

(%)



Note: Details on ICT specialists data broken down by sex and estimated by Eurostat are available on Eurobase: for country notes, see source dataset. Definitions differ in Spain and France: see the source data metadata (Labour Force survey) for more details.

Source: Eurostat (online data code: isoc_sks_itsps)

eurostat

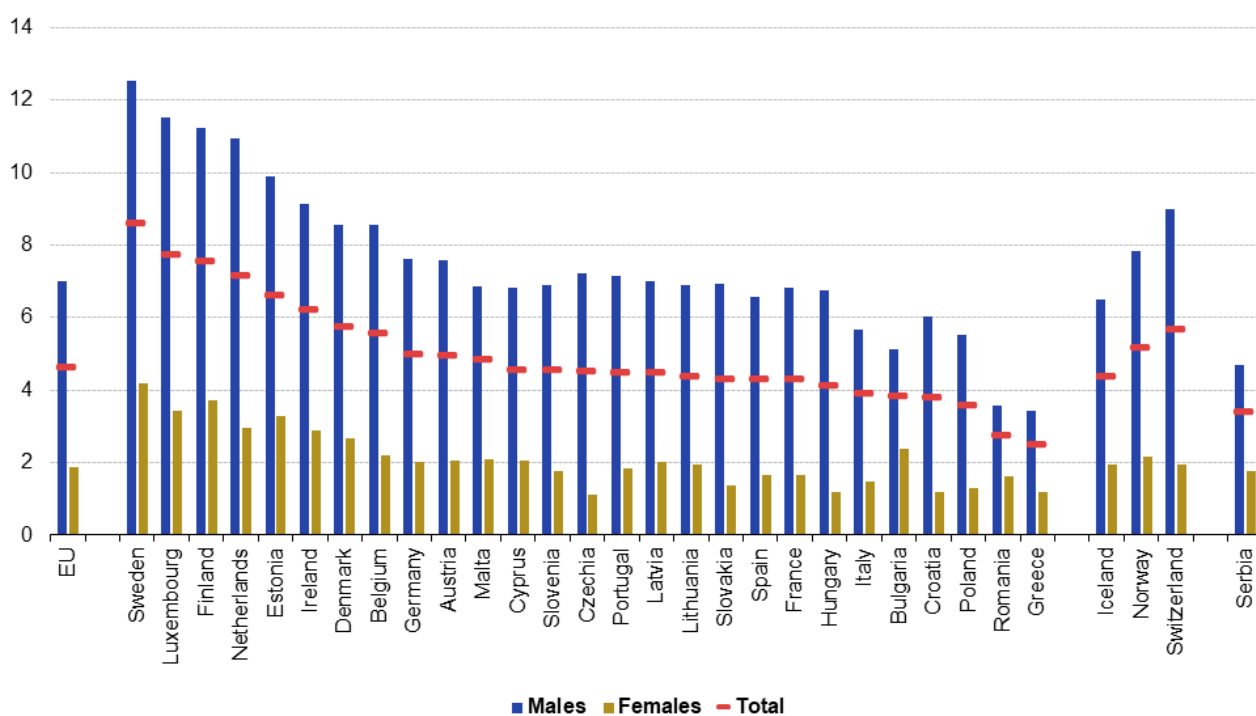
Figure 5: Distribution of ICT specialists by sex, 2022 Source: Eurostat (isoc_sks_itspt)

In 2022, the highest share in the EU of employed ICT specialists in the total employment was recorded in Sweden (8.6 %), followed by Luxembourg (7.7 %), Finland (7.6 %) and the Netherlands (7.2 %). The lowest proportions of people employed in ICT occupations in total employment were in Greece (2.5 %) and Romania (2.8 %).

Employment in ICT occupations in the total employment was much lower among women (1.9 %) than among men (7.0 %). There are significant disparities in male and female ICT specialists' participation in total employment across all the EU. The biggest differences between the shares of men and women employed in ICT occupations were in Sweden (8.3 pp), Luxembourg (8.1 pp), the Netherlands (8.0 pp) and Finland (7.5 pp). The smallest differences in the shares of male and female ICT specialists in employment were in Romania (1.9 pp), Greece (2.2 pp) and Bulgaria (2.8 pp) (Figure 6).

ICT specialists in employment, by sex, 2022

(% of total employment)



Source: Eurostat (online data code: isoc_sks_itspt, isoc_sks_itsps, ifsa_egam)

eurostat

Figure 6: ICT specialists in employment, by sex, 2022 (% of total employment) Source: Eurostat (isoc_sks_itspt), (isoc_sks_itsps) and (ifsa_egam)

Digital transformation of businesses

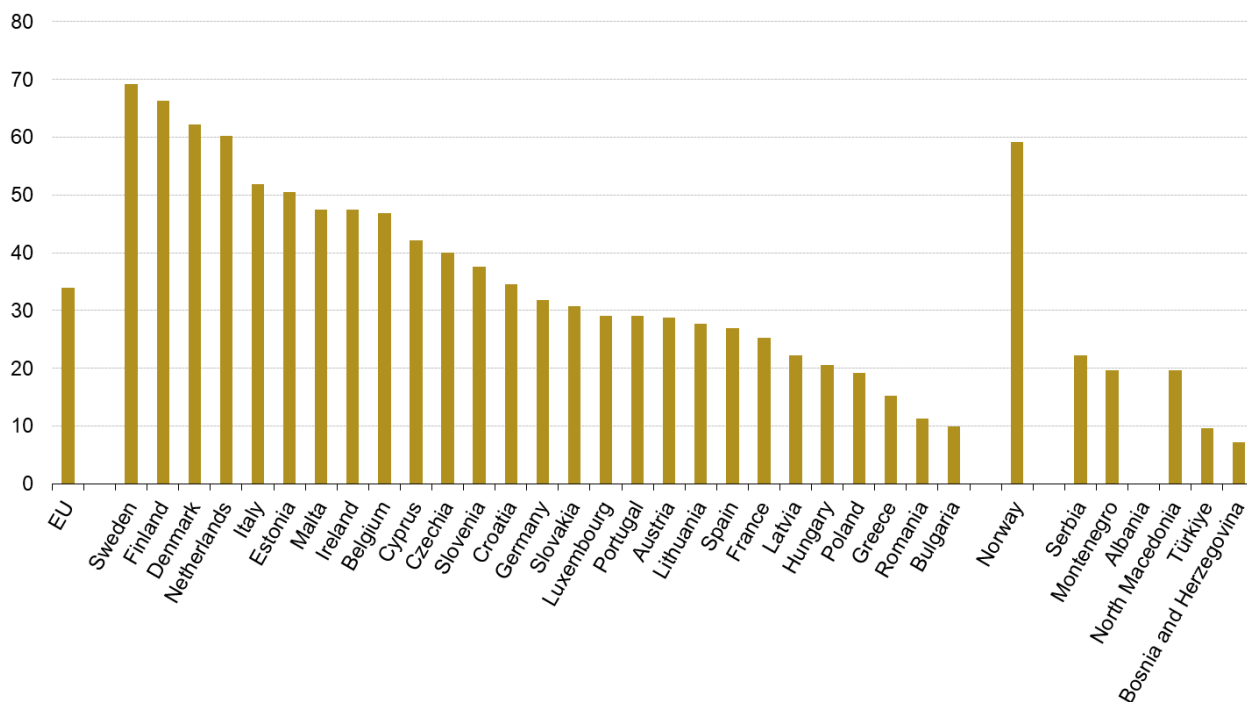
The Digital Compass sets goals for the EU's digital transformation of businesses. By 2030, three out of four EU companies should use cloud computing services, big data or artificial intelligence, and more than 90 % of small and medium-sized enterprises (SMEs) should reach at least a basic level of digital intensity.

In 2021, 34 % of EU businesses used sophisticated or intermediate cloud computing services.

Cloud computing gives businesses an opportunity to access computing resources hosted by third parties on the internet (the cloud), instead of building or expanding their own IT infrastructure, which would include hardware and involve developing and maintaining software applications and databases. In technological terms, cloud computing is a model for providing businesses with ubiquitous, flexible, on-demand access over the internet to a pool of configurable computing resources, including servers, databases, software applications, storage capacity and computing power.

In 2021, 34 % of enterprises in the EU reported that they bought sophisticated or intermediate cloud computing services (i.e. at least one of the following: finance or accounting software applications; enterprise resource planning (ERP) software applications; customer relationship management (CRM) software applications; security software applications; hosting the enterprise's database(s); computing platform providing a hosted environment for application development, testing or deployment). The highest shares of sophisticated or intermediate cloud services users among businesses were in Sweden (69 %) and Finland (66 %), followed by Denmark (62 %) and the Netherlands (60 %). In 14 Member States, the shares of enterprises using sophisticated or intermediate cloud computing were below the EU average, with the lowest proportions recorded in Bulgaria (10 %) and Romania (11 %) (Figure 7).

