



Brussels, 11.6.2019  
SWD(2019) 206 final

PART 3/6

**COMMISSION STAFF WORKING DOCUMENT**

**Digital Economy and Society Index (DESI) 2019**

## **Digital Economy and Society Index Report 2019**

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## 2. Connectivity: Broadband market developments in the EU

**The map of 5G digital cross-border corridors** shows the test corridors identified by the Member States and included in Horizon 2020 research and innovation actions.

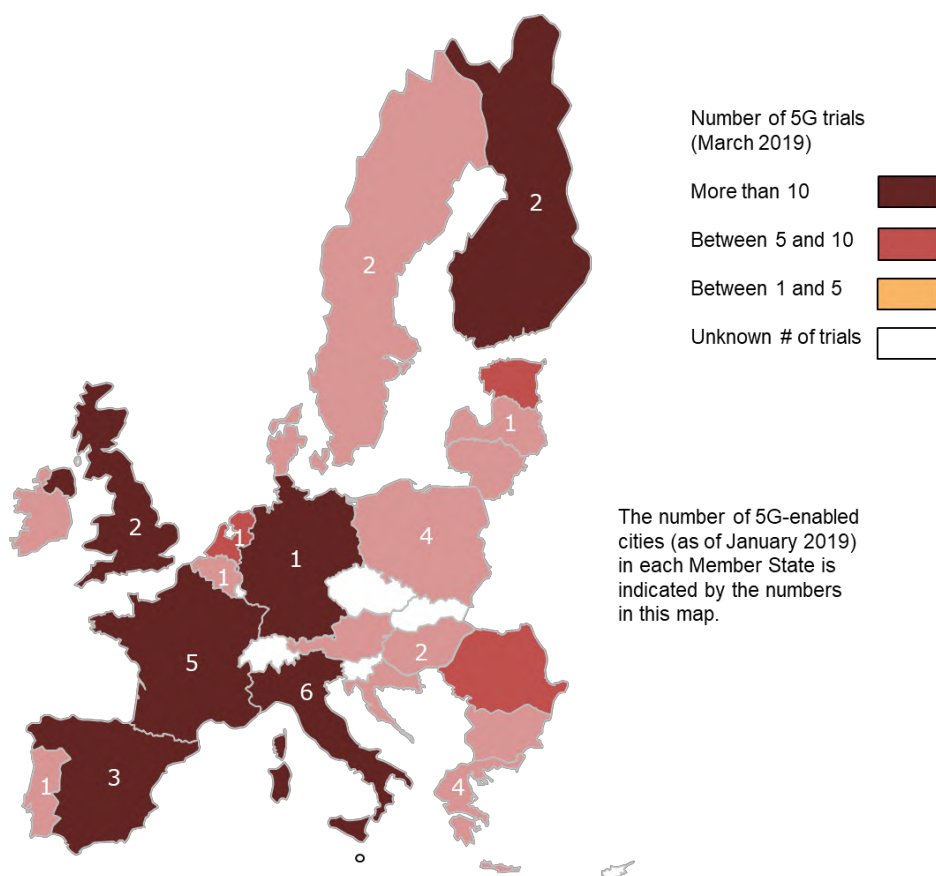
Figure 2-71 5G digital cross-border corridors



Source: European 5G Observatory

The number of reported **5G trials** in the EU and **5G cities** identified by the Member States are shown in this map.

Figure 2-72 5G trials in the EU and 5G cities



Source: European 5G Observatory

The **5G readiness indicator** in the DESI shows the portion of spectrum that has been assigned for 5G purposes in each Member State in the so-called pioneer bands.

The percentage score of the 5G readiness indicator is based on the amount of spectrum that has been assigned in a specific Member State and ready for 5G use by the end of 2020 within the so-called 5G pioneer bands identified in Europe;

The percentage is calculated based on the amount of spectrum assigned in each 5G pioneer band in comparison with the maximum feasible amounts, which are as follows:

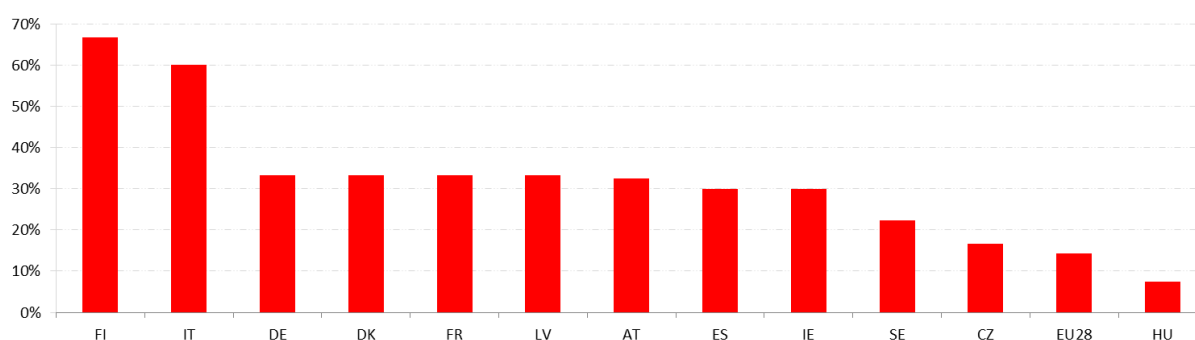
- 700 MHz band: 60 MHz (703-733 & 758-788 MHz)
- 3.6 GHz band: 400 MHz (3400-3800 MHz)
- 26 GHz band: 1000 MHz within 24250-27500 MHz

All three spectrum bands have an equal weight, so having the maximum spectrum amount assigned - and ready for 5G use - in the range of one of these bands will result as 33.3%.

## Remarks

1. For the 700 MHz band, there are a number of derogations allowing for a delay until 2022; however, 5G readiness indicator is about factual reporting, not a judgement on legal compliance;
2. For the 3 400-3 800 MHz band, only licences aligned with the new technical conditions (according to Commission Decision (EU)2019/235) were considered ready for 5G use;
3. For the 26 GHz band, at least a portion of 1000 MHz within the band shall be assigned and ready for 5G use by the end of 2020, as required by the European Communications Code.

**Figure 2-73 5G readiness (assigned spectrum as a % of total harmonised 5G spectrum)**



❖ *Data for Czechia is not available*

Source: Idate Digiworld, Communications Committee

### 3. Human capital: Digital Inclusion and Skills

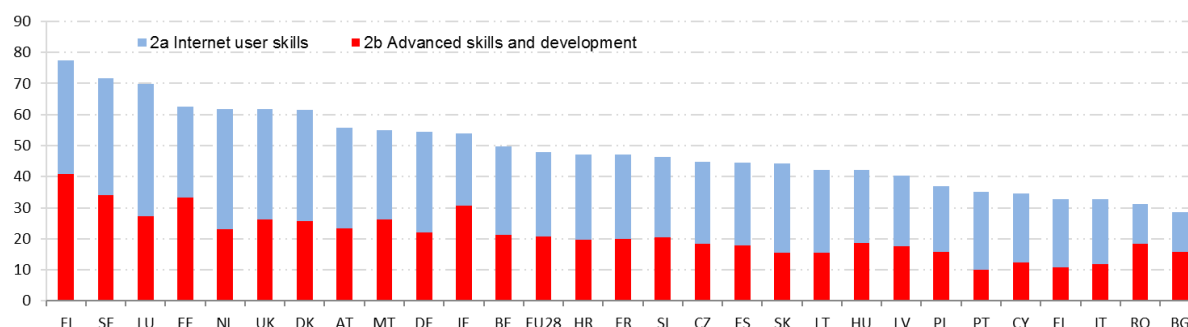
In the **Human capital dimension of DESI 2019**, Finland, Sweden, Luxembourg and Estonia had the highest scores. Bulgaria, Romania, Italy and Greece scored the lowest.

The Human capital dimension of DESI has two sub-dimensions covering 'internet user skills' and 'advanced skills and development'. The former draws on the European Commission's Digital Skills Indicator, which is computed based on the number and complexity of activities involving the use of digital devices and/or the internet. The latter includes indicators on ICT specialist employment and ICT graduates. According to the latest data, Luxembourg, the Netherlands and Sweden are the top performers in terms of internet user skills, whereas Finland, Sweden and Estonia have the highest scores in advanced skills and development. Bulgaria, Romania, Italy and Greece rank the lowest overall on DESI's Human Capital dimension.

**Figure 3-1 Human Capital indicators in DESI 2019**

Human Capital indicators in DESI 2019	EU
<b>2a1 At least basic digital skills</b>	<b>57%</b>
% individuals	2017
<b>2a2 Above basic digital skills</b>	<b>31%</b>
% individuals	2017
<b>2a3 At least basic software skills</b>	<b>60%</b>
% individuals	2017
<b>2b1 ICT specialists</b>	<b>3.7%</b>
% total employment	2017
<b>2b2 Female ICT specialists</b>	<b>1.4%</b>
% female employment	2017
<b>2b3 ICT graduates</b>	<b>3.5%</b>
% graduates	2015

**Figure 3-2 Digital Economy and Society Index (DESI) 2019, Human Capital**

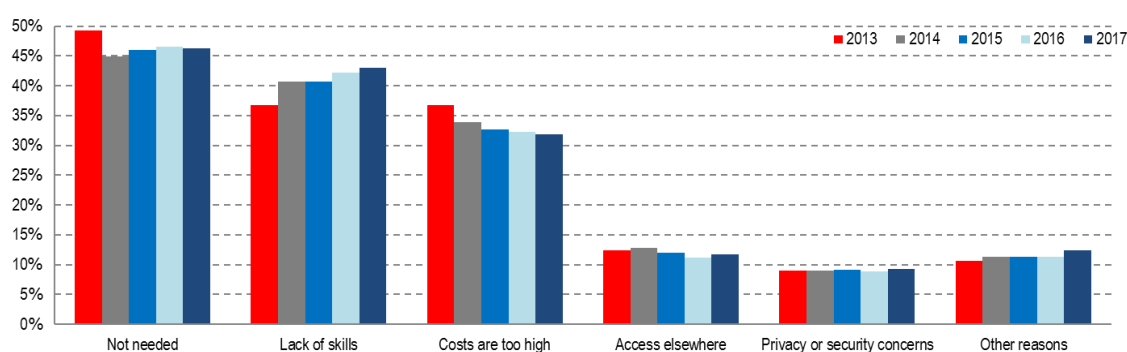


Source: DESI 2019, European Commission

**Lack of need or interest, insufficient skills and cost-related barriers are the most common reasons for not having internet access at home. Digital skills are key to combat digital exclusion.**

The three main reasons given for not having internet access at home remain, respectively, the lack of need or interest (46 % of households without internet access in 2017), insufficient skills (43 %) and high access and equipment costs (32 %). The deterring effect of each of these factors varies significantly in strength across Member States. For example, only 8 % of Danish households without internet access mentioned costs as a barrier but as many as 57 % did so in Croatia and Hungary. Lack of relevant skills remains by far the fastest-growing factor deterring households from having internet access at home. Moreover, given that this factor limits awareness of potential benefits from digitisation, it may also be among the reasons behind the large numbers of EU households that still claim not to have internet access at home because they do not need it.

**Figure 3-3 Barriers to internet access at home in the EU, 2013-2017 (% households without internet access)**



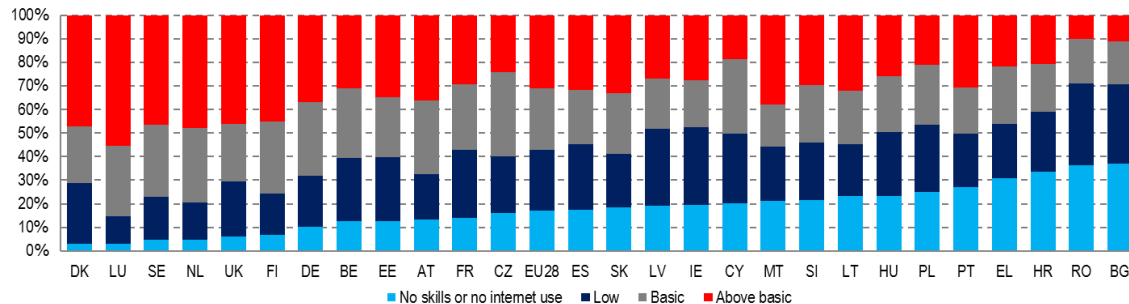
Source: Eurostat

**In 2017, 43 % of the EU population had an insufficient level of digital skills. 17 % had none at all, as they either did not use the internet or barely did so.**

According to the digital skills indicator, a composite indicator based on the digital competence framework for citizens\*, 17 % of the EU population had no digital skills in 2017, the main reason being that they did not use the internet or only seldom did so. This represents an improvement (i.e. decrease) of 2 percentage points compared to 2016. The share of EU citizens without basic digital skills, in turn, went down by 1 percentage point (to 43 %). However, these figures imply serious risks of digital exclusion in a context of rapid digitisation. There are proportionally more men than women with at least basic digital skills (respectively, 60 % and 55 %). In addition, only about 31 % of people with low education levels or no education have at least basic digital skills. This figure is also significantly lower among those living in rural areas (49 %) than for their city-dwelling counterparts (63 %).

There are still major disparities across Member States. The share of people with at least basic digital skills ranges from 29 % in Bulgaria and Romania (despite noticeable progress in both these countries in 2017) to 85 % in Luxembourg and 79 % in the Netherlands.

**Figure 3-4 Digital skills of the EU population, 2017 (% of individuals, by skills level)\*\***



\*More details at: <https://ec.europa.eu/jrc/digcomp>.

\*\*To be classified as low skilled, an individual has to have carried out activities from only one of the four digital competence dimensions considered (information, communication, content-creation and problem-solving). Basic skills means that an individual has basic skills in at least one dimension, but no skills in none. To be classified as above basic, the individual has to score above basic in all dimensions. Data not available for Italy.

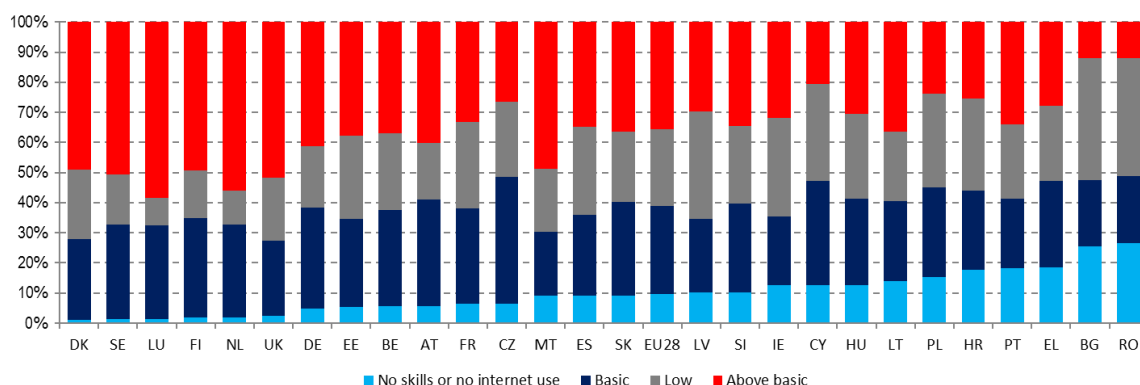
Source: Eurostat

**About 10 % of the EU labour force has no digital skills, mostly because they do not use the internet. 35 % does not have at least basic digital skills, which are now required in most jobs.**

The share of the EU's active labour force (employed and unemployed) that can be considered to have no digital skills (essentially because they do not use the internet or do so only seldom) fell from 11 % in 2016 to 10 % in 2017. This share is much higher in Member States like Romania (26 %), Bulgaria (25 %) and Portugal (18 %), although they are among those showing the largest improvements in this respect. Conversely, a very large proportion of the labour force (between 82 % and 89 %) in Member States such as Luxembourg, the Netherlands, Finland and Sweden has at least basic digital skills. In addition, at least half of the labour force in each of these countries have above basic skills. Digital skills are critically important not only for accessing the labour market but also for harnessing the benefits of the digital transformation that is currently underway. Making sure the EU labour force has the necessary digital skills, including by addressing digital skills deficits in certain groups, such as older cohorts or blue-collar workers, will thus be essential to bring about an inclusive digital economy and society.