Enterprises using sophisticated or intermediate cloud computing services, 2021 (% of enterprises)



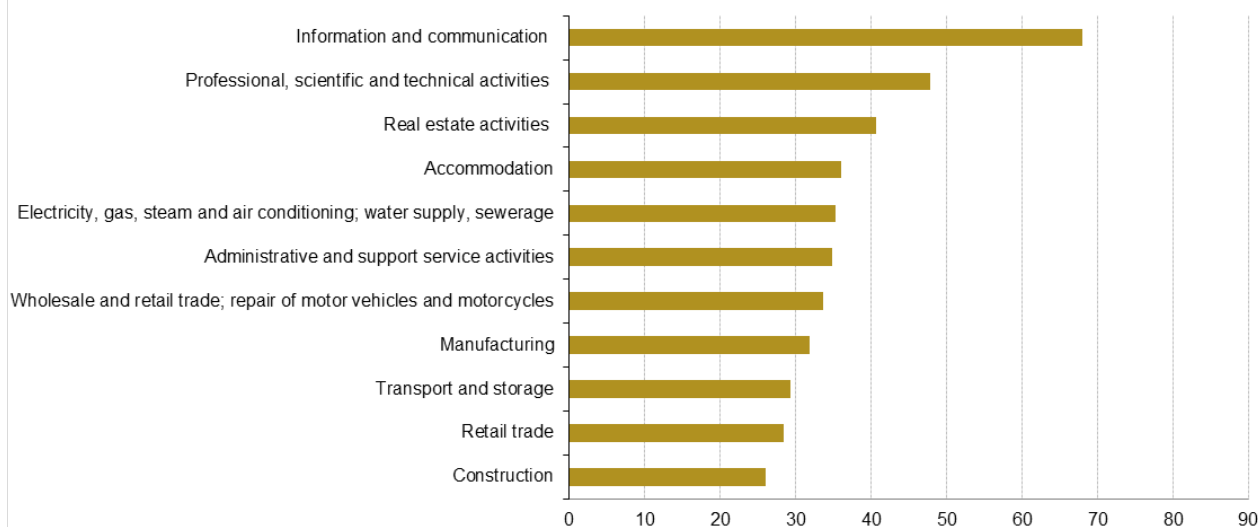
Source: Eurostat (online data code: isoc_cicce_use)

eurostat 

Figure 7: Enterprises using sophisticated or intermediate cloud computing services, 2021 (% of enterprises)
Source: Eurostat (isoc_cicce_use)

The uptake of cloud computing services varies significantly among different economic activities, to a large extent determined by their need of such technologies. Information and communication stood out with the highest uptake of sophisticated or intermediate cloud services, with 68 % of the EU businesses active in this economic activity using them in 2021, followed by businesses in professional, scientific and technical activities (48 %). The lowest uptake of the sophisticated or intermediate cloud services was among enterprises active in construction (26 %), retail trade (28 %) and transport and storage (29 %) (Figure 8).

Enterprises using sophisticated or intermediate cloud computing services, by economic activity, EU, 2021
(% of enterprises)



Source: Eurostat (online data code: isoc_cicce_usen2)

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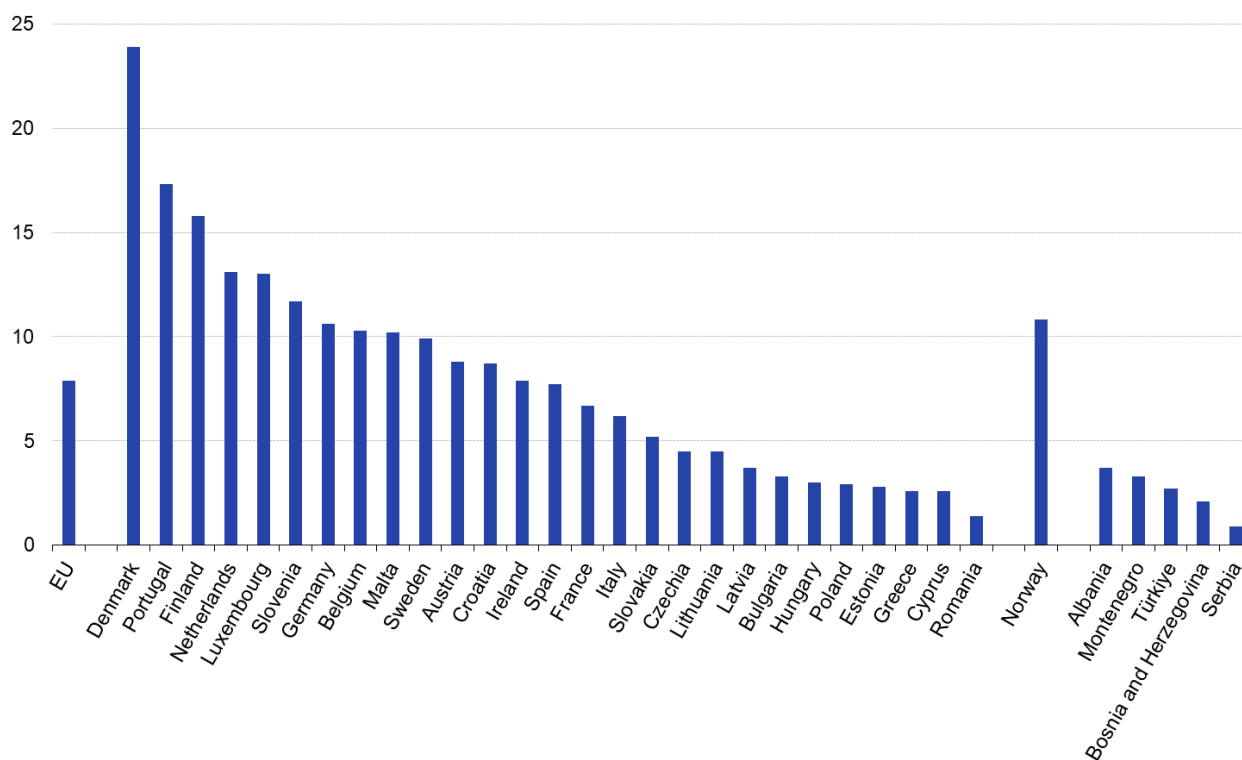
Figure 8: Enterprises using sophisticated or intermediate cloud computing services, by economic activity, EU, 2021 (% enterprises) Source: Eurostat (isoc_cicce_usen2)

In 2021, 8 % of EU enterprises used artificial intelligence technologies.

Artificial intelligence (AI) can bring many benefits to businesses, such as improved decision-making, productivity or efficiency gains, and optimised and more sustainable energy or resource management. AI systems can be software-based (e.g. image recognition software, virtual assistants, speech and face recognition systems) or embedded in devices (e.g. autonomous robots, self-driving vehicles, drones).

In 2021, 8 % of EU enterprises used at least one AI technology - of text mining, speech recognition, natural language generation, image recognition or processing, machine learning (incl. deep learning) for data analysis, technologies automating different workflows or assisting in decision-making (AI based software robotic process automation), technologies enabling machines to physically move by observing their surroundings and taking autonomous decisions. The highest share of enterprises using AI was recorded in Denmark (24 %), followed by Portugal (17 %) and Finland (16 %), while the lowest shares were recorded in Romania (1 %) and Cyprus, Greece, Estonia, Poland, Hungary and Bulgaria (all 3 %) (Figure 9).

Enterprises using AI technologies, 2021 (% of enterprises)



Note: North Macedonia: data confidential
Source: Eurostat (online data code: isoc_eb_ai)