**Figure 3-5 Digital skills of the EU labour force, 2017 (% individuals, by skills level)\***



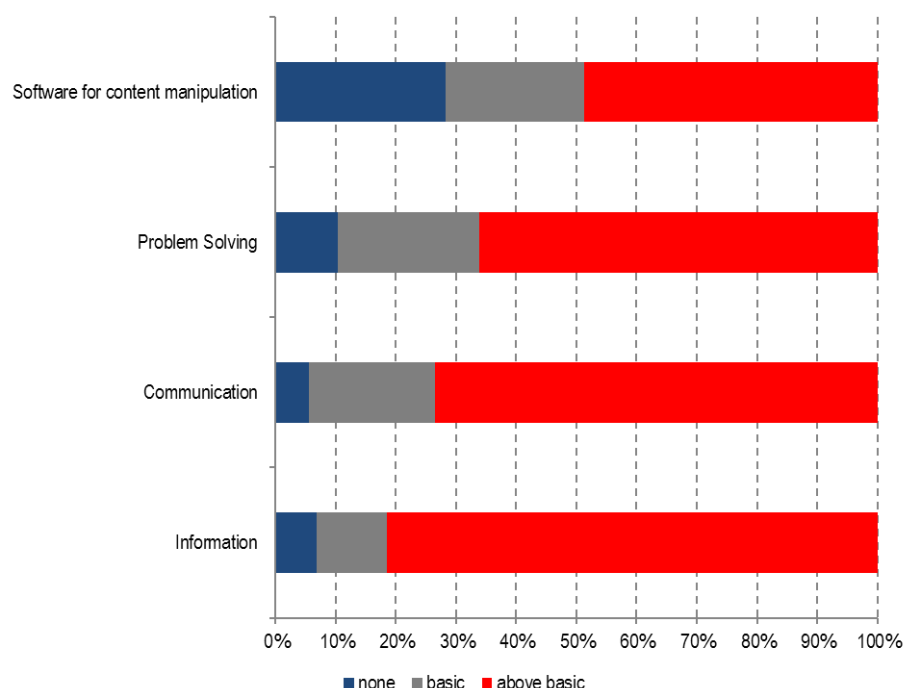
\*Data not available for Italy

Source: Eurostat

**Approximately 28 % of the EU's internet users have no software-related skills.**

Advanced digital skills are becoming a prerequisite for entry into many jobs and have a wide range of applications, even beyond domains where they are needed for core tasks. Across competence dimensions, the largest skills deficit, both among the active labour force and the population at large, relates to the use of software for content manipulation. Almost one in three internet users in the EU has no skills in this area (i.e. they claimed not to have carried out any of the activities considered under this dimension, which range from relatively basic text treatment and spreadsheet-based work to video editing and coding). This share is particularly large in Member States like Bulgaria, Romania (about 51 % of internet users) as well as Latvia (40 %) and Ireland (39 %). Conversely, in others like Luxembourg, Portugal, the UK and the Netherlands, a large majority of internet users has above basic software skills (69 %, 58 % - both- and 57 % respectively). By type of activity, only about 7 % and 30 % of EU internet users had, respectively, written code and used advanced spreadsheet functions. In contrast, 82 % and 73 % can be considered to have above basic skills in the information and communication dimensions respectively.

**Figure 3-6 Digital skills, by competence dimension and level, 2017 (% of internet users)**

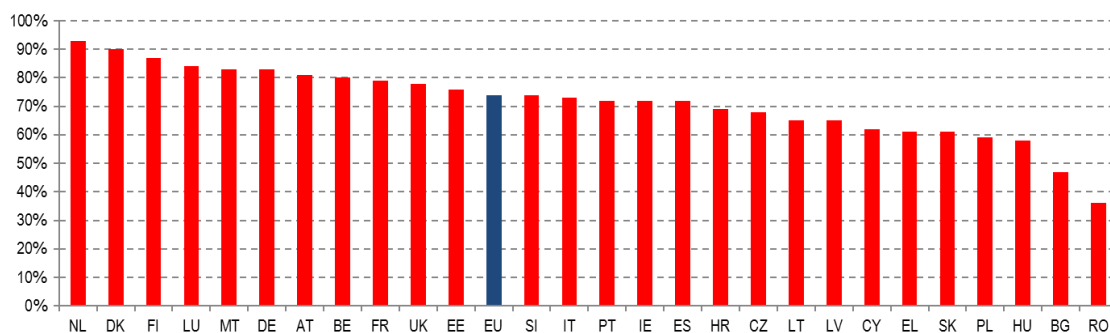


Source: Eurostat

**74 % of internet users who were employed in the EU used computers or computerised equipment at work in 2018, with large disparities across countries.**

In 2018, 71 % of EU internet users in employment reported to use computers, laptops, smartphones, tablets or other portable devices at work; 19 % of these workers used computerised equipment or machinery, such as those used in production lines, warehouses or delivery services. 74 % used ICT devices or equipment from at least one of those categories. The Netherlands had the highest rate of ICT usage by workers in the EU, as 93 % of its internet users in employment declared that they used computers or computerised equipment at work. It is followed by Denmark (90 %) and Finland (87 %). Conversely, the lowest ICT usage rates amongst the internet users in employment were observed in Romania (36 %), Bulgaria (47 %), which is partly explained by these countries' low shares of ICT specialists in total employment.

**Figure 3-7 Use of computers or computerised equipment at work, 2018 (% of employed having used the internet in previous 12 months)\***



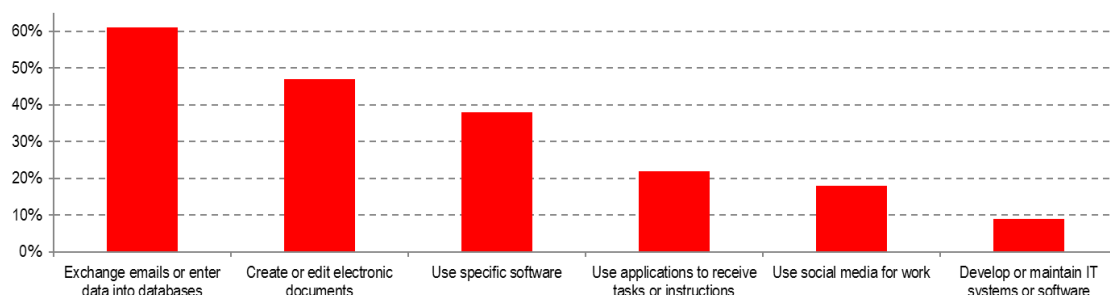
\*Data not available for Sweden.

Source: Eurostat

**61 % of internet users in employment used email or entered data into databases and 47 % worked with electronic documents in 2018, but less than 10 % developed or maintained IT systems.**

The most common activities involving the use of computers, laptops, smartphones, tablets or other portable devices or computerised equipment at work were exchanging emails or entering data into databases (61 % of internet users in employment), creating or editing electronic documents (47 %) and using specific occupational software; e.g. for design, data analysis, processing, etc. (38 %). 22 % of internet users in employment worked with applications to receive tasks or instructions (excluding emails), and 18 % used social media for their work. Only about 9 % of internet users in employment were involved in developing or maintaining IT systems or software, although significant variations exist across Member States: from only 2 % in Romania, Bulgaria and Slovakia to 14 % and 15 % in Denmark and Finland respectively.

**Figure 3-8 ICT-related activities at work carried out at least once a week, 2018\* (% of employed people having used the internet in previous 12 months)**



\*Activities not mutually excluding.

Source: Eurostat

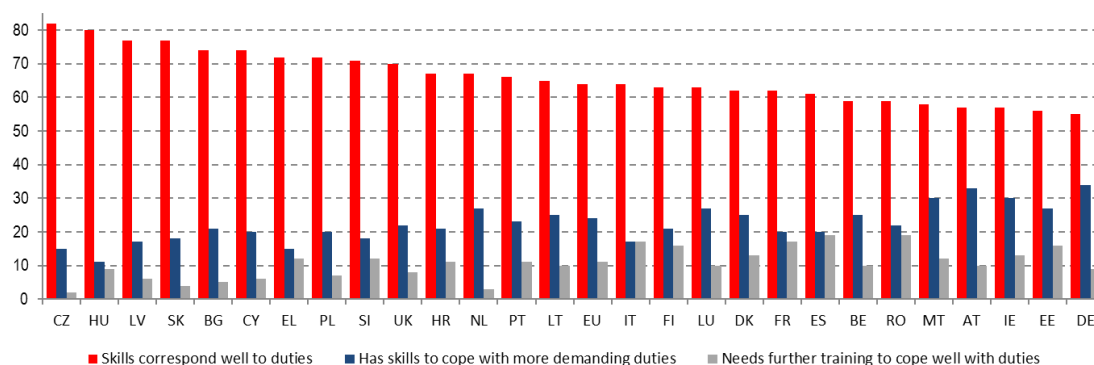
**New software or computerised equipment entailed changes in the main job tasks of 16 % of European internet users in employment in 2018.**

In 2018, 39 % of EU workers using some sort of ICT device or equipment declared that they had to learn how to use new software or computerised equipment for their job over the previous

year. 21 % reported changes in their main professional tasks as a result of new software or equipment being introduced during same period, and 20 % said they were involved in choosing, modifying or testing the software or computerised equipment used at their work. The highest shares of ICT-using workers whose main job tasks changed due to new software or computerised equipment were registered in Denmark, Luxembourg and Portugal (all 30 %). Cyprus (5 %), Latvia (11 %) and Bulgaria (12 %) had the lowest shares.

About 64 % of the EU's of workers using ICT devices or equipment deemed their skills relating to the use of computers, software or applications at work corresponded well to their duties, whereas 24 % said they had the skills to cope with more demanding duties and 11 % admitted that they needed further training. Approximately 12 % of the EU's internet users (regardless of employment status), in turn, relied on on-the-job training to improve their digital-related skills; 11 % on free online training or self-study and 9 % on training provided by their employer\*.

**Figure 3-9 Skills relating to use of use of computers, software or applications at work (self-assessed), 2018\*\* (% of individuals using computers, portable devices or computerised equipment/machinery at work)**



\*Activities not mutually excluding.

\*\*Data not available for Sweden.

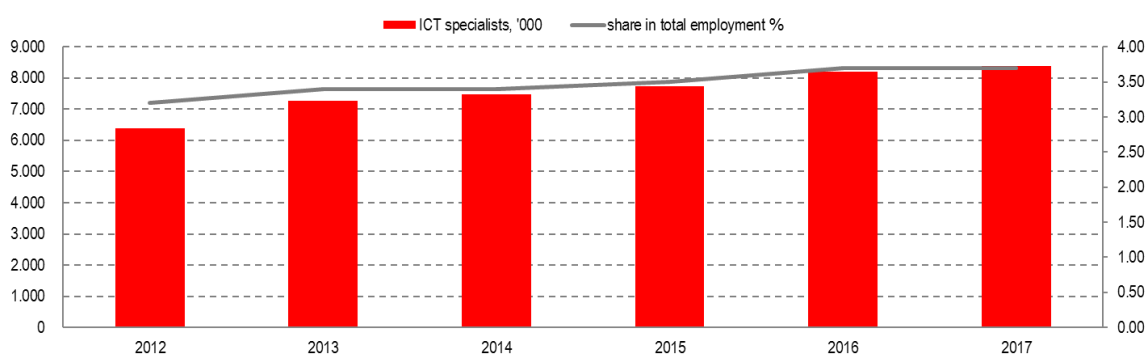
Source: Eurostat

**The number of ICT specialists employed in the EU reached nearly 8.4 million in 2017. However, the employment potential of people with specialised ICT skills remains underexploited.**

In 2017, nearly 8.4 million persons were employed as information and communication technologies (ICT) specialists in the EU. This amounts to about 3.7 % of total employment. These figures represent a slight increase compared with a year earlier. Although the progression is less strong than in 2016, it remains significant from a long-term perspective: between 2007 and 2017, the number of ICT specialists employed in the EU grew by 36 %, compared with a 3.2 % increase in overall employment. Nearly 83% of all ICT specialists employed in the EU in 2017 were men, and about 62 % had at least tertiary education. The Member States employing the most ICT specialists were the UK (1.6 million), Germany (1.5 million) and France (1 million). The highest shares of ICT specialists in total employment were

recorded in Finland (6.8 %) and Sweden (6.6 %) and Estonia (5.6 %); the lowest in Greece (1.6 %), Romania (2.1 %) and Portugal (2.2%). In 2018, 1 in 5 companies in the EU employed ICT specialists and nearly 1 in 10 recruited or tried to recruit ICT specialists. However, 53 % of enterprises that recruited or tried to recruit ICT specialists in 2018 reported difficulties in filling vacancies, compared to 41 % a year earlier. This situation, combined with evidence on the growing number of ICT vacancies, suggests that the gap between demand and supply of ICT specialists may be widening in the EU, and that the employment potential of people with specialised ICT skills remains underexploited.

**Figure 3-10 Employment of ICT specialists in the EU, 2012-2017**



Source: Eurostat

Through its **Digital Skills and Jobs Coalition**, the Commission seeks to further reduce digital skills gaps by fostering the sharing, replication and upscaling of best practices in areas such as training and matching for digital jobs, certification and awareness raising.

The Digital Skills and Jobs Coalition is one of the 10 key actions under the New Skills Agenda for Europe. It has been operational since 2016 and brings together Member States and stakeholders from the private and public sectors to develop a large digital talent pool and ensure that Europe's citizens and labour force are equipped with adequate digital skills.

As of mid-2018, more than 100 companies, education providers and NGOs have made pledges to reduce digital skills gaps by providing measures such as training courses, matching for digital jobs, certification and awareness raising. 23 National Coalitions for Digital Skills and Jobs have also been created in the EU Member States.

The members of the Digital Skills and Jobs Coalition have so far offered 10.9 million people in the EU a chance to improve their digital skills. In total, 7.4 million digital skills training courses were provided, 1.9 million certifications were delivered and 1.6 million people were reached through awareness-raising campaigns.

Furthermore, the Digital Opportunity Traineeship, which was



launched in 2018, will provide cross-border traineeships for up to 6,000 students until 2020. The aim is to provide students of all disciplines with hands-on experience in digital-related fields demanded by the market. Trainees will strengthen their ICT specific skills, in fields like digital marketing, software development, cybersecurity and big data. More than 3,000 traineeships have already taken place throughout the EU and in partner countries during the first year of implementation.

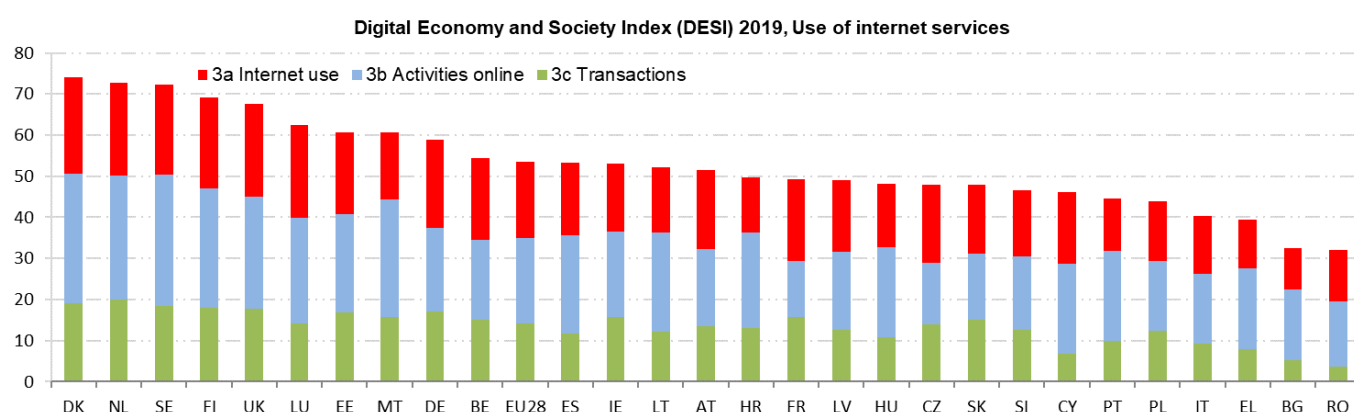
## 4. Use of Internet Services

There are still large disparities across EU Member States regarding the **use of internet services**.