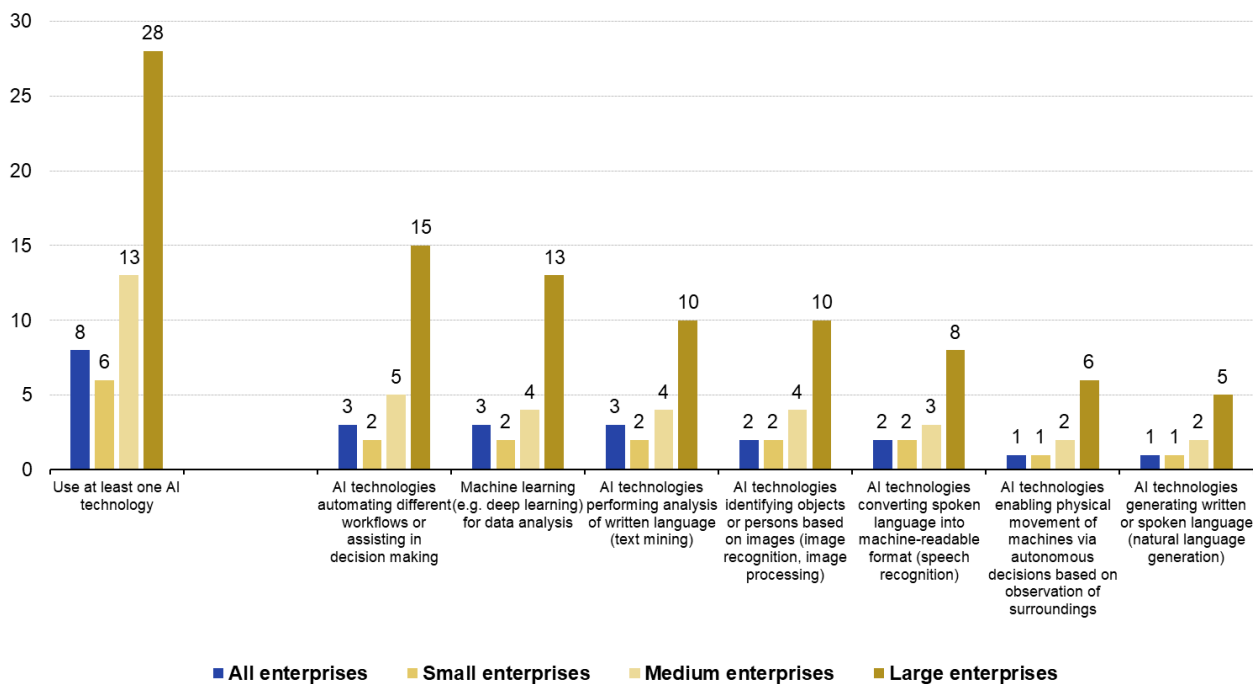
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Figure 9: Enterprises using AI technologies, 2021 (% enterprises) Source: Eurostat ((isoc_eb_ai)

The uptake of AI varied significantly depending on the size class of businesses. The highest share of AI users was recorded among large enterprises (28 %), followed by medium-sized enterprises (13 %) and small ones (6 %).

In 2021, the most commonly used AI technologies were technologies automating various workflows or assisting in decision-making (AI-based software robotic process automation), machine learning for data analysis, and technologies analysing written language (i.e. text mining): each was used by 3 % of enterprises. AI technologies identifying objects or persons based on images (image recognition, image processing) and technologies converting spoken language into a machine-readable format (speech recognition) were each used by 2 % of businesses. Technologies enabling machines to physically move by observing their surroundings and taking autonomous decisions (e.g. self-driving vehicles) and technologies generating written or spoken language (natural language generation) were each used by 1 % of businesses. The different AI technologies were all used much more by large enterprises rather than medium-sized or small ones (Figure 10).

Enterprises using AI technologies, by type of AI technology and enterprise size class, EU, 2021 (% of enterprises)



Source: Eurostat (online data code: isoc_eb_ai)

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Figure 10: Enterprises using AI technologies, by type of AI technology and enterprise size class, EU, 2021 (% enterprises) Source: Eurostat (isoc_eb_ai)

During 2019, 14 % of EU enterprises analysed big data internally or externally.

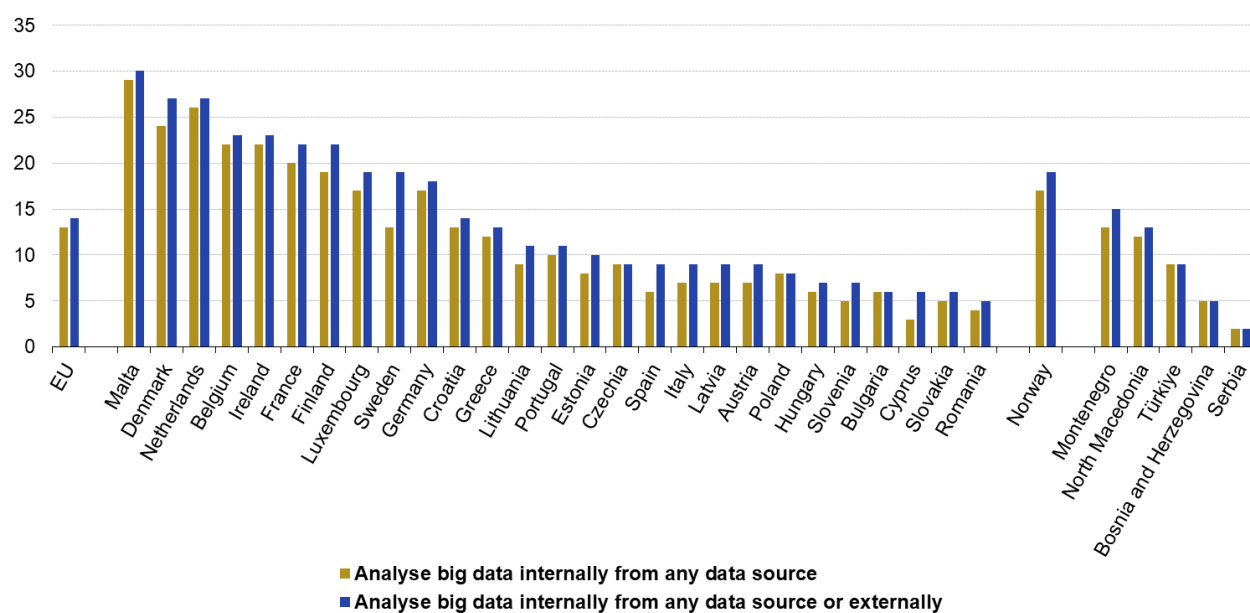
Nowadays, the multiple business applications, IoT devices or systems, and e-commerce or omnichannel strategies in marketing propel the increasingly data-intensive business environments. Businesses may benefit greatly from analysing big sets of various data existing in either their own systems or other data sources, for instance by gaining better customer insights, improving business operations, strengthening their supply chain management or increasing innovation.

In 2020, 14 % of enterprises in the EU reported that, in 2019, they had performed big data analysis (from any data source) or had had another enterprise or organisation perform big data analysis for them. The highest shares of businesses trying to benefit from analysing big data were recorded in Malta (30 %), Denmark and the Netherlands (both 27 %). The lowest proportions of businesses analysing big data internally or externally were in Romania (5 %) and Slovakia, Cyprus and Bulgaria (all 6 %).

Among EU enterprises, 13 % engaged in analysing big data performed by their own employees. The highest shares of enterprises analysing big data internally were in Malta (29 %), followed by the Netherlands (26 %) and Denmark (24 %). The lowest percentages were recorded in Cyprus (3 %), Romania (4 %), Slovakia and Slovenia (both 5 %) (Figure 11).

Enterprises using big data analysis, 2019

(% of enterprises)



Source: Eurostat (online data code: isoc_eb_bd)

eurostat

Figure 11: Enterprises using big data analysis, 2019 (% enterprises) Source: Eurostat (isoc_eb_bd)

In 2019, the most used data sources for performing big data analysis by businesses were geolocation data from the use of portable devices (e.g. portable devices using mobile telephone networks, wireless connections or GPS) and data generated from social media (e.g. social networks, blogs, multimedia content-sharing websites), both of which were used by 7 % of EU businesses. Some 3 % of EU enterprises in the EU used data from smart devices or sensors (e.g. machine-to-machine (M2M) communications, digital sensors, and radio frequency identification tags) and 3 % used other data sources for performing big data analysis.

The big data generated from social media was most often analysed by enterprises in Malta (18 %), the Netherlands (16 %), Denmark (15 %) and Ireland (14 %). The highest shares of businesses analysing big data from geolocation of portable devices were recorded in France (12 %), Malta, the Netherlands (both 11 %), Belgium, Germany and Luxembourg (all 10 %). The highest proportions of businesses performing analysis on big data from smart devices or sensors were recorded in Malta, Finland (both 9 %) and the Netherlands (8 %) (Table 1).

Enterprises analysing big data internally, by data source, 2019
(% of enterprises)

	Analyse big data from smart devices or sensors	Analyse big data from geolocation of portable devices	Analyse big data generated from social media	Analyse big data from other sources
EU	3	7	7	3
Belgium	7	10	12	5
Bulgaria	2	4	2	2
Czechia	2	5	3	4
Denmark	7	9	15	9
Germany	3	10	9	2
Estonia	5	4	5	4
Ireland	6	9	14	6
Greece	: (u)	: (u)	: (u)	: (u)
Spain	2	3	3	2
France	4	12	9	2
Croatia	5	4	7	5
Italy	2	3	3	2
Cyprus	2	1	1	2
Latvia	2	4	4	3
Lithuania	3	5	4	3
Luxembourg	3	10	9	3
Hungary	3	3	3	2
Malta	9	11	18	10
Netherlands	8	11	16	8
Austria	3	3	4	3
Poland	2	4	4	3
Portugal	3	5	7	4
Romania	1	2	2	1
Slovenia	3	2	1	1
Slovakia	2	3	3	2
Finland	9	8	10	7
Sweden	4	7	8	5
Norway	6	6	10	5
Bosnia and Herzegovina	2	3	3	2
Montenegro	6	6	4	4
North Macedonia	: (c)	5	7	4
Serbia	1	1	1	1
Türkiye	4	5	6	3

: (u) - data unreliable and not available.