People in the EU engage in a range of online activities — they actively use the internet to get news, browse social networks, communicate, shop, use online banking services and much more. Such activities are captured in DESI's Use of internet services dimension. Denmark, the Netherlands, Sweden and Finland have the most active internet users, followed by the UK, Luxembourg, Estonia and Malta. Romania, Bulgaria and Greece are, by comparison, the least active.

Ireland and Lithuania are the Member States that have registered the largest improvement in this dimension compared with the previous edition (4 percentage points) closely followed by the UK, Italy, Croatia and Greece, also making significant progress in comparison to results of DESI 2018.

**Figure 3.4-1 Digital Economy and Society Index (DESI) 2019, Use of internet services**

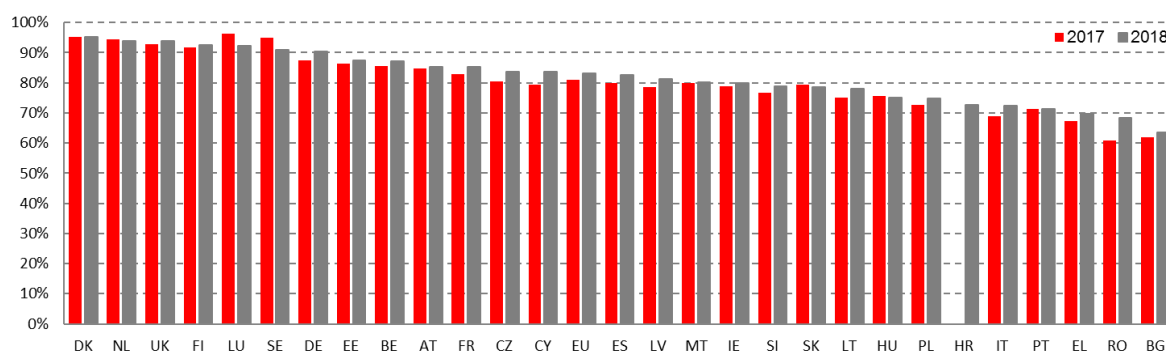


Source: DESI 2019, European Commission

The differences in **regular internet use** shrank further in 2018. However, in some Member States, over a third of the population still does not regularly go online.

In Member States such as Denmark, the Netherlands, the UK and Finland, the vast majority of the population uses the internet at least once a week. The countries in the process of catching up with these top-performing Member States, such as Germany, Estonia, Belgium and Austria saw further improvements in this respect in 2018. Spain, Latvia and Malta also made significant progress and now stand very close to the EU average. Noteworthy increases were also recorded in both Romania (+ 8 percentage points compared with 2017) and Cyprus (+ 4 percentage points). 31 % of Romanians and 36% of Bulgarians still do not go regularly online. The largest number of internet users are young individuals (97 % for 16-24 year olds) and those who have a high-level of formal education (97 %).

**Figure 3.4-2 Regular internet use in the EU, 2017-2018 (% of individuals)**



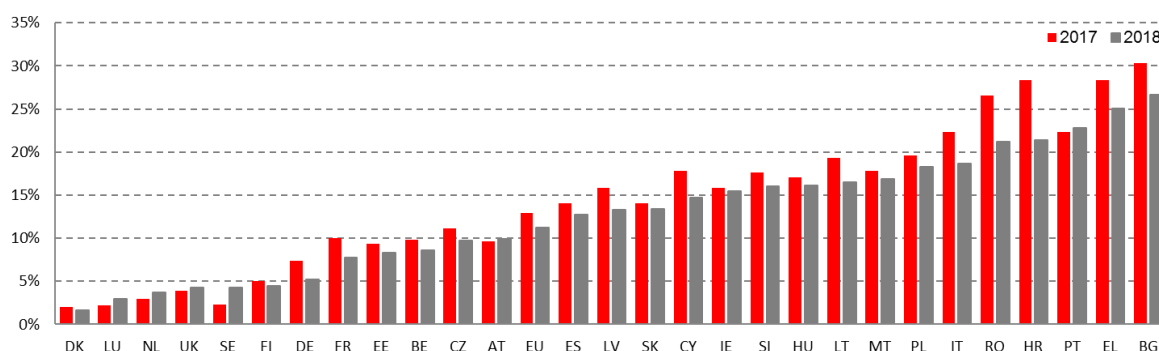
Source: Eurostat

The **share of people in the EU who have never gone online** decreased again in 2018, although the current share of 11 % warrants further actions. Despite convergent trends, large disparities remain across Member States.

The share of people in the EU not using the internet fell in nearly all Member States in 2018. Still every 10<sup>th</sup> European has never used the internet. Denmark, Luxembourg, the Netherlands, the UK, Sweden and Finland are countries where the share is even below 5 %. The share is still significantly large in Bulgaria (27 %), Greece (25 %), Portugal (23 %), Croatia and Romania (both 21 %).

The Members States with the largest reductions were Croatia with a drop of 7 percentage points, Romania with a drop of 5 percentage points, and Italy and Bulgaria, both with a drop of 4 percentage points. People with low education levels or on low incomes, as well as the elderly, the retired or the inactive tend to use the internet comparatively less.

**Figure 3.4-3 Individuals who never used the internet, 2017-2018 (% of individuals)**



Source: Eurostat

**83 % of people in the EU go online at least weekly.** A gender gap persists but it is narrowing. The elderly and those with low education levels or on low incomes continue to be at risk of digital exclusion.

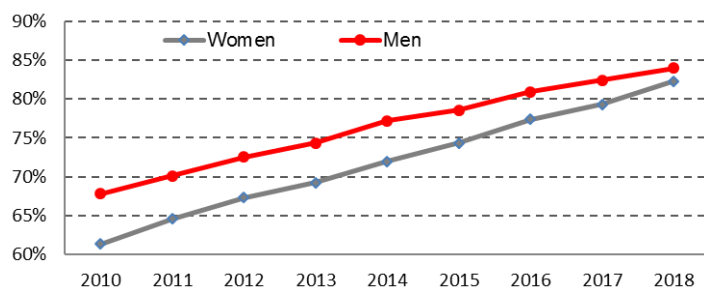
In 2018, 83 % of Europeans used the internet at least weekly and about 76 % daily or almost every day, compared with 81 % and 72 % respectively a year earlier.



Proportionately, men use the internet more than women do (at least weekly: 84 % against 82 %; daily or almost: 75 % against 77 %), although the difference is narrowing.

The gender gap persists but continues to narrow, reaching 1.7 % in 2018 against 6.4 % in 2010.

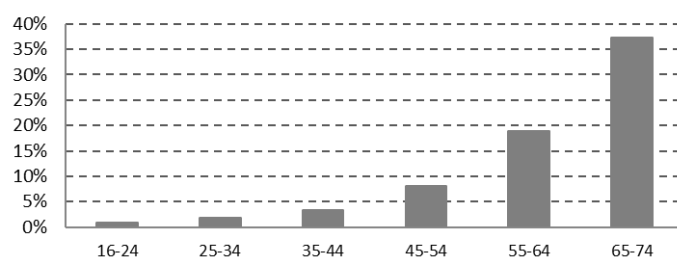
**Figure 3.4-4 Gender gap between individuals who are regular internet users (at least once a week) between 2010-2018**



Source: Eurostat

89 % of households in the EU have internet access but the share of individuals who have never used the internet is still significant. It is the highest among 65-74 year olds (37 %), while among 16-24 it is less than 1 %. Similar proportions are seen based on the education level - 27 % of individuals with no or a low-level of education and 1 % of individuals with a high-level of formal education. People from these groups continue to be at a high risk of digital exclusion.

**Figure 3.4-5 Individuals who have never used the internet by age, 2018**



Source: Eurostat

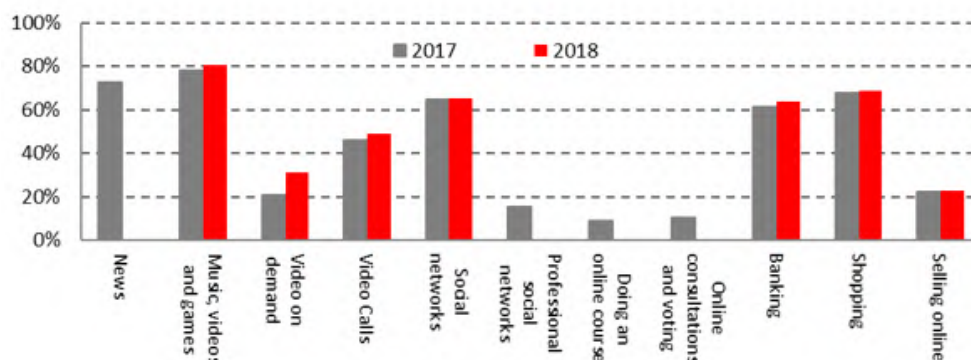
**Growth in the use of online services is generally slow, although use of the internet for video on demand picked up significantly in 2018.**

As in the previous edition of DESI, annual variation in the different activities considered in the Use of internet services dimension has been limited. The percentage of people using the internet for video calls, banking, music videos and games increased moderately (about 3 percentage points in each). The largest increase was in use of the internet for video on demand, where the share of users went from 21 % in 2016 to 31 % in 2018.

Reading news online is second the most popular activity performed by internet users. Shopping and participating on social networks are also very popular. While doing an online course is among the least popular activities online, it is relatively widespread in Sweden and Finland with 18 % and 17 % of internet users participating in these in 2017.

It is also not that common for users to participate in professional social networks, create professional profiles, or create content and post it online.

**Figure 3.4-6 Use of internet services in the EU, 2017-2018, selected indicators (% of internet users)**



Source: Eurostat

**Almost every third internet user (31 %) watched video on demand in 2018.**

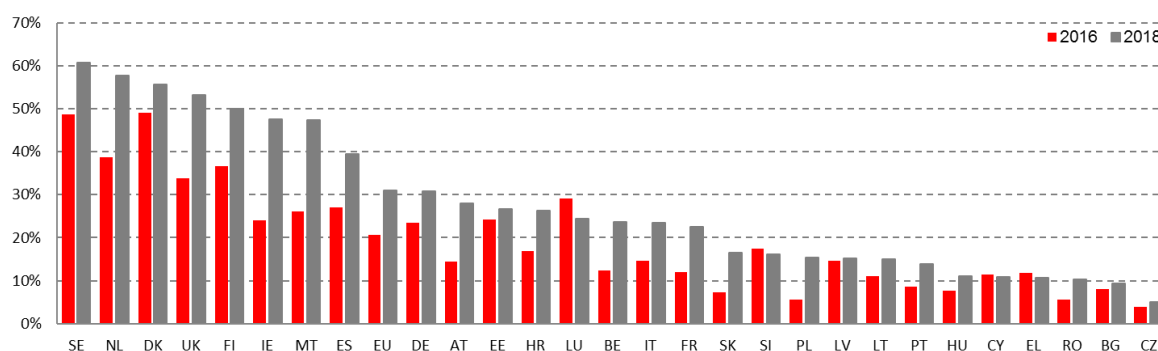
In 2018, 31 % of internet users watched video on demand (21 % in 2016). Among 16-24 year olds, the share of users watching video on demand reached 51 %, whereas this figure was 25 % for the 45-54 year olds, 17% for the 55-64 year olds and 11 % for 65-74 year olds.

The countries with the largest proportion of internet users who watched video on demand (above 50%) were Sweden (61 %), the Netherlands (58%), Denmark (56 %) and the UK (53 %). Czechia (5 %), Bulgaria (9 %), Romania (10%), Greece, Hungary and Cyprus (11 % each) had the lowest proportion.

Among female internet users there was an increase of 11 percentage points between 2016 (18 %) and 2018 (29 %). A similar trend was observed for male internet users with an increase of 10 percentage points from 23 % in 2016 to 33 % in 2018.

The largest increases in the proportion of internet users watching video on demand were registered in Ireland (24 percentage points) followed by Malta (21 percentage points).

**Figure 3.4-7 Individuals watching video on demand, 2016-2018 (% of internet users)**



Source: Eurostat

**Participation in online social networks increased moderately in the EU in 2018, reaching 65 % of internet users.**

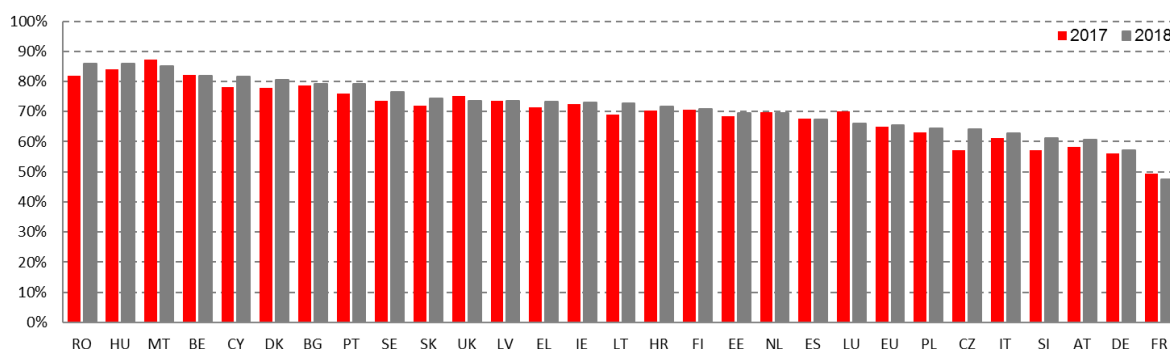
In 2018, 65 % of internet users participated in social networks. Among 16-24-year olds, the proportion of users participating in social networks reached close to 90 %, whereas this figure was 57 % for 45-54 year olds.

The countries with the largest proportion of internet users participating in social networks were Romania and Hungary (86 %), followed by Malta (85 %), and Belgium and Cyprus (both 82 %).

The largest increases in the proportion of internet users participating in social networks between 2017 and 2018 were registered in Czechia (7 percentage points) followed by Romania and Slovenia (4 percentage points each).

France had the lowest proportion of users (48 %), followed by Germany (57 %), and Austria and Slovenia (both 61 %).

**Figure 3.4-8 Participation in social networks, 2017-2018 (% of internet users)**



Source: Eurostat

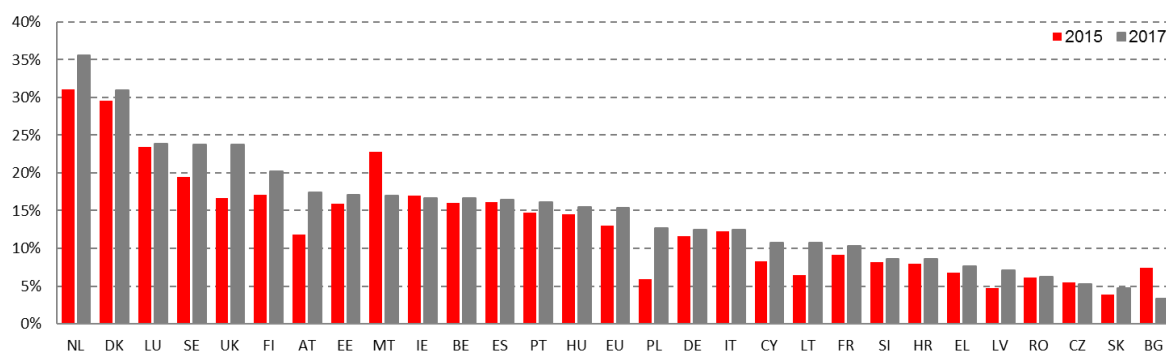
**Participation in online professional social networks is still very low in the EU, oscillating at around 15 % of internet users in 2017.**

In 2017, 15 % of internet users participated in professional social networks, a small increase (2 percentage points) from 2015.

The countries with the largest proportion of internet users using professional social networks were the Netherlands and Denmark (36 % and 31 %), followed by Luxembourg, Sweden and the UK (reaching 24 %). Bulgaria had the lowest proportion of users (3 %), followed by Slovakia (5 %).

The largest increases in the proportion of internet users participating in professional social networks between 2015 and 2017 were registered in the UK (7 percentage points) followed by Poland (7 %) and Austria (6 %).

**Figure 3.4-9 Participation in professional social networks, 2015-2017 (% of internet users)**



Source: Eurostat

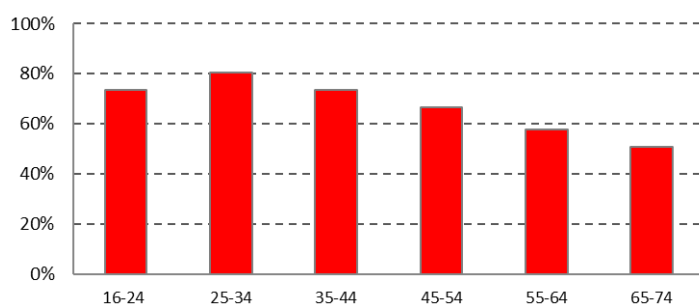
**The upward trend in e-commerce continued in 2018, with around 69 % of EU internet users now shopping online.**

In 2018, 69 % of internet users ordered goods and services online and 23 % of individuals sold goods or services online, using, among other means, online auctions.

e-Commerce varies considerably across EU Member States. In 2018, 87 % of internet users in the UK shopped online compared to only 26 % in Romania.

The largest annual increase in the proportion of internet users engaging in e-commerce was in Ireland (5 percentage points).

**Figure 3.4-10 Individuals buying online by age groups, 2018**

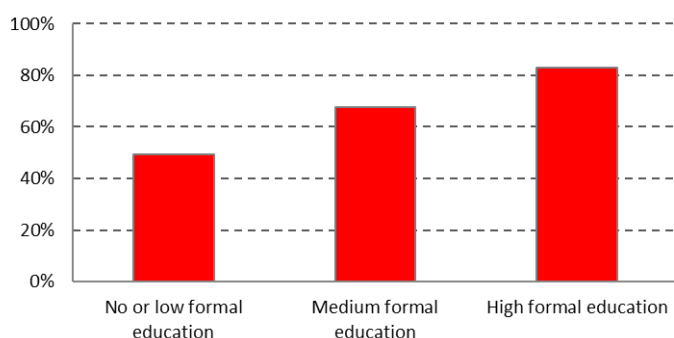


Source: Eurostat

e-Commerce is affected by age, level of education and employment situation. There was a slightly higher share of men shopping online than women (69 % and 68 % respectively).

Young people make up the most active age group of online shoppers is (81 % of 25-34-year-olds); while the proportion of internet users with a higher level of education shopping online (83 %) is 34 percentage points higher than those with lower-level formal education. Employees and the self-employed (75 %) together with the students (70 %) are very active online shoppers.

**Figure 3.4-11 Individuals buying online by education levels, 2018**



Source: Eurostat

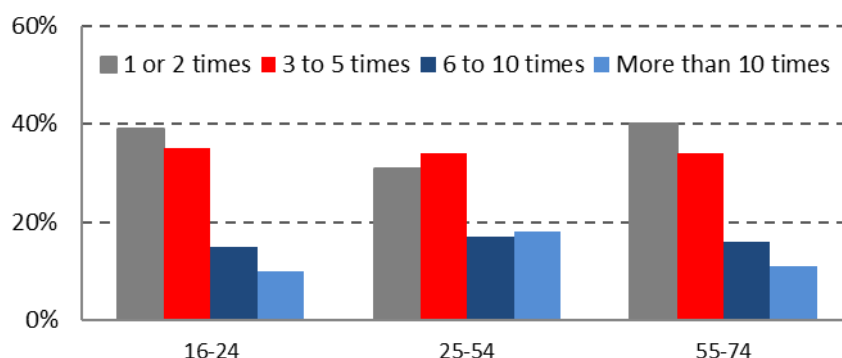
**The most popular goods and services purchased in 2018 were clothes and sport goods, followed by travel accommodation services and household goods.**

In 2018, the most popular categories of goods and services purchased online in the EU were clothes and sport goods (64 % of online buyers), travel and holiday accommodation (53 %), household goods (45 %), tickets for events (39 %), and books, magazines and newspapers (32 %).

Fewer than one in five purchases were for telecommunication services (20 %), computer hardware (17 %), medicines (14 %) and e-learning material (7 %).

Online shoppers aged 16-24 and 25-54 favoured clothes and sports goods in their online purchases (72 % and 67 % respectively).

**Figure 3.4-12 Purchase frequency by the age groups, 2018**



Source: Eurostat

Among people aged 16-24 almost every third purchase was either computer software (31 %), films and music (29 %) or electronic equipment (26 %)

People aged 25-54 were the most frequent buyers of household goods (50 %), tickets for events (41 %), food or groceries (28 %) and telecommunication services (20 %).

The older (55-74) age group took the lead in buying books, magazines and newspapers (34 %), medicines (19 %), and travel and holiday accommodation (55 %), which was also popular among those aged 25-54 (55 %).

41 % of online shoppers claimed to have spent between EUR 100 and EUR 499 on online purchases over the previous three-month period. Every 10<sup>th</sup> person aged 25-54 spent more than EUR 1000. Among 16-24 year-olds the small value purchases (between EUR 50 and EUR 100) are the most common (27 %).

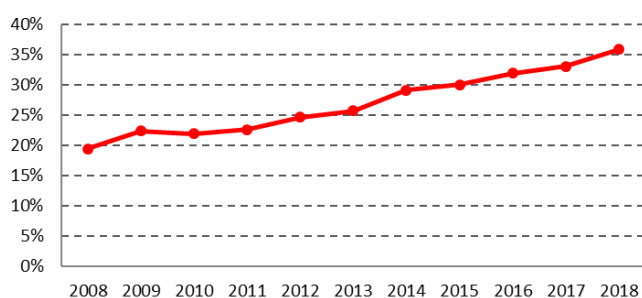
People aged 25-54, in turn, tend to make more frequent purchases: every third person purchased between 3 to 5 times (34 %), 17 % of online shoppers in this group bought online 6-10 times and 18 % even more than 10 times in 2018.

### **Only 36 % of online shoppers ordered cross-border goods and services from other EU countries in 2018.**

In 2018, although 69 % of internet users in the EU shopped online, cross-border online shopping is advancing more slowly. Among online shoppers, 36 % made online purchases from sellers in other EU countries and 26 % from sellers in non-EU countries in 2018, compared with 25 % and 13 % respectively in 2012.

Among online shoppers, who made purchases over 2018, 88 % bought goods or services from national sellers. There was an increase in purchases from sellers in other EU countries (from 30 % in 2015 to 36 % in 2018) and from sellers outside the EU (from 37 % in 2015 to 46 % in 2018).

**Figure 3.4-13 Individuals ordering goods or services cross border, 2018 (% of individuals)**



Source: Eurostat

The extent of cross-border e-commerce differs substantially between Member States, as it ranges from 3 % of internet users in Romania and 7 % in Poland to 61 % in Luxembourg and 59 % in Malta.

A number of factors including country size and language influence buying goods and services from other EU Member States. For example, Luxembourg, Malta and Austria, which have relatively small home markets and have strong language connections with other large European countries, have higher shares of cross-border e-commerce.

Among internet users who made cross border purchases in 2017, 80 % bought or ordered tangible goods such as: electronics, clothes, toys, food, groceries, books, and CDs/DVDs.

Lower proportions of internet users booked online travel, accommodation or made holiday arrangements (34 %).

Only 16 % bought or ordered other services, such as e-tickets for events (sport events, concerts or other entertainment events) or telecommunication services (subscription of telephone services, SIM cards).

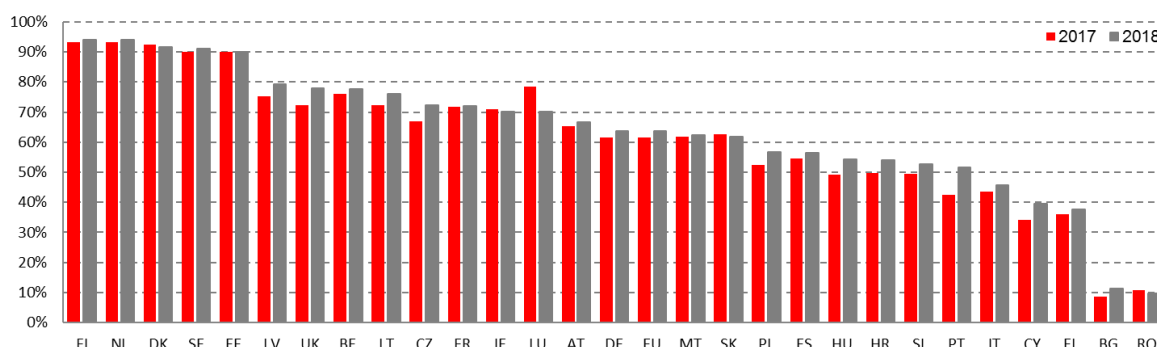
**64 % of EU internet users used online banking in 2018, although a large majority of them still do not in a number of Member States.**

Online banking is a relatively common activity among internet users in the EU. 64 % used internet banking in 2018, a 3 percentage points annual increase from 2017.

In 2018, high shares of internet users doing online banking were recorded in the Netherlands and Finland (both 94 %), Denmark (92 %) and Sweden (91 %) in 2018. Large differences remain across Member States, with Romania (10 %) and Bulgaria (11 %) having the lowest shares. The highest increase in 2018 was observed in Portugal.

Among individuals with a high-level of formal education the share reached 80 %, while it was half of that for individuals with no or low formal education (41 %). Among 25-34 year olds, the share reached 75 %, and 70 % for 35-44 year olds.

**Figure 3.4-14 Individuals who used internet banking in previous 3 months (% of internet users), 2017-2018**



Source: Eurostat

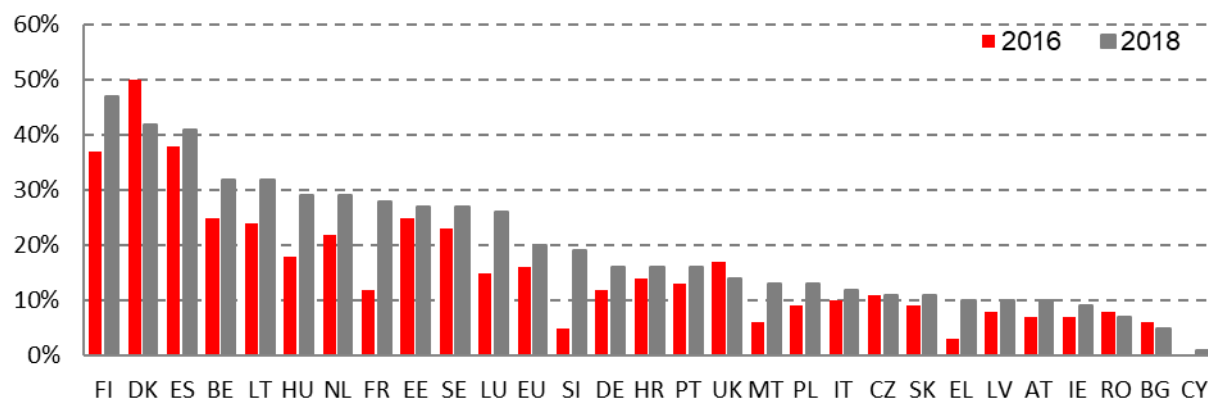
**Seeking health information on the internet is widespread, but only one-fifth of EU internet users made an online appointment with practitioner in 2018.**

Using the internet to seek health-related information is widespread across the EU. 60 % of EU internet users, sought out health-related information online in 2018, with the Netherlands (76 %), Hungary and Finland (both 74 %) having the highest share.

On average, only 20 % of EU internet users went online to make an appointment with a practitioner in 2018. Across the EU Member States, this figure ranges from over 47 % in Finland and 42 % in Denmark to 1 % in Cyprus and 5 % in Bulgaria.

From 2016, the biggest increase was observed in France (16 percentage points) and Slovenia (14 percentage points). Denmark and the UK were two countries where the highest drop between 2016 and 2018 was observed (8 percentage points drop for Denmark and 3 percentage points drop for UK).

**Figure 3.4-15 Individuals who have made an appointment with a practitioner via website, 2016-2018 (% of internet users)**



Source: Eurostat



## 5. Integration of digital technologies

On **Integration of digital technology**, Ireland scored highest, followed by the Netherlands, Belgium and Denmark. Bulgaria, Romania, Poland and Hungary scored lowest.

Integration of digital technology covers (a) 'business digitisation' and (b) 'e-commerce'.

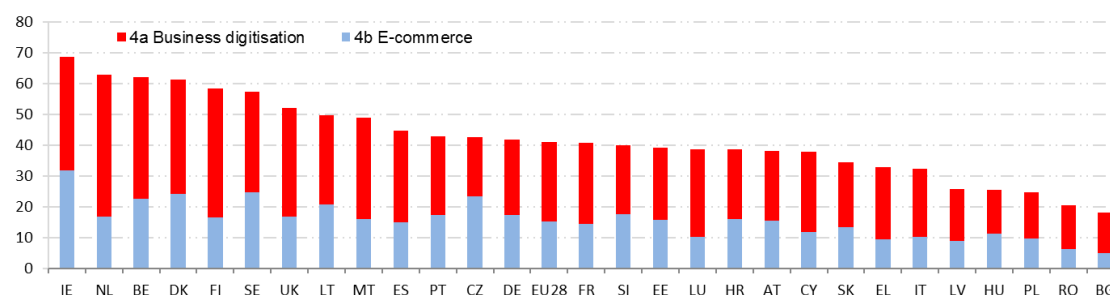
'Business digitisation' has four indicators (as the % of enterprises using): electronic information sharing, social media, big data analysis and cloud solutions.

e-Commerce includes three indicators: the percentage of small and medium-sized enterprises (SMEs) selling online, e-commerce turnover as a percentage of total turnover of SMEs, and the percentage of SMEs selling online cross-border.

**Figure 5-1 Integration of digital technology indicators in DESI 2019**

Integration of Digital Technologies indicators in DESI 2019	EU
<b>4a1 Electronic information sharing</b>	<b>34%</b>
% enterprises	2017
<b>4a2 Social media</b>	<b>21%</b>
% enterprises	2017
<b>4a3 Big data</b>	<b>12%</b>
% enterprises	2018
<b>4a4 Cloud</b>	<b>18%</b>
% enterprises	2018
<b>4b1 SMEs selling online</b>	<b>17%</b>
% SMEs	2018
<b>4b2 e-Commerce turnover</b>	<b>10%</b>
% SME turnover	2018
<b>4b3 Selling online cross-border</b>	<b>8%</b>
% SMEs	2017

**Figure 5-2 Digital Economy and Society Index (DESI) 2019, Integration of technology**



Source: European Commission services based on Eurostat data

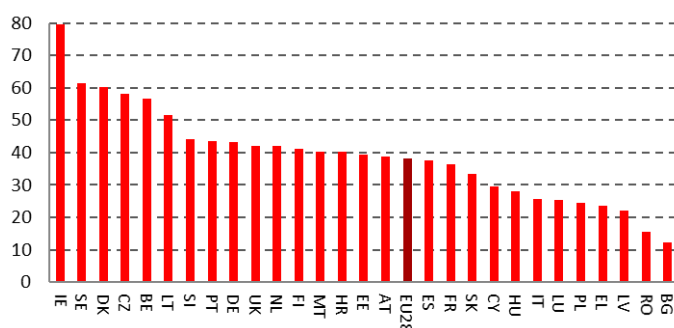
The EU Member States that have exploited **e-commerce** opportunities the most are Ireland, Sweden and Denmark, whereas the Netherlands and Finland are leading in the adoption of **e-business** technologies.