: (c) - confidential data

Source: Eurostat (online data code: isoc_eb_bd)

Table 1: Enterprises analysing big data internally, by data source, 2019 (% enterprises) Source: Eurostat (isoc_eb_bd)

In 2022, 69 % of small and medium-sized enterprises reached basic digital intensity.

The uptake of digital technologies by businesses has the potential to improve services and products, and to increase competitiveness. The crisis caused by COVID-19 has also shown that digitalisation is crucial for improving the economic resilience of businesses.

The level of digitalisation of EU businesses is measured by the Digital Intensity Index (DII). The DII measures the use of different digital technologies by businesses. Its score (0-12) is determined by how many of the 12 selected digital technologies are used by businesses. The higher the score, the higher the digital intensity of the business, ranging from very low (0-3 technologies used), through low (4-6), high (7-9) to very high (10-12).

According to one of the targets of the EU's vision for the decade of the digital transformation, more than 90 % of EU small and medium-sized enterprises (SMEs) should reach at least a basic level of digital intensity by 2030. Basic

level entails the use of at least four of the selected technologies, which means it includes businesses with low, high and very high DII.

In 2022, 69 % of EU SMEs reached a basic level of digital intensity, 21 pp shy of the ambition set in the Digital Compass for 2030. Majority of SMEs had a low level of digitalisation, with 31 % scoring a very low level of DII and 38 % a low level of DII.

Among all EU businesses, 70 % reached a basic level of digital intensity. The level of DII varied significantly among enterprises of different size classes, with 97 % among large enterprises, compared to 88 % among medium-sized and 66 % among small enterprises. Large enterprises stood out with the highest share for very high digital intensity (30 %) compared with enterprises in other size classes – 10 % among medium-sized enterprises and 2 % among small ones. Large enterprises had also the smallest share of businesses with the very low level of digital intensity (3 %) (Figure 12).

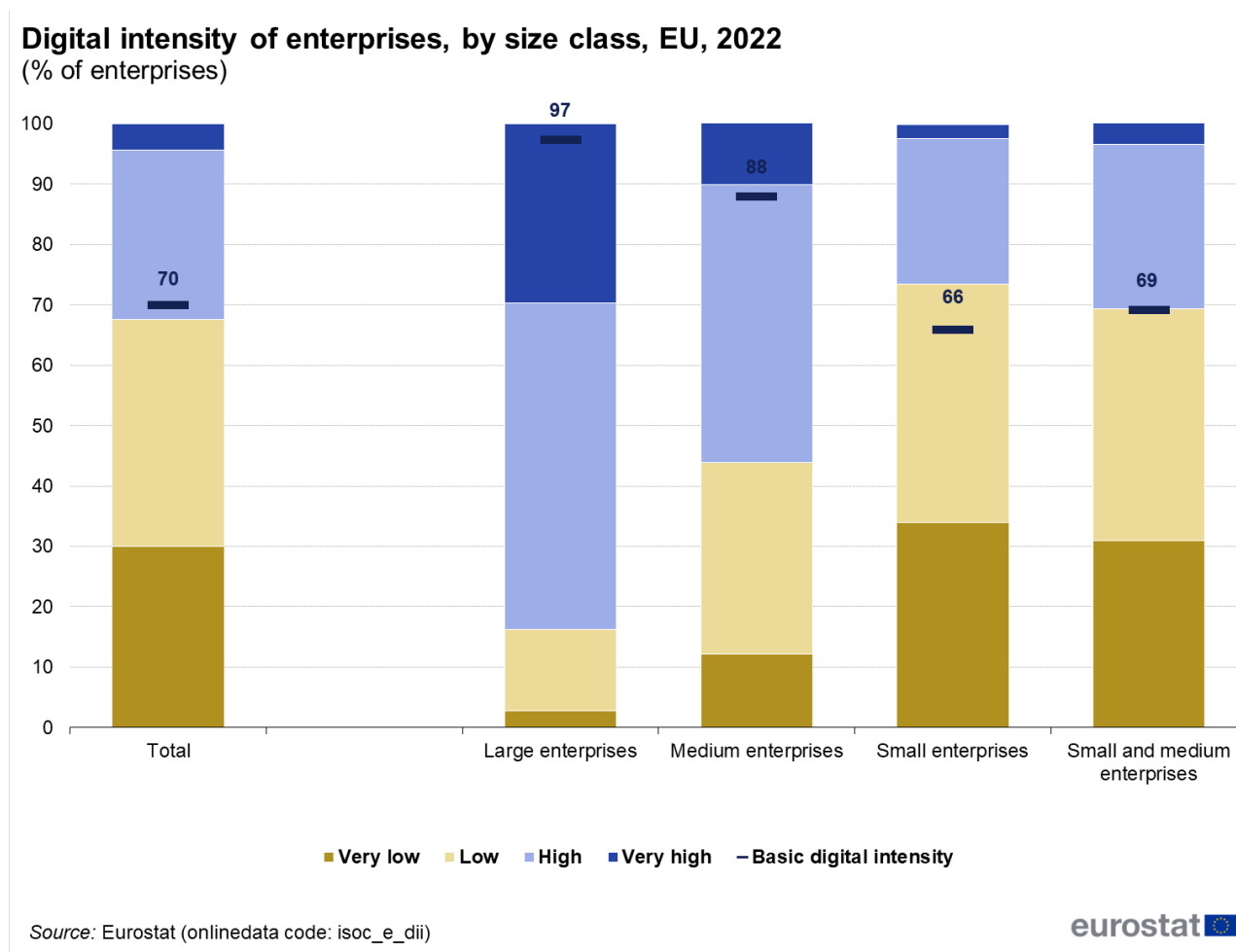
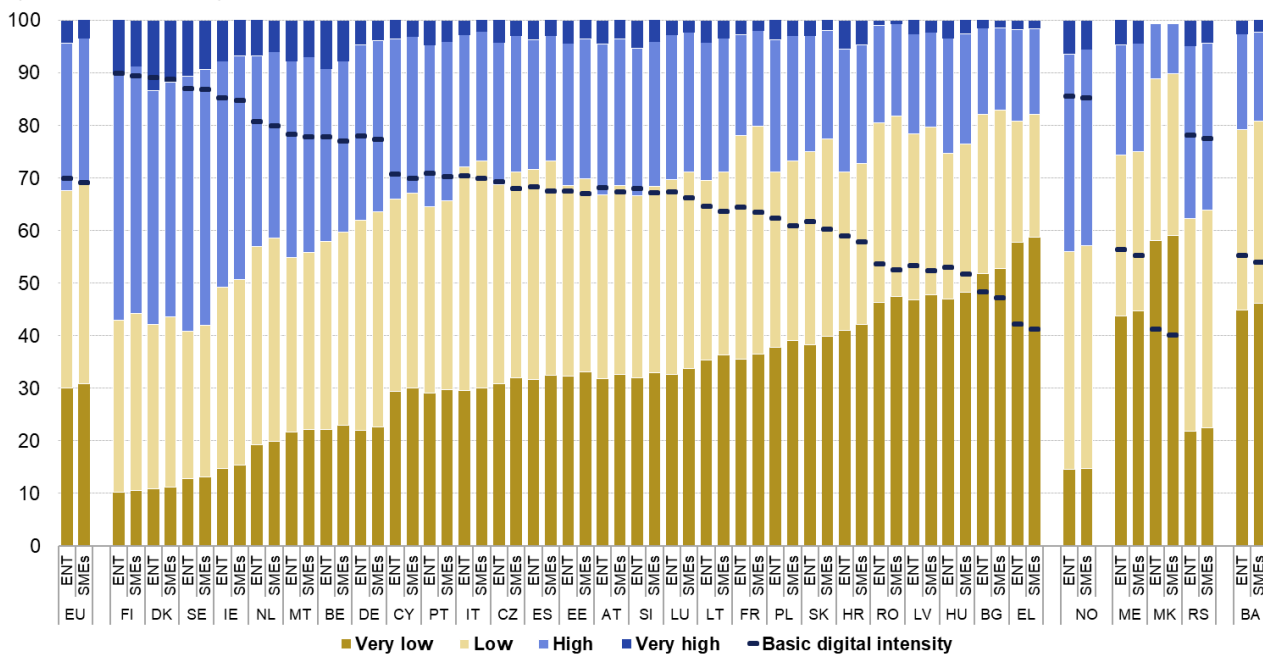


Figure 12: Digital intensity of enterprises, by size class, EU, 2022 (% enterprises) Source: Eurostat (isoc_e_dii)

In 2022, only 4 % of SMEs reached a very high DII level, while 27 % reached a high level. Most businesses in small and medium size class recorded low (38 %) or very low (31 %) levels of DII. The highest proportions of SMEs reaching a very high DII level were in Denmark (12 %), Sweden and Finland (both 9 %). Bulgaria and Greece were lagging behind with less than 20 % of SMEs reaching high or very high digital intensity. The levels of digital intensity among SMEs did not differ much from the levels of digital intensity among enterprises of all size classes, both at EU level and national level (Figure 13).