Enterprises are implementing both e-business and e-commerce solutions.

Regarding e-commerce, Ireland, Belgium and Czechia are among the top five countries in all the three indicators mentioned previously. Denmark is leading regarding the share of enterprises selling online, whereas Sweden ranks 3<sup>rd</sup>. Sweden is positioned 4<sup>th</sup> and Denmark 5<sup>th</sup> concerning the share of e-commerce turnover in total turnover.

In Bulgaria, Romania and Latvia, SMEs are yet to exploit the many opportunities in e-commerce.

**Figure 5-3 DESI 2019 – e-commerce index**

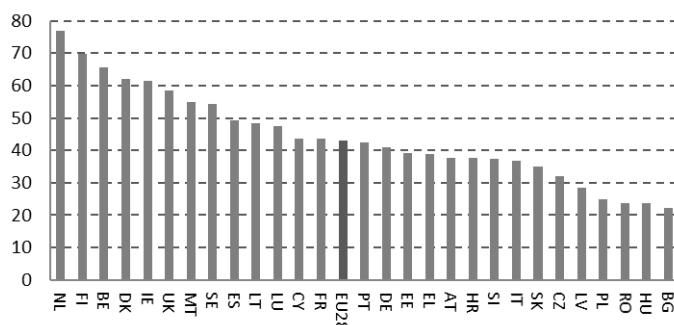


Source: European Commission services based on Eurostat data

When it comes to e-business technologies, the leading countries are the Netherlands (2<sup>nd</sup> among EU Member States in three indicators: electronic information sharing, social media and big data analysis; 3<sup>rd</sup> in cloud solutions), Finland (forerunner in the use of cloud solutions) and Belgium (first in electronic information sharing).

Bulgaria, Hungary, Romania, Poland and Latvia are lagging behind in the adoption of e-business technologies.

**Figure 5-4 DESI 2019 - Business digitisation index**



Source: European Commission services based on Eurostat data

Less than a fifth of companies in the EU-28 are highly digitised, but the situation across countries is varied, ranging from 50 % of companies in Finland and Denmark to only 10 % in Bulgaria, Greece and Latvia.

The Digital Intensity Index (DII) measures the availability at firm level of 12 different digital technologies:

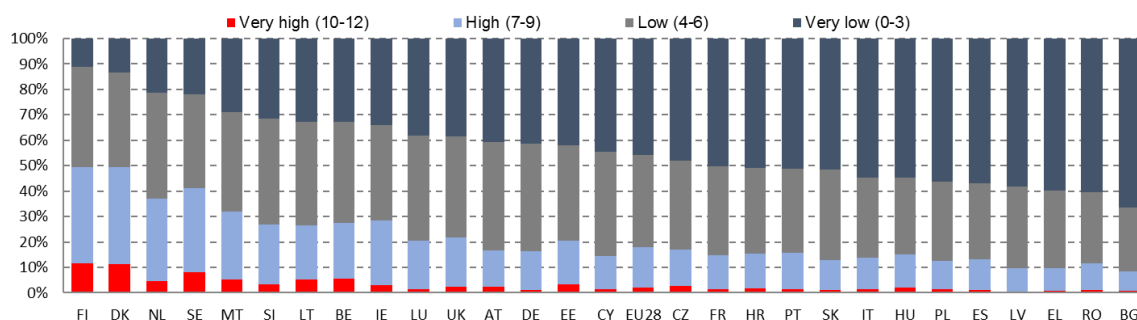
- internet for at least 50 % of people employed;
- recourse to ICT specialists;
- fast broadband (30 Mbps or above);
- mobile internet devices for at least 20 % of people employed;
- a website or homepage;
- a website with sophisticated functions;
- social media,
- paying to advertise on internet;
- buying medium-high cloud computing services,
- sending e-invoices suitable for automated processing;
- e-commerce web sales accounting for at least 1 % of total turnover; and
- business-to-consumer (B2C) web sales of over 10 % of total web sales.

The value for the index therefore ranges from 0 to 12.

Finland and Denmark are the only countries in the EU where the percentage of firms with a very high DII (i.e. possessing at least 10 out of the 12 monitored digital technologies) is above 10 %, followed by Sweden with 8 %.

By contrast, in some countries such as Bulgaria, Romania, Greece, Latvia, Spain, Poland Hungary and Italy the majority of businesses (over 55 %) have had low investments in digital technologies (i.e. have a very low DII), often having just a simple website and a few computers.

**Figure 5-5 Digital Intensity Index 2018 (% of enterprises by level)**



Source: Eurostat

## Digital transformation of European businesses is driven by fast broadband connections, social media and mobile applications.

The table below shows the degree of penetration and speed of adoption of the different technologies monitored by the DII. Large companies are more digitised than SMEs. While some dimensions seem to be reaching saturation (e.g. having a simple website), at least for large companies, for most dimensions there is still room for improvement.

**Figure 5-6 Key indicators tracking digitisation processes**

Key indicators tracking digitisation processes	Year	% of EU28 enterprises		Variation 2018 on 2017 or 2016	
		Large	SMEs	Large	SMEs
Enterprises having a <b>web site</b> or homepage	2018	94%	77%	0%	0%
Access to <b>ICT specialist</b> skills	2018	90%	65%	1%	1%
Website has some <b>interactive functionalities</b>	2018	74%	57%	0%	-1%
Website has references to the enterprise's <b>social media profiles</b>	2018	63%	37%	3%	3%
>50% of the persons employed <b>use computers &amp; Internet</b>	2018	52%	43%	2%	3%
Fastest <b>broadband</b> connection is at least 30 Mb/s	2018	75%	43%	6%	5%
>20% of workers with <b>portable devices</b> for business use	2018	42%	34%	3%	2%
Pay to <b>advertise</b> on the internet	2018	38%	26%	4%	1%
<b>Selling</b> online (at least 1% of turnover)	2018	38%	17%	-1%	-1%
Sending <b>eInvoices</b> suitable for automated processing	2018	47%	23%	Not comparable with 2017 or 2016	
Buy medium-high <b>Cloud Computing</b> services	2018	39%	17%	9%	4%
Exploit <b>B2C eCommerce</b>	2018	9%	8%	1%	0%

(a) Variation on 2016

(b) Enterprises where web sales are more than 1% of total turnover and B2C web sales more than 10% of the web sales

Source: European Commission services based on Eurostat data

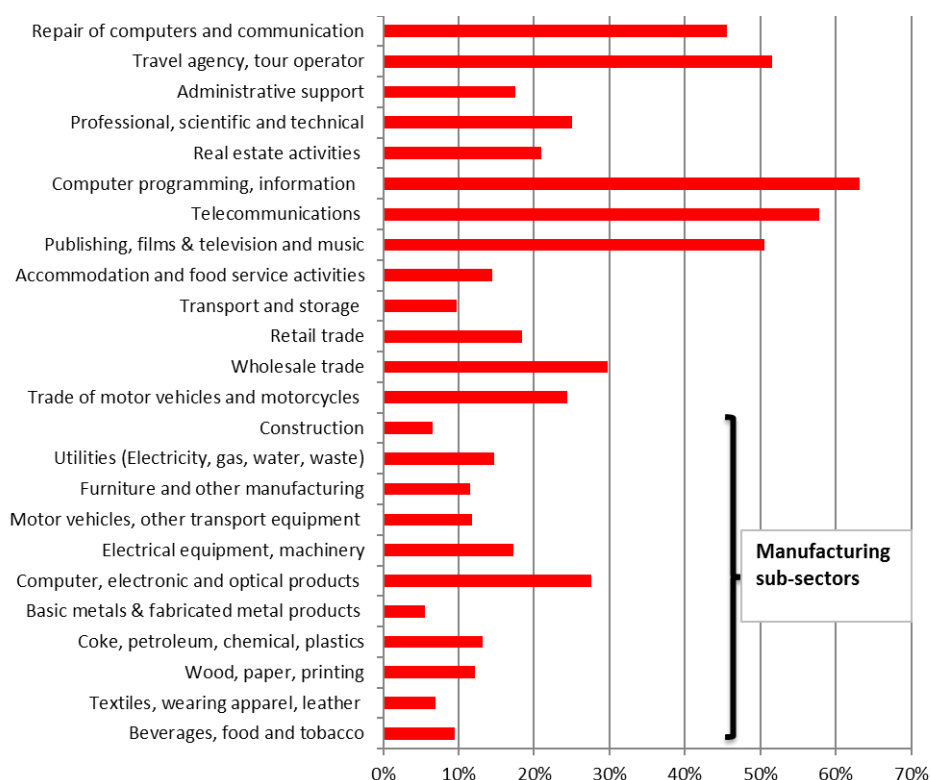
## The digitisation of economic sectors is progressing at different pace, according to their own specific needs and starting points.

The different segments of the ICT sector (from telecoms to the manufacture of computers) tend to be the most digitised sectors of the economy. However, other sectors such as travel agencies and the media sectors are also highly digitised.

Some sectors are still impervious to digital changes: for example, in the construction sector only 6.5 % of the enterprises have a high or very high DII, while for transport and storage almost 10 % of enterprises have high or very high DII.

The distribution of the DII by economic activity is similar across EU countries. Denmark, Finland and Sweden are over performing in many of the sectors. Some positive exceptions of higher digitisation exist in the following sectors: "travel agency; tour operator reservation service and related activities" (Slovenia, Lithuania, Romania, Hungary, Estonia, the Netherlands and Czechia), "professional scientific and technical activities" (Finland, Slovenia and Lithuania), "real estate activities" (Finland, the Netherlands and Ireland) and "transport and storage" (Malta).

**Figure 5-7 Enterprises with high or very high digital intensity index by economic activity, EU, 2018 (% enterprises)**



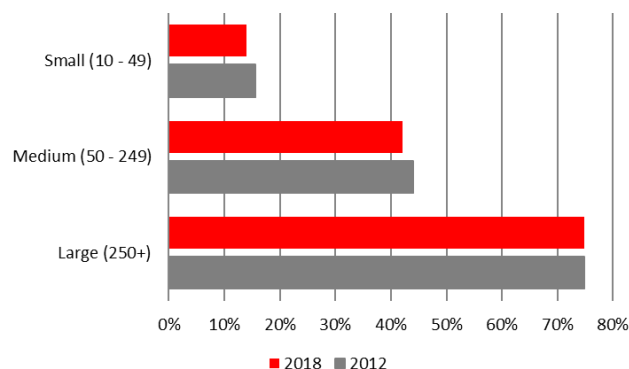
Source: European Commission services based on Eurostat data

**The adoption of digital technologies varies strongly according to company size. There are still many areas for SMEs, where opportunities for digitisation can be exploited.**

Large enterprises have a scale advantage, thus 80 % of them employ internal ICT specialists. The share of SMEs employing ICT specialists decreased slightly (1.6 percentage points) during the last six years, however the share of SMEs where ICT tasks were carried out by external personnel increased since 2015 (1.7 percentage points)

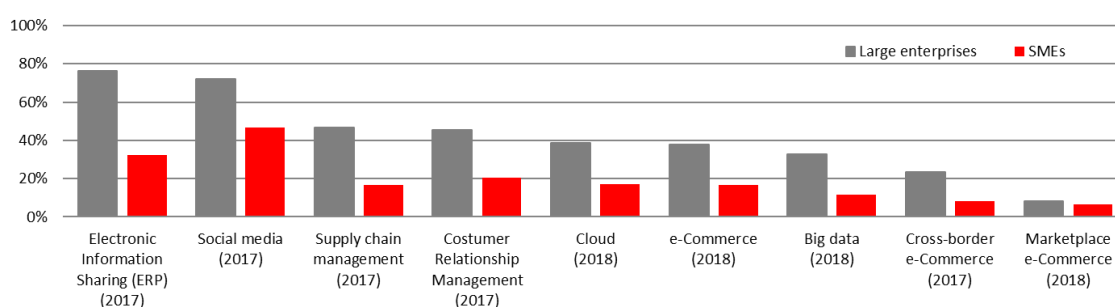
Electronic information sharing through Enterprise Resource Planning (ERP) software is much more common in large companies. SMEs are active on social media (47 % use any type of social media, 2017) and, to a limited extent, they try to exploit e-commerce opportunities by selling through online marketplaces (6.5 % of SMEs versus 8.3 % of large enterprises). Nevertheless, there are many technological opportunities yet to be exploited by SMEs such as cross-border e-commerce, cloud services and customer relationship management.

**Figure 5-8 Enterprises employing ICT specialists, EU (% of enterprises), 2012-2018**



Source: Eurostat

**Figure 5-9 Adoption of digital technologies, EU (% of enterprises)**

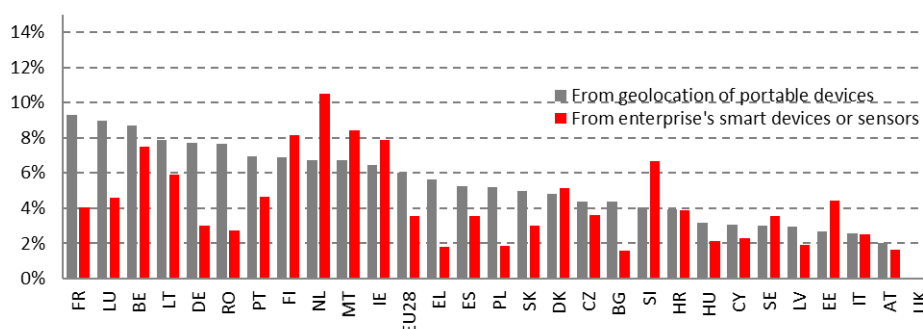


Source: Eurostat

**More than 12 % of enterprises analyse big data. Malta performs the best, with almost 25 % of Maltese enterprises analysing big data.**

Enterprises all around the EU are constantly evolving and aligning with the trends and technologies for collecting, storing and analysing data. Companies use big data for analysing in large volumes, producing near or real time results from data that comes in different format types. Large companies have the lion's share in big data processing (33 %), while SMEs have still room for improvement (12 %) to take advantage of the benefits that big data can bring. Nearly 6 % of enterprises analyse big data from geolocation of portable devices, while almost 4 % analyse data from their smart devices or sensors.