Digital intensity of enterprises, by size class, 2022

(% of enterprises)



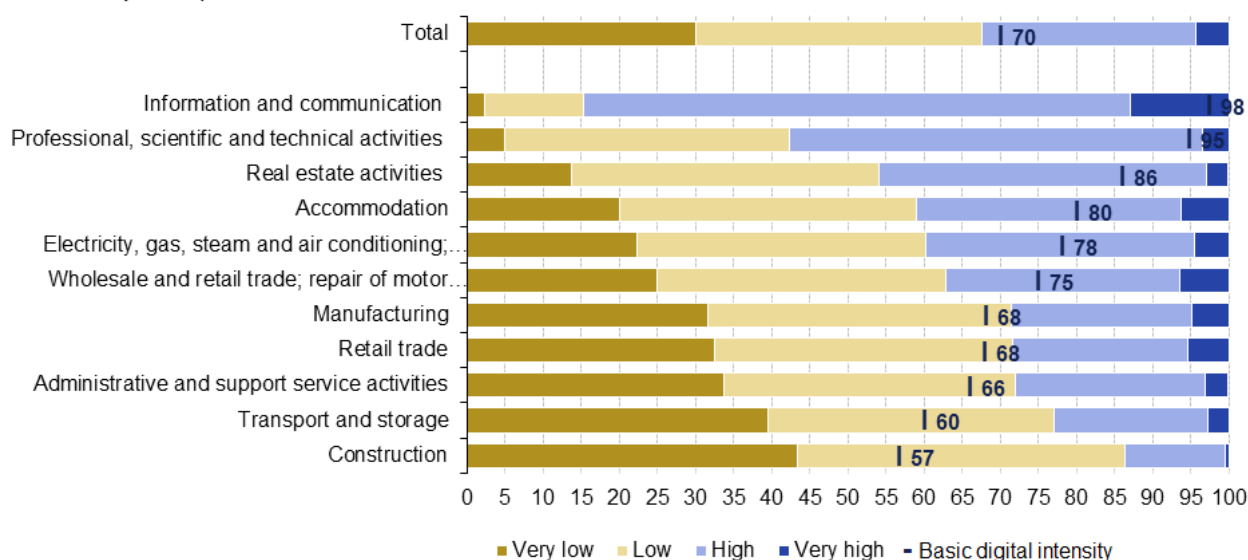
Source: Eurostat (online data code: isoc_e_dii)

eurostat

Figure 13: Digital intensity of enterprises, by size class, 2022 (% enterprises) Source: Eurostat (isoc_e_dii)

The use of different digital technologies and consequently the digital intensity level of businesses depend largely on their economic activity. In 2022, the most digitally intensive part of the EU's economy comprised businesses in the information and communication activities, where 98 % of enterprises reached a basic level of digital intensity, with 85 % of enterprises scoring the two highest levels of the Digital Intensity Index (72 % - high, and 13 % - very high). Apart from information and communication, five other sectors had the shares of enterprises with a basic digital intensity above the EU average of 70 %. These sectors were professional, scientific and technical activities (95 %), real estate activities (86 %), accommodation (80 %), electricity, gas, steam and air conditioning; water supply, sewerage, waste management and remediation activities (78 %) and wholesale and retail trade; repair of motor vehicles and motorcycles (75 %). The highest proportions of businesses with a very low digital intensity were recorded in the construction sector (43 %) and in transport and storage activities (40 %) (Figure 14).

Digital intensity of enterprises, by economic activity, EU, 2022 (% of enterprises)



Source: Eurostat (online data code: isoc_e_diin2)

eurostat

Figure 14: Digital intensity of enterprises, by economic activity, EU, 2022 (% enterprises) Source: Eurostat (isoc_e_diin2)

Digitalisation of public services

The Digital Compass targets for digitalisation of public services are that, by 2030, all key public services should be available online, all citizens will have access to their e-medical records¹, and 80 % of citizens should use an eID solution².

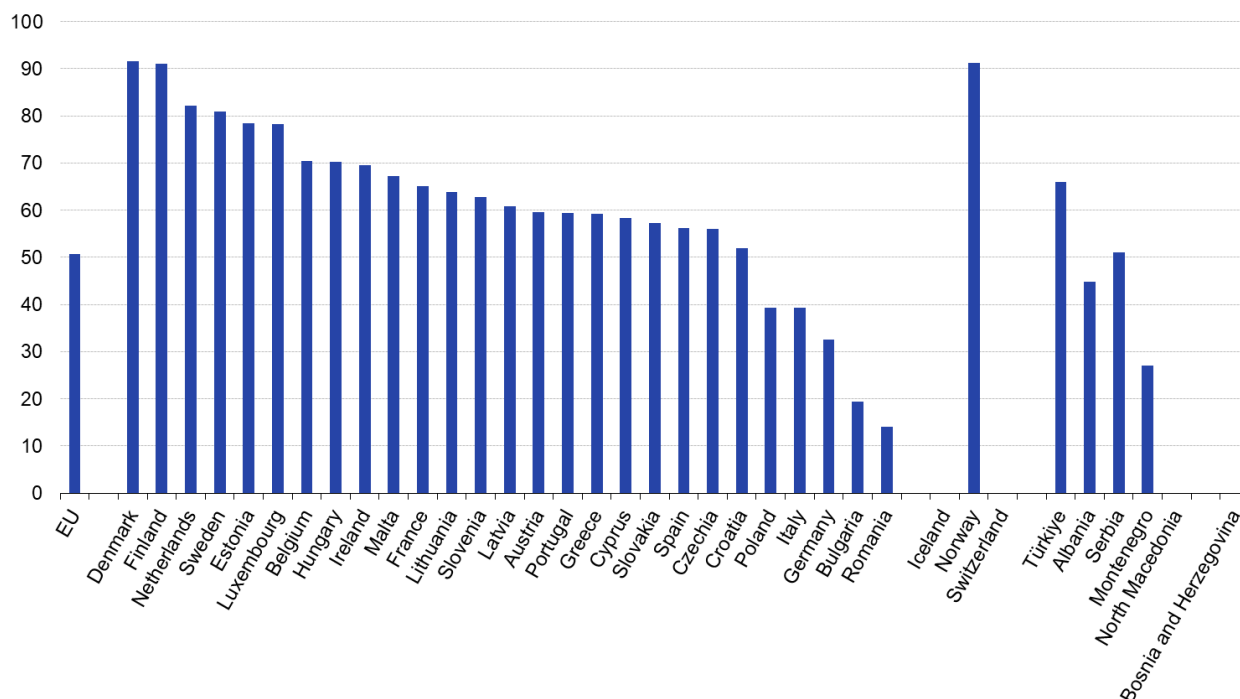
In 2022, 51 % of people aged 16-74 in the EU, in the 12 months prior to the survey on ICT usage in households and by individuals, contacted or interacted over the internet with public authorities or public services for private purposes. The highest rates of individuals using e-government (incl. websites concerning citizen obligations (e.g. tax declaration, notification of moving), rights (e.g. social benefits), official documents (e.g. ID card, birth certificate), public educational services (e.g. public libraries, information on enrolment in schools or universities), public health services (e.g. services of public hospitals)) were recorded in Denmark (92 %), Finland (91 %), the Netherlands (82 %) and Sweden (81 %). The lowest use of e-government was in Romania (14 %), Bulgaria (19 %) and Germany (33 %) (Figure 15).

¹The targets refer to the availability of public services. The data presented below do not refer directly to those targets, as it presents the level of use, not availability of the service.

²The data presented below do not refer to the eID, but to the different identification procedures for online services used by people.

Individuals who used the internet for interacting with public authorities, 2022

(% of individuals aged 16-74)



Note: Data for Iceland, Switzerland, North Macedonia, and Bosnia and Herzegovina not available

Source: Eurostat (online data code: isoc_ciegi_ac)

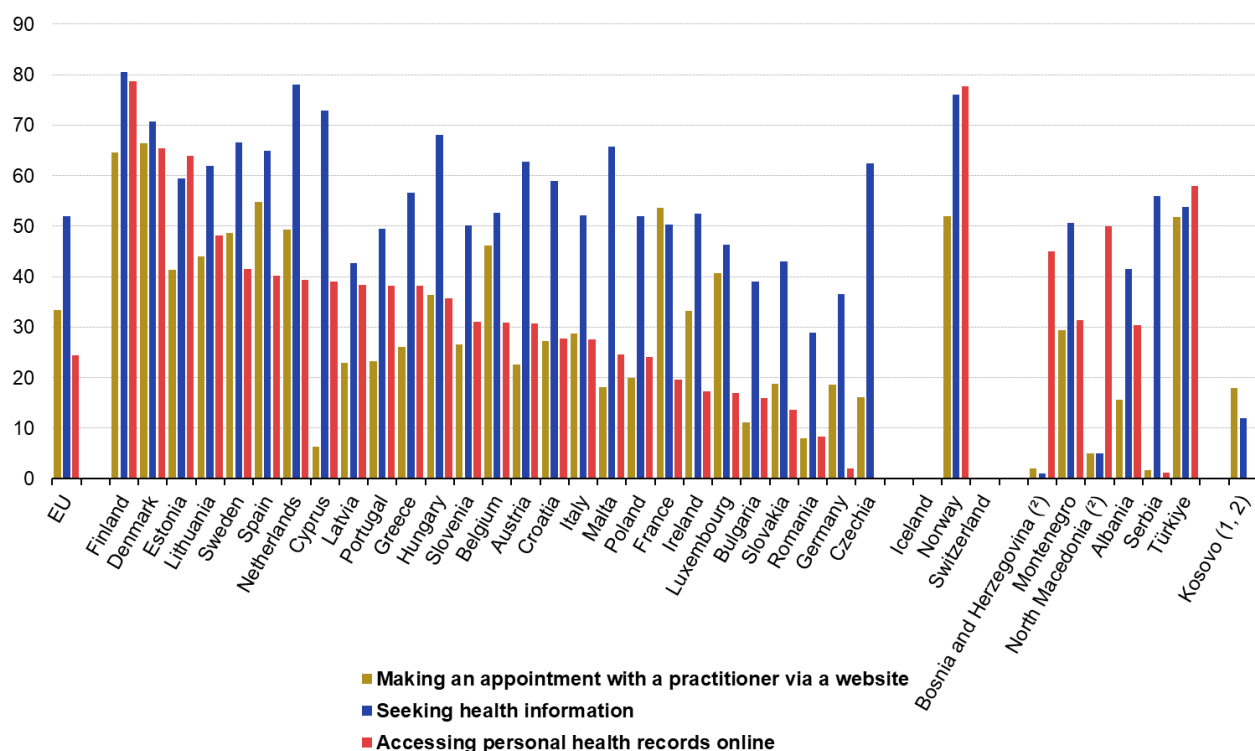
eurostat

Figure 15: Individuals who used the internet for interacting with public authorities, 2022 (% of individuals aged 16-74) Source: Eurostat (isoc_ciegi_ac)

In 2022, 24 % of EU citizens aged 16-74 reported having accessed their personal health records online, 33 % made an appointment with a practitioner via a website, and 52 % of EU citizens were seeking health-related information online. All three rates were highest in Finland, with 81 % of citizens consulting the internet in search of health-related information, 79 % accessing their health records online, and 65 % making a doctor's appointment via the internet (Figure 16).

Individuals who used the internet for health-related purposes, 2022

(% of individuals aged 16 to 74)



Note: Data for Making an appointment with a practitioner via a website and for Accessing personal health records online not available for France and Switzerland. Data for Accessing personal health records online not available for Czechia. Data for Seeking health information not available for Kosovo.

(1) under United Nations Security Council Resolution 1244/99

(2) Data for 2021 instead of 2022

Source: Eurostat (online data code: isoc_ci_ac_i)

eurostat

Figure 16: Individuals who used the internet for health-related purposes, 2022 (% of individuals aged 16-74)
Source: Eurostat (isoc_ci_ac_i)

In 2020, the most commonly used identification procedure when accessing online services was a simple login with username and password, which was used by 73 % of EU citizens aged 16-74. The second most popular identification method for online services was a procedure involving a person's mobile phone (code received via message), which was used by 45 % of people. Some 35 % of people used a social media login as an identification procedure to access other online services (Table 2). The use of these identification procedures varied by country, depending also on the availability of the specific identification method in the country.

Individuals using identification procedures for accessing online services, 2020
(% of individuals aged 16-74)

	Simple login with username and password as identification procedure	Social media login as identification procedure	Security token as identification procedure	Electronic identification certificate or card with a card reader or an app as identification procedure	Procedure involving their mobile phone (a code received via a message) as identification procedure	Single use pin code list or random characters of a password as identification procedure	Other electronic identification procedure
EU (*)	73	35	13	20	45	21	9
Belgium	72	51	11	37	33	7	6
Bulgaria	54	30	3	3	9	1	2
Czechia	86	29	4	22	73	2	2
Denmark	72	52	16	50	76	84	20
Germany	85	26	7	22	46	27	5
Estonia	77	35	13	78	37	1	4
Ireland	73	37	19	25	53	15	5
Greece	69	25	12	4	22	10	1
Spain	78	43	11	23	61	32	22
France	:	:	:	:	:	:	:
Croatia	54	31	30	8	29	4	4
Italy	65	40	16	9	38	16	6
Cyprus	74	29	10	:	27	0 ⁽²⁾	0 ⁽²⁾
Latvia	76	37	11	16	66	21	8
Lithuania	50	20	23	47	22	2	11
Luxembourg	71	23	36	54	52	17	5
Hungary	72	49	17	11	48	25	21
Malta	74	47	51	10	55	18	11
Netherlands	91	37	51	56	74	29	22
Austria	76	26	5	23	56	6	11
Poland	68	40	11	6	34	19	5
Portugal	60	37	14	10	46	26	8
Romania	45	26	6	2	14	4	2
Slovenia	81	27	15	14	31	21	0 ⁽²⁾
Slovakia	77	25	20	11	47	11	4
Finland	72	34	8	3	58	67	4
Sweden	69	45	21	89	48	7	6
Iceland	90	51	21	93	80	22	7
Norway	90	48	71	20	77	32	13
Bosnia and Herzegovina	30	17	1	1	17	1	1
Montenegro	45	31	4	3	24	8	8
North Macedonia	53	9	5	2	9	1	2
Albania	44	15	0 ⁽²⁾	0 ⁽²⁾	4	0 ⁽²⁾	2
Serbia	52	23	10	5	19	7	2
Kosovo (*)	66	55	22	10	34	20	8

Note:

(*) estimated

(²) not significant

(³) under United Nations Security Council Resolution 1244/99

: data not available

Source: Eurostat (online data code: isoc_cisci_ip20)

eurostat 

Table 2: Individuals using identifications procedures for accessing online services, 2020 (% of individuals aged 16-74) Source: Eurostat (isoc_cisci_ip20)

Secure, performant and sustainable digital infrastructures

Some of the ambitions set in the Digital Compass for the secure, performant and sustainable digital infrastructures are that, by 2030, all EU households should have gigabit connectivity and all populated areas should be covered by 5G.

In 2022, most EU households (97 % of the total number of households), including households in rural areas (91 %), were covered by fixed broadband internet technologies. Among these technologies, DSL covered 87 % of households, FWA was accessible to 68 % of households, FTTP to 56 %, and DOCSIS 3.0 cable covered 42 % of households. Next generation access (NGA) technologies (VDSL, VDSL2 vectoring, FTTP, DOCSIS 3.0, DOCSIS 3.1), capable of delivering download speeds of at least 30 Mbps, covered 91 % of households, including 73 % of

households in rural areas. Fixed very high capacity networks (VHCN, which include FTTP and cable network upgrades to DOCSIS 3.1), having the capabilities of offering gigabit connectivity, were accessible to 73 % of EU households and 45 % of households in rural areas. Of the mobile technologies, LTE (4G) was reaching 100 % of populated areas, while 5G covered only 81 % (Figure 17).