**Figure 5-10 Sources used from enterprises to analyse big data, 2018 (% of enterprises)**

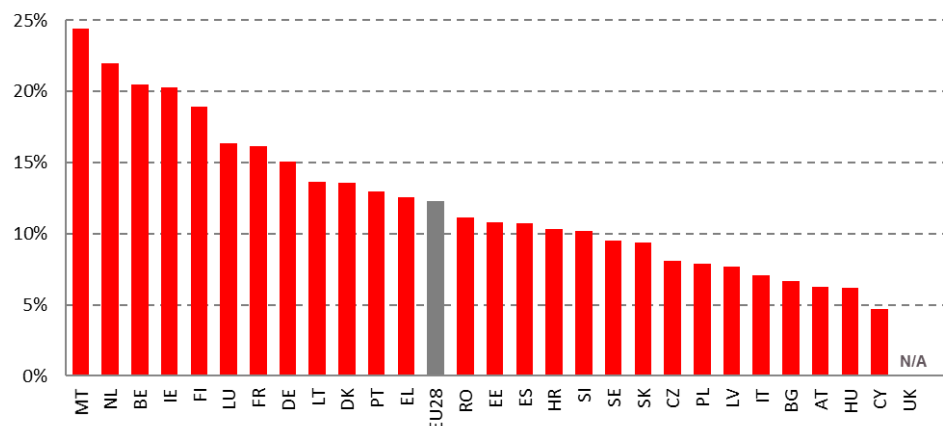


❖ The UK did not cover this (optional) question in 2018

Source: Eurostat

In Malta, almost one fourth of enterprises use big data. The Netherlands, Belgium and Ireland follow closely, with more than 20 % of enterprises taking advantage of big data. On the other hand, enterprises in Cyprus, Hungary, Austria and Bulgaria barely use big data.

**Figure 5-11 Enterprises analysing big data from any data source, 2018 (% of enterprises)**



❖ The UK did not cover this (optional) question in 2018.

Source: Eurostat

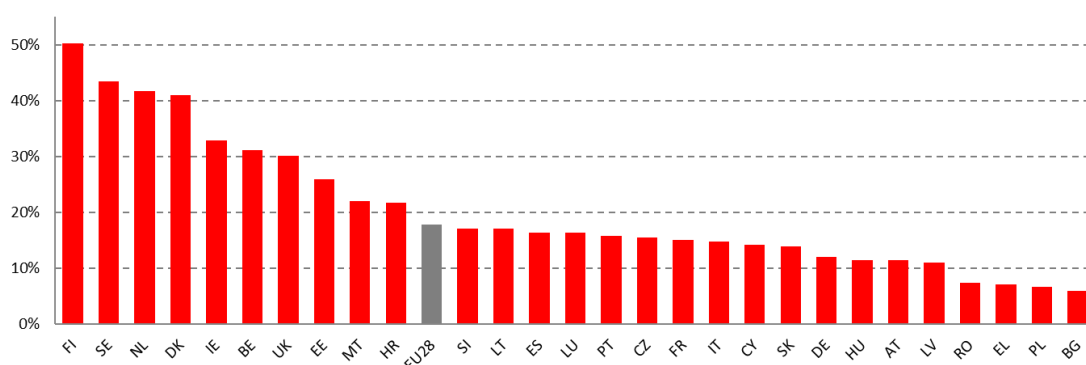
## **26.2 % enterprises invest in cloud computing services, with 17.8 % investing in cloud computing services of medium-high sophistication.**

26.2 % of European enterprises purchase cloud computing services and incorporate cloud technologies for improving operations while reducing costs, representing an increase of 25 % compared to 2016. The cloud uptake of larger companies (55.6 %) is higher than SMEs (25.3 %) in 2018.

17.8 % of companies use medium-high sophisticated services (i.e. hosting of the enterprise's database, accounting software applications, Customer Relationship Management (CRM) software and computing power). There is a bigger proportion of larger enterprises following this trend (38.5 %) than SMEs (17.2 %).

Finnish enterprises are leaders in incorporating cloud services of medium-high sophistication. 50 % of Finnish enterprises buy such services, having recorded a 50 % increase between 2014 and 2018. Sweden, the Netherlands and Denmark follow with more than 40 % of enterprises using these services. However, the gap between top and low performers remain large, with Bulgaria, Poland, Greece and Romania performing below 10 %.

**Figure 5-12 Cloud computing services of medium-high sophistication, 2018 (% of enterprises)**



Source: European Commission services based on Eurostat

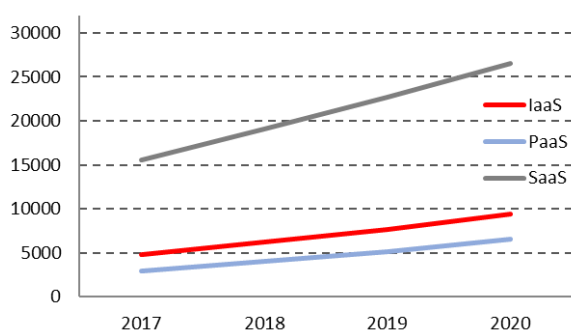
**Revenues generated from public cloud services** within the EU market increased by **25 %** compared to 2017. They are expected to grow by **45 %** in average between 2018 and 2020.

Total revenues generated by public cloud services, i.e. Infrastructure as a service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS), across the EU market increased by 25 % between 2017 and 2018. They are expected to continue to grow by 45 % between 2018 and 2020.

In 2018, SaaS represented almost two thirds of total public cloud revenues generated within the EU market. It is forecasted to continue until at least until 2020. In 2018, IaaS and PaaS represented 21 % and 13 % of total public cloud revenues generated within the EU market.

Between 2018 and 2020, it is forecasted that IaaS and PaaS will respectively grow at 52 % and 64 % both at a higher rate than SaaS over the same period (39 %).

**Figure 5-13 EU public cloud service revenues per category, 2017 - 2020 (EUR million)**



Source: European Commission services based on IDC

Between 2017 and 2018, of the three applications contributing the most to SaaS revenues across the EU market, the revenue rates for each increased by the following percentages:

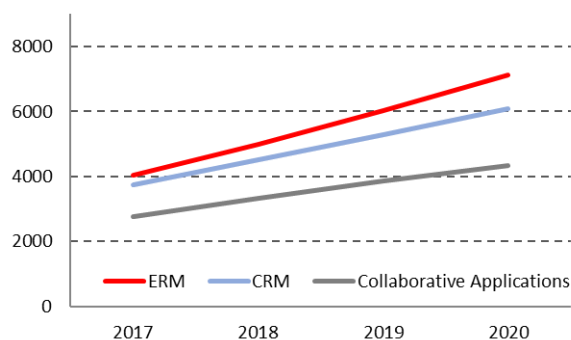


23 % for Enterprise Risk Management (ERM); 20 % for Customer Relationship Management (CRM) and; 21 % for Collaborative Applications.

They are expected to remain the most prominent ones applications that contribute to total SaaS revenues until at least 2020 with respective revenue growth rates of 43 %; 35 % and; 30 % between 2018 and 2020.

In 2018, software security, as a SaaS application, contributed EUR 1169.8 million to total SaaS revenues within the EU market. The revenue growth rate is expected to be at 37 % and therefore growing faster than CRM and collaborative applications but still slower than ERM over the 2018 to 2020 period.

**Figure 5-14 Revenue of the top 3 SaaS Applications in share of total SaaS EU revenues, 2017 - 2020 (EUR million)**



Source: European Commission services based on IDC

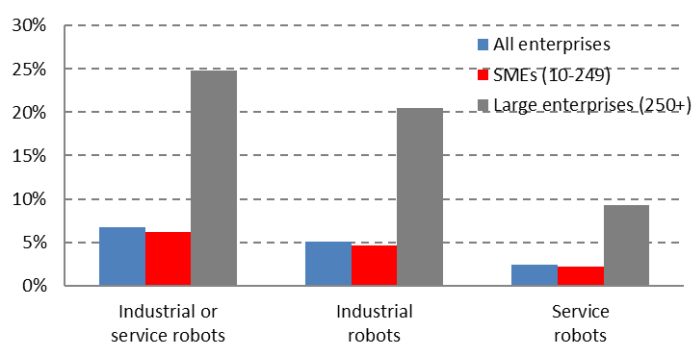
**Use of robots is low on an EU level, with 6.7 % of all enterprises using industrial or service robots. The share of large enterprises that use robots is four times higher than the share of SMEs.**

The adoption of robotics is quite low in all EU Member States for which data are available (Belgium, Croatia, Ireland, Latvia, Luxembourg and the UK did not cover this optional module in 2018), with a take-up rate in all enterprises ranging from 10.8 % in Spain to 1.2 % in Cyprus. Only Western European countries are above the EU average of 6.7 %. The share of enterprises using robots is below 4 % in Estonia, Hungary, Lithuania, Greece, Romania and Cyprus.

The use of robots varies strongly according to company size. Almost 25 % of large enterprises use both industrial and service robots, while the take-up rate for SMEs is four times less at only 6.2 %. More than 30 % of large enterprises use robots in Slovenia, Finland, Denmark, Sweden and Czechia.

The use of industrial robots is more than twice that of service robots both in large enterprises and in SMEs.

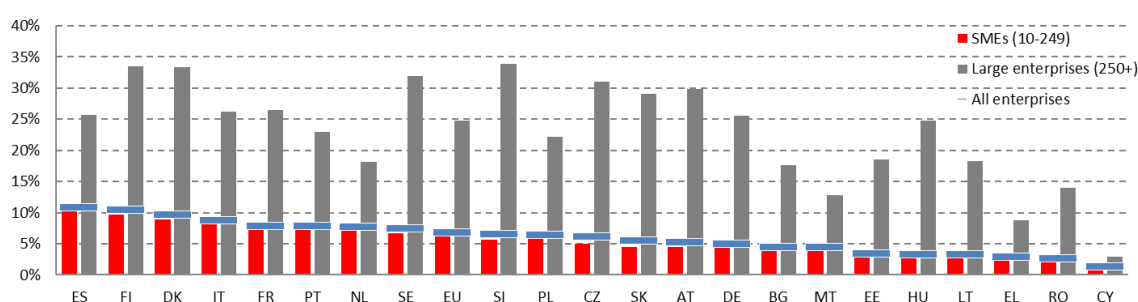
**Figure 5-15 Use of robots, EU, 2018 (% of enterprises)**



❖ Data not available in six EU Member States.

Source: Eurostat

**Figure 5-16 Use of robots, 2018 (% enterprises using industrial or service robots)**



❖ Data not available in six EU Member States.

Source: Eurostat Data not available in six EU Member States

**More than 4 % of enterprises use 3D printing services for internal use or for products for sale.**

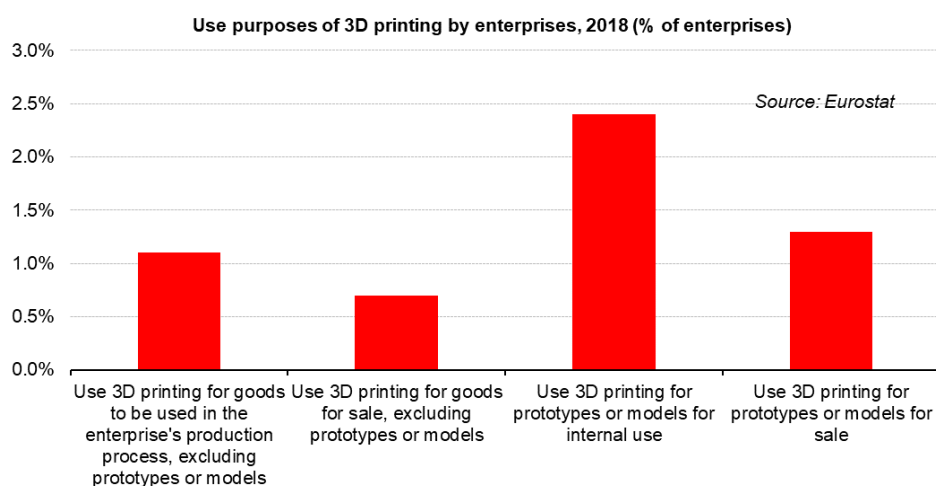
3D printing evolves and its use extends beyond the manufacturing sub-sectors. Enterprises invest in 3D printing technologies and services for improving production and product sales.

During 2018, 1.1 % of enterprises used 3D printing services for producing goods to be used in the enterprises' production process, while 0.7 % used them for printing goods for sale. 2.4 % of enterprises used 3D printing for producing prototypes or models for internal use, while 1.3 % used them for printing prototypes or models for sale purposes.

3D printing is a new technology that is not commonly used by all the enterprises. Almost 4 % of SMEs used 3D printing. Larger enterprises make greater use of 3D services (13.4 %).

More than 6 % of Finnish and Danish enterprises use 3D printing services, while less than 1.5 % of Latvian and Cypriot enterprises use these services.

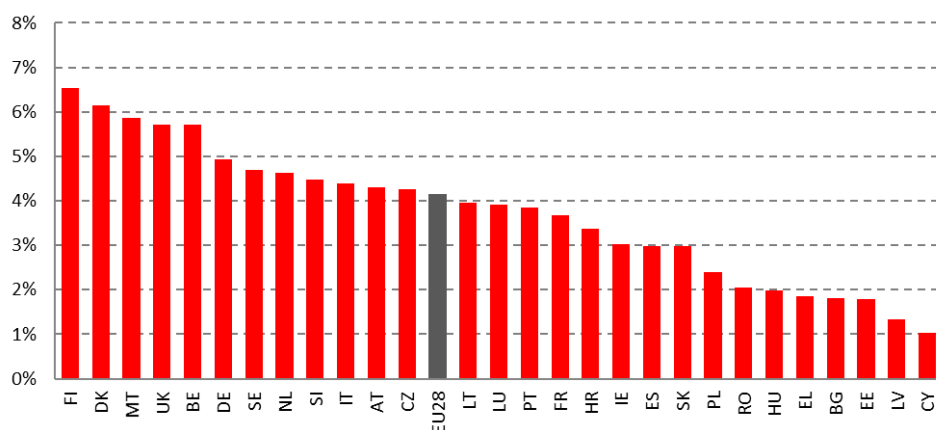
**Figure 5-17 Use of 3D printing by purposes, 2018 (% of enterprises)**



❖ This indicator is slightly different from the “enterprises selling online” indicator, which concerns enterprises that received orders via computer mediated networks with the sales representing at least 1% of the total turnover.

Source: Eurostat

**Figure 5-18 Enterprises using 3D printing services, 2017 (% of enterprises)**



Source: Eurostat

**e-Commerce:** only 20 % of companies make electronic sales, representing slow progress in this area. **Larger enterprises** are better at exploiting e-commerce possibilities.

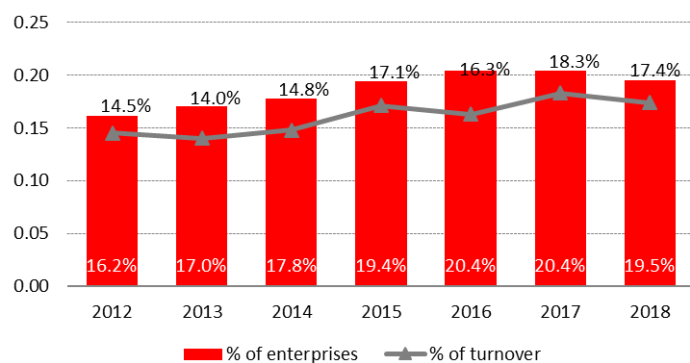
One out of five enterprises in the EU-28 made electronic sales<sup>1</sup> in 2017. The percentage of turnover on e-sales amounted to 17.4 % of the total turnover of companies with 10 or more persons employed.

<sup>1</sup> This indicator is slightly different from the ‘enterprises selling online’ indicator, which concerns businesses that received orders via computer mediated networks with the sales representing at least 1% of the total turnover.

In the EU-28, between 2012 and 2018, the percentage of companies selling online increased by 4.2 percentage points and the companies' turnover realised from e-sales increased by 2.8 percentage points.

The share of companies conducting e-sales and the turnover from e-sales varies significantly according to size.

**Figure 5-19 Trends in e-commerce, EU (% of enterprises, % of turnover)**



Source: Eurostat

The share of SMEs making e-sales (18.9 %) is less than half compared to the share of large enterprises (42.5 %). Similarly, the share of the e-sales' turnover on the total turnover by SMEs (10.1 %) is less than the half of the share generated by the large ones (24.1 %).