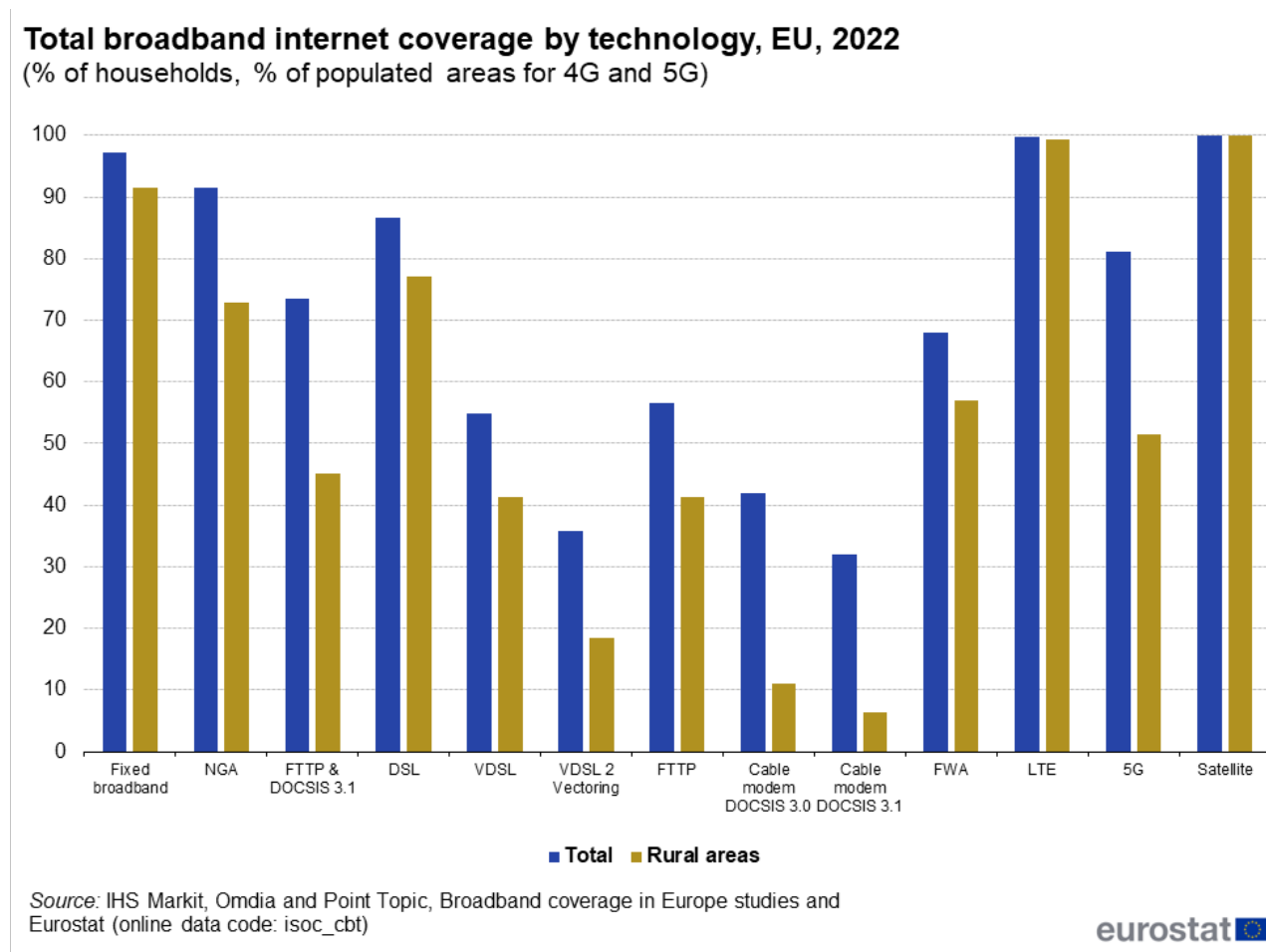
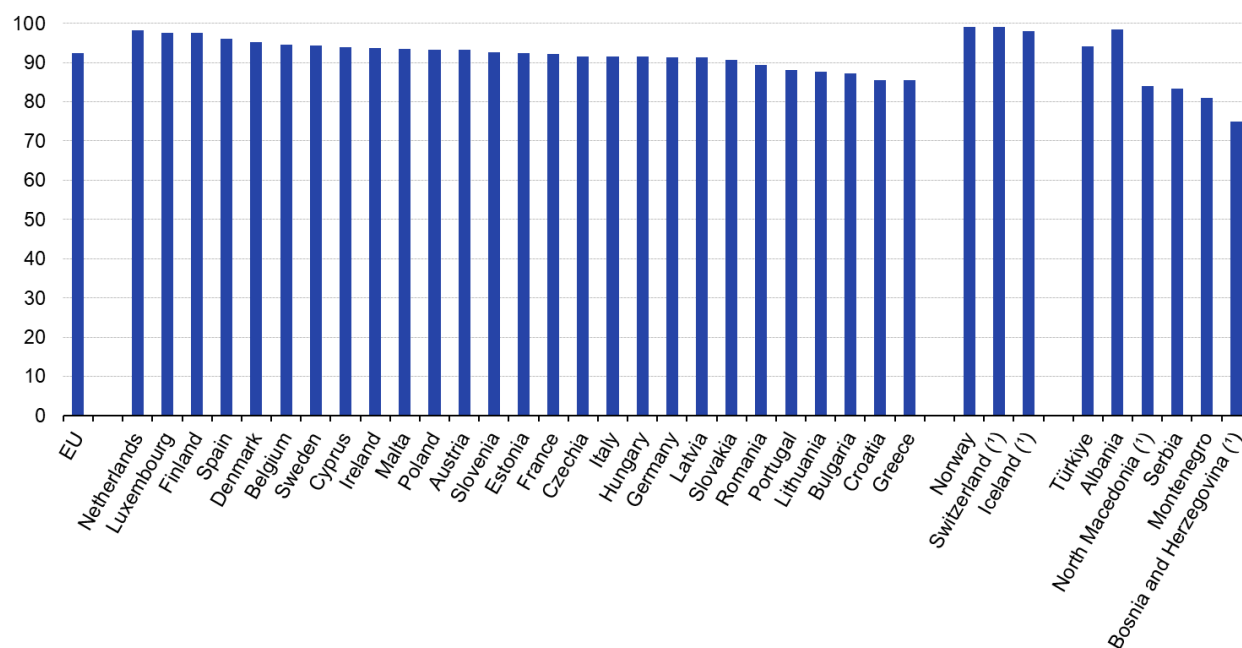


Figure 17: Total broadband internet coverage by technology, EU, 2022 (% of households, % of populated areas for 4G and 5G) Source: IHS Markit, Omdia and Point Topic, Broadband coverage in Europe studies (isoc_cbt)

While all households in the EU were covered by broadband technologies, the internet take-up among EU households was below 100 %. In 2022, 92 % of EU households had access to the internet at home. The highest shares of households having internet at home were recorded in the Netherlands, Luxembourg and Finland (all 98 %), followed by Spain (96 %) and Denmark (95 %). The lowest percentages of households having internet access at home were in Greece (85 %), Croatia (86 %) and Bulgaria (87 %) (Figure 18).

Internet access in households, 2022

(% of all households)



(*) Data for 2021 instead of 2022

Source: Eurostat (online data code: isoc_ci_in_h)

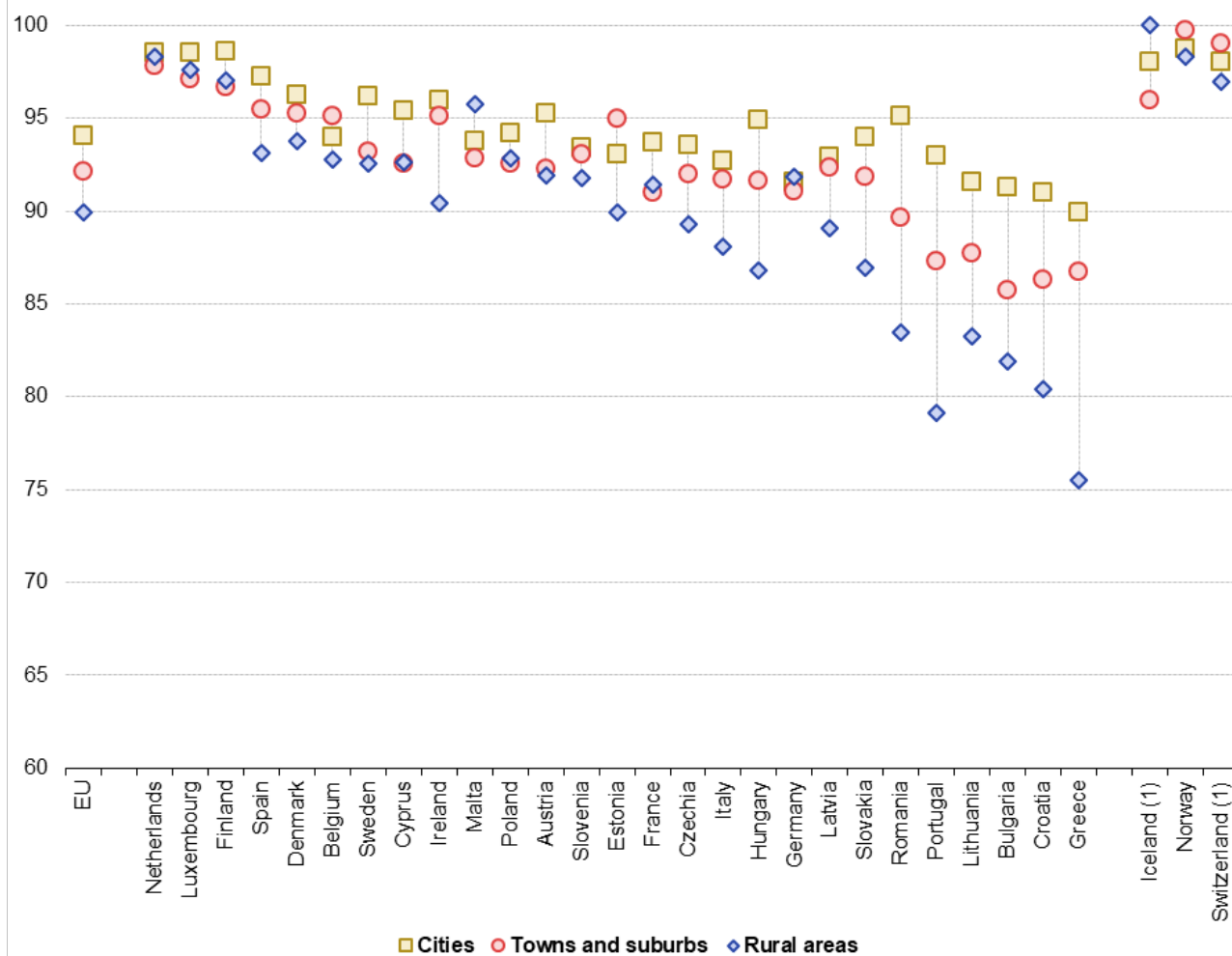
eurostat 

Figure 18: Internet access in households, 2022 (% of all households) Source: Eurostat (isoc_ci_in_h)

While take-up rates are relatively high within the EU, there are still some gaps in the level of internet access between urban and rural areas. While households in cities and in towns and suburbs had comparatively high internet access rates (94 % in cities and 92 % in towns and suburbs), the share of households having internet access was somewhat lower in rural areas (90 %). The divide between rural areas and the two other area types was particularly significant in Greece and Portugal. In the Netherlands, Luxembourg, Germany and Slovenia the share of households with internet access was almost identical across all three area types (Figure 19).