**Figure 5-20 e-Sales and turnover from e-sales , by firm size, between 2012 and 2018 (% of enterprises, %of turnover)**

	Enterprises with e-sales (%)			Turnover from e-commerce (%)		
	2012	2015	2018	2012	2015	2018
All enterprises	16.2%	19.4%	19.5%	14.5%	17.1%	17.4%
Large (250+)	39.3%	42.8%	42.5%	20.7%	23.7%	24.1%
SMEs (10-249)	15.5%	18.8%	18.9%	7.8%	9.4%	10.1%

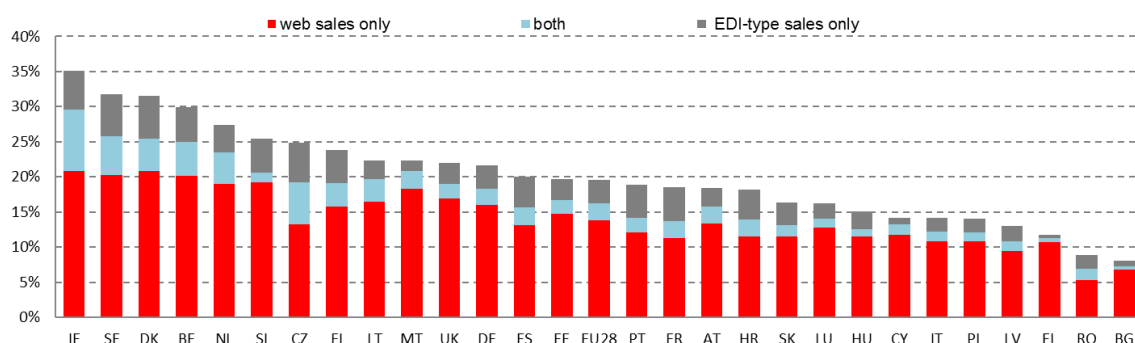
Source: Eurostat

### Different types of e-commerce: **Web and EDI-type.**

e-Commerce can be broadly divided into two types: web sales and Electronic Data Interchange (EDI-type) sales, referring to the way customers place orders for products. The EDI type is the exchange of data between information systems, through a dedicated channel and according to a defined standard. It does not require human intervention except in exceptional cases.

The percentage of enterprises selling online (web or EDI type) ranged from 8 % in Bulgaria to 35 % in Ireland, followed by Sweden (32 %). Web sales, made through the enterprise own website or through third parties one (including marketplace), is the most common option for e-sales. Around 14 % of the enterprises sell through a website, 2 % exploit both channels, while slightly more than 3 % make use of EDI-type sales.

**Figure 5-21 e-Sales broken down by web sales and EDI-type sales, 2018 (% of enterprises)**

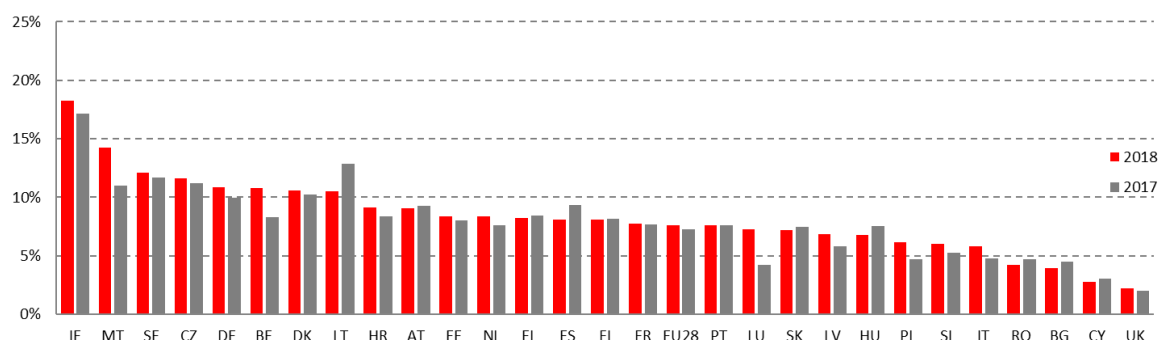


Source: Eurostat

### Enterprises selling online are slowly increasing their share of sales to consumers (B2C).

Among the EU-28, the percentage of enterprises exploiting the opportunities of e-sales to consumers (with web sales more than 1% of total turnover and B2C web sales more than 10 % of their web sales) ranged from 2.2 % in the UK to 18.2 % in Ireland. Most of the Member States increased their B2C e-sales compared to 2017. Belgium and Malta improved the most.

**Figure 5-22 Enterprises exploiting the "Business to Consumers" opportunities of web sales, 2017-2018 (% of enterprises with B2C web sales more than 10% of the web sales)**



Source: Eurostat

Large enterprises and SMEs increased their B2C share of e-sales by 21 % and 20 % respectively compared to 2015.

**Figure 5-23 Enterprises exploiting the "Business to Consumers" opportunities of web sales, between 2015 and 2018 (% of enterprises)**

	2015	2016	2017	2018
All enterprises	9.6%	10.5%	11.3%	11.5%
Large (250+)	13.3%	13.6%	15.8%	16.1%
SMEs (10-249)	9.5%	10.4%	11.1%	11.4%

Source: Eurostat

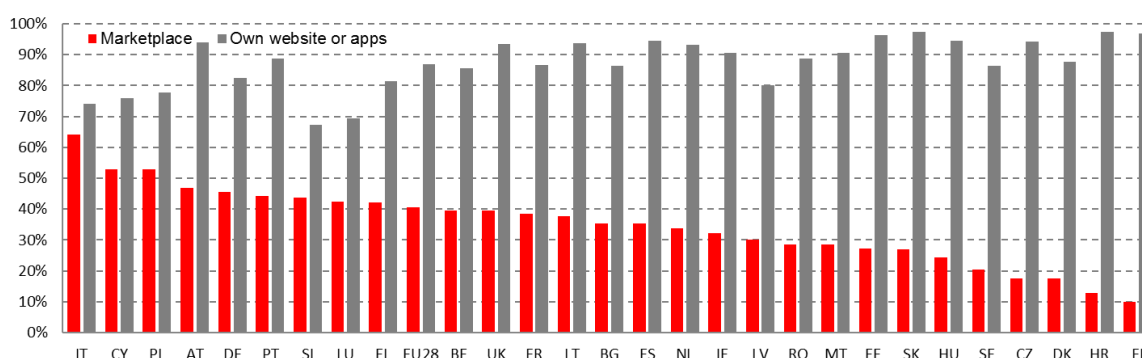
**Businesses are starting to become active on online marketplaces. More than twice as many companies with web sales sell on their own website or apps than in marketplaces.**

As regards web sales, it is necessary for an enterprise to disentangle its web sales made through a marketplace, available on external websites, from those done through its own website. e-commerce marketplaces and general online platforms may facilitate economic growth by enabling sellers to access new markets and reach new customers at lower cost. This option has been exploited at EU level by 40 % of enterprises with web sales against 87 % using their own website or apps.

Altogether 13 EU Member States reported that over 90 % share of enterprises with web sales via own sites, with Croatia, Slovakia, Finland and Estonia are leading in this group of countries.

Companies in Finland, Croatia, Denmark and Czechia have the lowest percentages of web sales via marketplaces (below 20 %). Selling online via marketplaces was the most common option in Italy (64 %), Cyprus and Poland (both 53 % of enterprises with web sales).

**Figure 5-24 Web sales broken down by own website or apps and marketplace, 2018 (% enterprises with web sales)**



Source: Eurostat

**The share of turnover from web sales via companies' own website or apps is greater than that from web sales via marketplaces.**

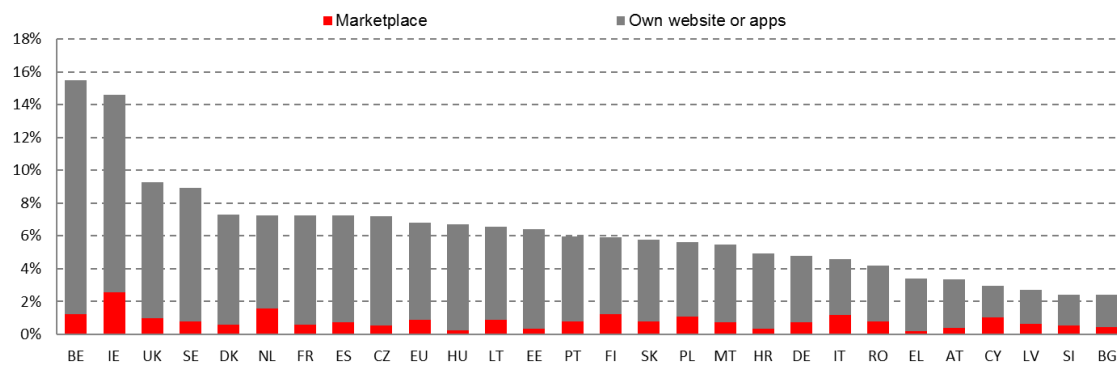
In the EU-28, companies gained 7 % of their total turnover from web sales. 87 % of it (equal to 6 % of total turnover) was gained from web sales via own website or apps and only 13 % (equal to 1 % of total turnover) from sales via online marketplaces.

Turnover from sales on own websites or apps had the highest share in total turnover in Belgium (14.2 %), Ireland (12 %), the UK (8.3 %) and Sweden (8.1 %).

The highest share of turnover from selling via the marketplace (from the total turnover of the firm) was gained in Ireland (2.5 %) and the Netherlands (1.6 %).

When looking at the composition of the web sales turnover, companies in Cyprus gained 35 % of their web sales turnover through sales on marketplaces, while companies in Italy gained 25 %.

**Figure 5-25 Turnover from web sales broken down by own website or apps and marketplace, 2018 (% total turnover)**



❖ Data not available for Luxembourg due to confidentiality.

Source: Eurostat

## 6. Digital public services

In **digital public services**, Finland has the highest score, followed by Estonia, the Netherlands and Spain. Romania, Greece and Hungary have the lowest scores.

The digital public services dimension consists of eight indicators:

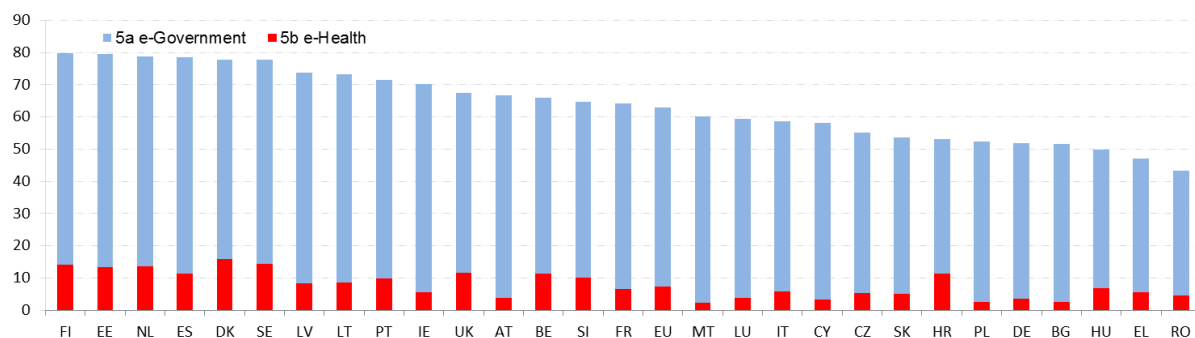
- the eGovernment users measured as a percentage of those internet users who need to submit forms to the public administration (the e-government users indicator);
- the extent to which data that is already known to the public administration is pre-filled in forms presented to the user (the pre-filled forms indicator);
- the extent to which the various steps in dealing with the public administration can be carried out completely online (the online service completion indicator);
- the degree to which public services for businesses are interoperable and cross-border (the digital public services for businesses indicator);
- the government's commitment to open data (the open data indicator);
- the percentage of people who used online health and care services without having to go to a hospital or doctors surgery (the e-health services indicator);
- the extent to which general practitioners are using electronic networks to exchange medical data with other healthcare providers and professionals (the medical data exchange indicator); and
- the extent to which general practitioners are using electronic networks to transfer prescriptions to pharmacists (the e-prescription indicator).

**Figure 6-1 Digital Public Services indicators in DESI 2019**

Digital Public Services indicators in DESI 2019	EU
<b>5a1 e-Government users</b>	<b>64%</b>
% internet users needing to submit forms	2018
<b>5a2 Pre-filled forms</b>	<b>58</b>
Score (0 to 100)	2018
<b>5a3 Online service completion</b>	<b>87</b>
Score (0 to 100)	2018
<b>5a4 Digital public services for businesses</b>	<b>85</b>
Score (0 to 100) - including domestic and cross-border	2018
<b>5a5 Open data</b>	<b>64%</b>
% of maximum score	2018
<b>5b1 e-Health services</b>	<b>18%</b>
% individuals	2017
<b>5b2 Medical data exchange</b>	<b>43%</b>
% of general practitioners	2018
<b>5b3 e-Prescription</b>	<b>50%</b>
% of general practitioners	2018

**Figure 6-2 Digital Economy and Society Index (DESI) 2019, Digital Public Services**





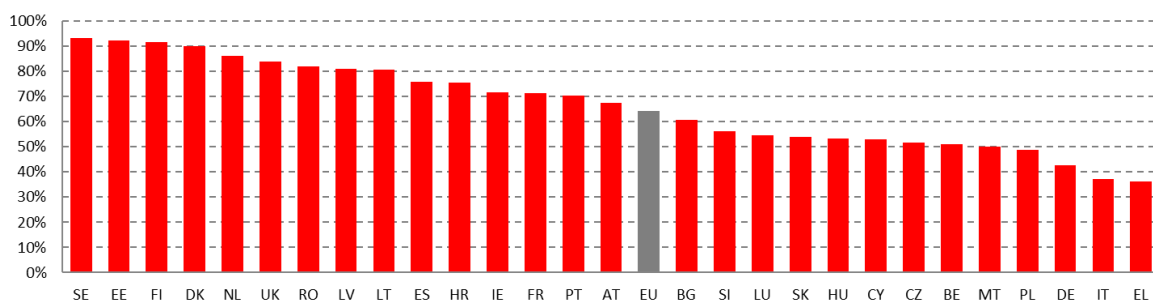
Source: DESI 2019, European Commission

**The demand side of digital public services is progressing, as 64 % of EU citizens used public services online.**

e-Services reduce the time spent in public administrations and this encourages people to use them. Sweden, Estonia, Finland and Denmark performed very well, with more than 90 % of internet users (aged 16-74), who need to submit filled forms to the public administration, choosing governmental portals. Only Italy and Greece perform below 40 %.

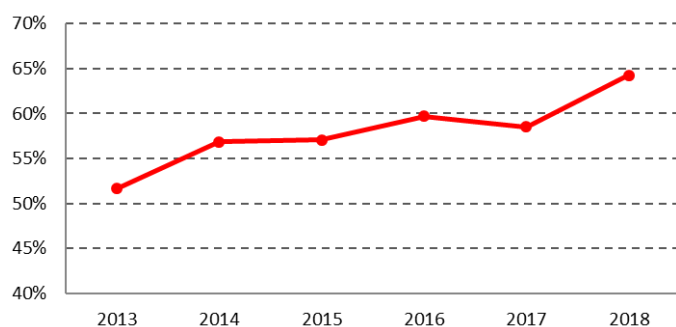
24 countries performed better in 2018 than in 2017, with Portugal and Czechia making the biggest improvement with 18 and 15 percentage points respectively. In 2018, the number of e-government users increased by 10 %, which is the greatest recorded change since the DESI started. Compared to recent years, the upward trend from 2015 to 2017 stopped in 2017 with a fall of 1 percentage point.