Internet access in households by degree of urbanisation, 2022

(% of all households)



Note: ranked on overall internet access.

(1) Data for 2021 instead of 2022

Source: Eurostat (online data code: isoc_ci_in_h)

eurostat

Figure 19: Internet access in households by degree of urbanisation, 2022 (% of all households) Source: Eurostat (isoc_ci_in_h)

Source data for tables and graphs

- [Digital Decade targets - graphs and tables](#)

Data sources

The data presented in this article are based on the results of the [Eurostat survey on ICT usage in households and by individuals](#) and the [survey on ICT usage and e-commerce in enterprises](#). Secondary statistics on ICT specialists, covering people working as ICT specialists in all parts of the economy, derived from the [Labour Force Survey \(LFS\)](#), have also been used. Additionally, some results come from the IHS Markit, Omdia and Point Topic studies Broadband Coverage in Europe. The two annual surveys on ICT usage are revised every year to accommodate various data needs and to maintain their relevance, taking into account developments in technologies, their uptake and their impact. The reference period for the survey on ICT usage in households and by individuals is in most cases the first quarter of each year; in most countries, the survey is conducted in the second quarter of each year. The household ICT survey covers those households having at least one member in the age group 16-74. Internet access of households refers to the percentage of households that have an internet access, so

that anyone in the household could use the internet at home, if desired. The survey on ICT usage and e-commerce in enterprises is conducted by national statistical authorities in the first months of the year. The reference period is the current situation of the survey period or, for selected questions, the preceding calendar year. In 2022, 150 400 enterprises, with 10 or more employees or self-employed persons, out of 1.47 million in EU were surveyed. Out of these 1.47 million enterprises, approximately 83 % were small enterprises (with 10-49 employees or self-employed persons), 14 % medium (50-249) and 3 % large enterprises (250 or more). The observation statistical unit is the enterprise, as defined in [Regulation \(EC\) No 696/1993](#) of 15 March 1993. The survey covered enterprises with at least 10 employees and self-employed persons. Economic activities correspond to the classification [NACE](#) Revision 2. The sectors covered are: manufacturing; electricity, gas and steam; water supply; construction; wholesale and retail trades; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities; information and communication; real estate; professional, scientific and technical activities; administrative and support activities; and repair of computers and communication equipment.

Source data shown as ':' refer to data that are unavailable, unreliable, confidential or not applicable. Unreliable data are included in the calculation of European aggregates. Data presented in this article may differ from the data in the database on account of updates made after the data extractions used for this article. Data in the database are organised according to the survey year.

The secondary statistics on ICT specialists derived from the Labour Force Survey (LFS). Regulation (EU) 2019/1700, which came into force on 1 January 2021, made a break in the LFS time series (the source data) for all EU Member States. More information on the source data can be found in the online publication [EU Labour Force Survey](#), which includes articles on technical and methodological aspects of the survey. The EU-LFS methodology in force from the 2021 data collection onwards is described in [Methodology from 2021 onwards](#).

Statistics on ICT specialists, defined as persons who have the ability to develop, operate and maintain ICT systems and for whom ICTs constitute the main part of their job, are compiled based on the OECD definition ([OECD, 2004](#)), which is built on the [International Standard Classification of Occupations \(ISCO\)](#). For data up until 2010, the definition was based on [ISCO-88](#), whereas the data from 2011 onwards are based on [ISCO-08](#); as such, there is a break in series in 2011. Under ISCO-08, Eurostat and the OECD define ICT specialists as people with the following occupations: ICT service managers; information and communications technology professionals (software and multimedia developers and analysts, and database specialists and systems administrators); information and communications technicians (ICT operations and user support technicians, and communications technicians); electronic engineers; telecommunication engineers; graphic and multimedia designers; information technology trainers; ICT sales professionals; electronics engineering technicians; electronics mechanics and servicers; and ICT installers and servicers.

Context

In 2019, the European Commission President outlined the vision for the EU to grasp the opportunities presented by the digital age. Such a digital transformation is based on the premise that digital technologies and solutions should: open up new opportunities for businesses; boost the development of trustworthy technology; foster an open and democratic society; enable a vibrant and sustainable economy; and help fight climate change.

One of the six Commission priorities for the period 2019-2024 is [A Europe fit for the digital age](#). The strategy is built on three pillars: (1) technology that works for the people; (2) a fair and competitive digital economy; and (3) an open, democratic and sustainable society. Furthermore, a very concrete vision of the EU's digital transformation and targets for 2030 were set by the Digital Compass for the EU's [Digital Decade](#), evolving around four cardinal points: skills, digital transformation of businesses, secure and sustainable digital infrastructures, and digitalisation of public services.

See also

- [How many citizens had basic digital skills in 2021?](#)
- [ICT specialists in employment](#)
- [Use of artificial intelligence in enterprises](#)
- [How digitalised are EU's enterprises?](#)
- [Cloud computing - statistics on the use by enterprises](#)
- [Digital economy and society statistics - enterprises](#)
- [EU citizens: over half seek health information online](#)
- [Digital economy and society statistics - households and individuals](#)

Main tables

- [Digital economy and society](#)

Database

- [Digital economy and society](#) , see:

[ICT usage in households and by individuals \(isoc_i\)](#)

[ICT usage in enterprises \(isoc_e\)](#)

Dedicated section

- [Digital economy and society](#)

Publications

- [Title of the publication](#)

Publications in Statistics Explained (either online publications or Statistical articles) should be in 'See also' above

Methodology

- [ICT usage in households and by individuals](#) (ESMS metadata file — [isoc_i_esms](#))
- [ICT usage and e-commerce in enterprises](#) (ESMS metadata file — [isoc_e_esms](#))

Legislation

- Regulation (EU) 2019/2152 of the European Parliament and of the Council of 27 November 2019 on European business statistics
- Regulation (EC) No 808/2004 of the European Parliament and of the Council of 21 April 2004 concerning Community statistics on the information society
- Regulation (EC) No 960/2008 of 30 September 2008 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EC) No 1023/2009 of 29 October 2009 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) No 821/2010 of 17 September 2010 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) No 937/2011 of 21 September 2011 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) No 1083/2012 of 19 November 2012 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) No 859/2013 of 5 September 2013 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) No 1196/2014 of 30 October 2014 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) 2015/2003 of 10 November 2015 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) 2016/2015 of 17 November 2016 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) 2017/1515 of 31 August 2017 implementing Regulation (EC) No 808/2004 concerning Community statistics on the information society
- Regulation (EU) 2018/1798 of 21 November 2018 implementing Regulation (EC) No 808/2004 of the European Parliament and of the Council concerning Community statistics on the information society for the reference year 2019
- Regulation (EU) 2019/1910 of 7 November 2019 implementing Regulation (EC) No 808/2004 of the European Parliament and of the Council concerning Community statistics on the information society for reference year 2020
- Regulation (EU) 2020/1030 of 15 July 2020 laying down the technical specifications of data requirements for the topic 'ICT usage and e-commerce' for the reference year 2021, pursuant to Regulation (EU) 2019/2152 of the European Parliament and of the Council
- Regulation (EU) 2021/1190 of 15 July 2021 laying down the technical specifications of data requirements for the topic 'ICT usage and e-commerce' for the reference year 2022 pursuant to Regulation (EU) 2019/2152 of the European Parliament and of the Council
- Regulation (EC) No 696/1993 of 15 March 1993 on the statistical units for the observation and analysis of the production system in the Community
- Regulation (EU) 2019/1700 of the European Parliament and of the Council of 10 October 2019 establishing a common framework for European statistics relating to persons and households
- Commission Implementing Regulation (EU) 2021/1223
- Commission Delegated Regulation (EU) 2021/1898
- Commission Implementing Regulation (EU) 2020/1013
- Commission Delegated Regulation (EU) 2020/1432