**Figure 6-3 e-Government users, 2018 (% of internet users needed to submit filled forms to public authorities over the Internet in the last 12 months)**



Source: Digital Scoreboard

**Figure 6-4 e-Government users between 2013 and 2018**



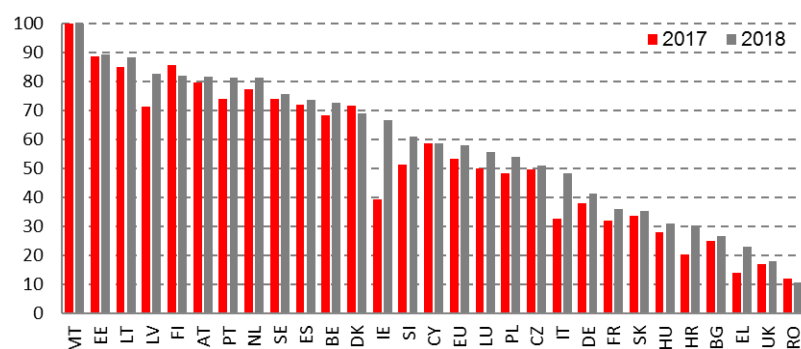
Source: Eurostat

**The provision of government services online is progressing, with several Member States recording big improvements.**

The use of inter-connected registers is key to assure that users do not have to resubmit data to the public administration.

Although all the countries improved compared to 2017, the amount of data available in public services' online forms (pre-filled forms) is still not satisfactory. Only four countries (i.e. Romania, Cyprus, Denmark and Finland) recorded lower scores compared to 2017. Ireland (+27.5 points), Italy (+15.75 points) and Latvia (+11.38 points) made the most progress. The three best performing countries were Malta, Estonia, and Latvia with scores above 82 points. However, the worst performing countries (i.e. Romania, the UK, Greece and Bulgaria) scored below 30 points.

**Figure 6-5 Pre-filled forms, 2017-2018 (score 0 to 100)**

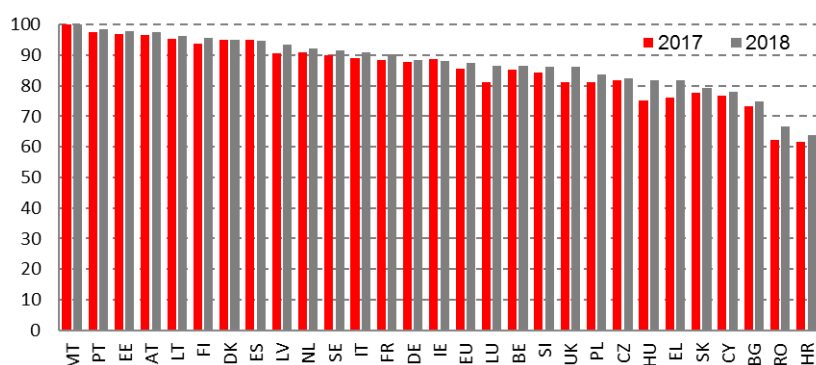


Source: eGovernment Benchmark Report

Online service completion refers to the extent to which the various steps needed in dealing with the public administration can be done completely online.

Malta, Portugal, Estonia, Austria, and Lithuania performed the best, retaining the same ranking they achieved in 2017. Altogether 13 countries (Malta, Portugal, Estonia, Austria, Lithuania, Finland, Denmark, Spain, Latvia, the Netherlands, Sweden, Italy, and France) scored above 90 points. Croatia, Romania and Bulgaria had low scores, while only two Member States (Spain and Ireland) had slightly declined compared to 2017. Hungary is the country with the greatest increase compared to 2017, followed by Luxembourg and Greece.

**Figure 6-6 Online service completion, 2017-2018 (score 0 to 100)**



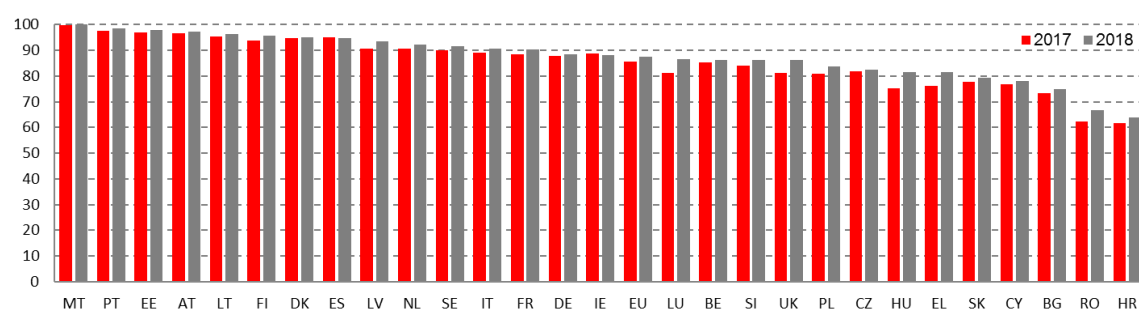
Source: eGovernment Benchmark Report

**The provision of digital public services for businesses is improving, having increased by more than 25 % in the last 5 years.**

This indicator measures the degree to which basic public services for businesses, when starting a business and conducting regular business operations, are available online and cross borders to other EU Member States. Services provided through a portal receive a higher score, while services that only provide information online but the operations of which have to be done offline receive a lower score.

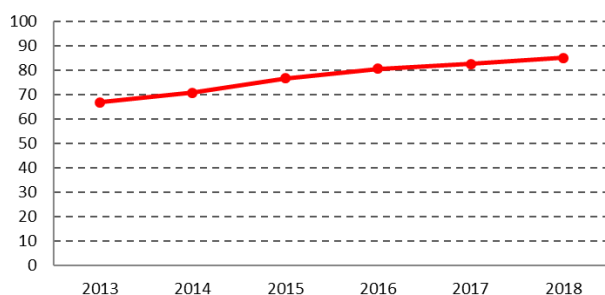
Altogether 11 countries (Denmark, Ireland, the UK, Lithuania, Bulgaria, Malta Spain, Estonia, Sweden, Latvia and Cyprus) scored more than 90 points (out of 100). Bulgaria and the UK recorded the greatest improvement compared to 2017. On the other hand, Croatia, Romania and Bulgaria scored below 75, while Germany recorded a drop of more than 4 points.

**Figure 6-7 e-Government services for businesses, 2017-2018 (score 0 to 100)**



Source: eGovernment Benchmark Report

**Figure 6-8 e-Government services for businesses, 2013-2018**



Source: eGovernment Benchmark Report

**Open data:** The overall results across the EU show the variety in the speed of transformation and the priorities that countries have set.

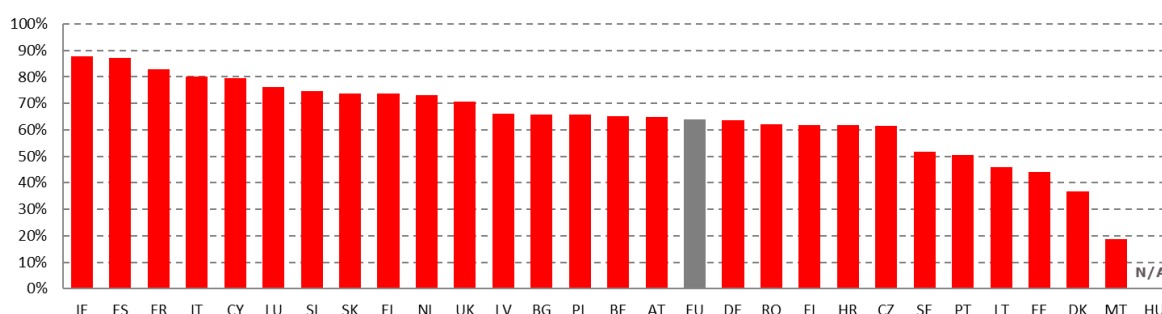
As from 2018, the level of maturity of open data is based on the four following indicators:

- Open data policy: the presence at national level of specific policies on open data, licensing norms, and the extent of coordination at national level to provide guidelines to national, local and regional administrations, and set up coordinated approaches towards data publication.
- Open data portals: the development of national portals and their level of sophistication to feature available open data.
- Open data impact: the impact of open data at country level on four dimensions: political, social, environmental and economic.
- Open data quality: the extent to which national portals have a systematic and automated approach to harvesting and the compliance level in terms of the metadata standard DCAT-AP (specification for metadata records).

The less advanced open data countries choose to take what they deem to be the natural next step and invest in modernising their national portals so they become the main gateways to open data available throughout the country. The more 'mature' open data countries have now shifted to boosting the quality of data publication. The top performing countries are now prioritising the impact derived from open data and carry out activities to monitor and capture this impact.

Ireland, Spain and France performed well, having scored more than 80 %. On the other hand, Malta, Denmark, Estonia and Lithuania underperformed, having scored less than 50 %.

**Figure 6-9 Open data, 2018 (% of the maximum open data score)**



❖ The methodology was updated to enforce the metadata quality and impact, therefore there is a break in the series compared to past years.

❖ Hungary did not participate in the exercise for 2018

Source: European Data Portal

## Can businesses and the public quickly and easily access public information and services? Public administrations **score 84 (out of 100) points in user centricity.**

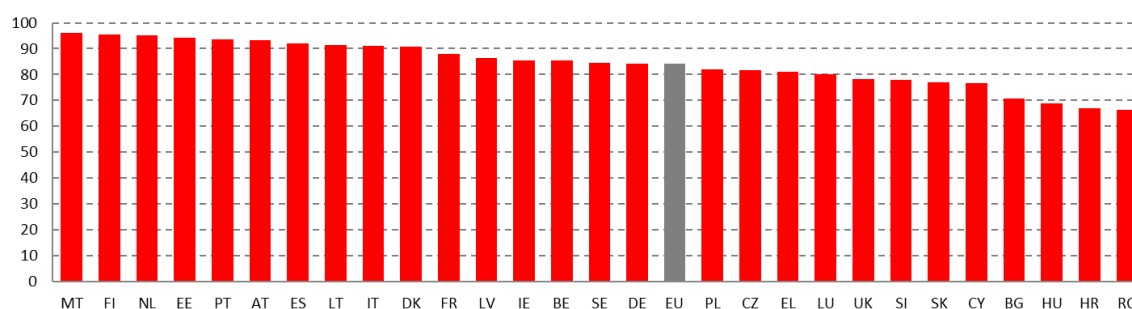
This indicator includes three key elements of online service provision:

- Online availability: this illustrates how services are made available (automated; service available online through a portal or directly; information on the service is available either through a portal or online; the service or any information about the service is not online available).
- Usability: this measures the availability of support channels and feedback mechanisms, such as online chats.
- Mobile friendliness: this captures the extent to which government services are available through mobile devices, providing seamless and convenient mobile experience to the public and businesses.

Member States are improving, having an overall score of 84 (out of 100) which keeps growing. Over the last five years, online availability has risen by 15 points, broadening the online scope of public services. Moreover, an initial gap of 64 points between the top and bottom five performing countries of 64 points has decreased by 12 points over the last five years. Encouragingly, public sector services are also increasingly mobile-friendly, allowing users to find information and obtain services anytime and anywhere.

Malta, Finland and the Netherlands are leading in the EU, scoring more than 90 points, while Romania, Croatia and Hungary are lagging behind, scoring less than 70 points.

**Figure 6-10 User centricity, 2018 (score 0-100)**



Source: eGovernment Benchmark Report

### **In the last 5 years, Member States increased the use of key enablers by 10 %**

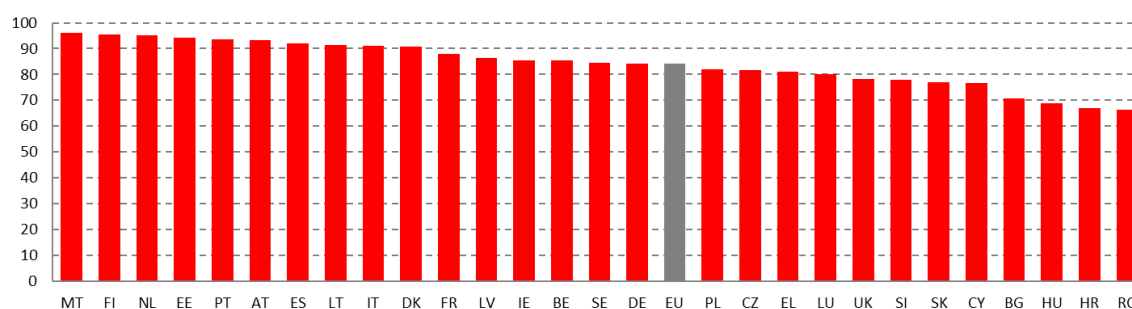
The key enabler indicator includes the following four key elements of online service provision and availability:

- Electronic Identification (eID) is a government-issued document for online identification and authentication.
- eDocuments: a document that has been authenticated by its issuer using any means recognised under applicable national law, specifically through the use of electronic signatures, i.e. not a regular pdf or word doc.
- Authentic sources: base registries used by governments to automatically validate or fetch data related to individuals or businesses.
- Digital post: assesses whether public authorities allow people to receive communications digitally only, and hence reducing paper mailings. Digital post refers to the possibility for governments to communicate by electronic means only with people or entrepreneurs, such as through personal mailboxes.

Member States have ample room to improve the implementation of key enablers in their service provisions. For example, public administrations could optimise the reuse of (personal) information already provided by users. In effect, the authentic source indicator stands at 56 (out of 100). However, countries substantially differ; eID stands at 55, while digital post options are available in 65 out of 100 institutions. E-documents stands at 65 (out of 100) as well.

Malta, Estonia, Lithuania, Austria, Latvia and Denmark are leading, scoring more than 80 points, while Romania, Croatia and Bulgaria and Greece are lagging behind, scoring less than 30 points.

**Figure 6-11 Key enablers 2018 (score 0-100)**



Source: eGovernment Benchmark Report

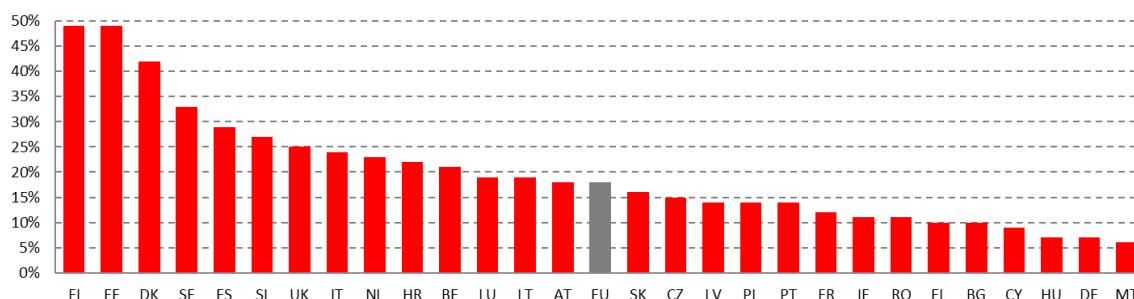
### **Digital health and care: more than half of the people in the EU want online access to their medical records.**

Only 18 % of people in the EU have used online health and care services without having to go to a hospital or a doctors surgery (for example, by getting a prescription or a consultation online). 5% have used these "once", 6 % "twice" and 7 % "three times or more". The majority (81 %) have "never" used these services.

According to Eurobarometer, 52 % of all people in the EU would like online access to their medical and health records. People in the EU are much more willing to share data on their health and wellbeing with doctors and healthcare professionals (65 %) than with companies (14 %) or with public authorities even if anonymised and for research purposes (21 %). One in twenty (5 %) would be willing to give their anonymised data to private sector companies for commercial purposes. Less than one in five people in the EU have used health and care services provided online (18 %). Overall, seven in ten (70 %) would be willing to give their health and personal wellbeing data to others. Most likely they are willing to do this for their doctor or health care professional (65 %).

Almost 50 % of people in Finland and Estonia used e-health services, while in Denmark the percentage is slightly lower (42 %). On the other hand, Malta Hungary, Germany and Cyprus underperformed, having scored less than 10 %.

**Figure 6-12 Use of e-health services, 2017 (% of individuals aged 16-74)**



Source: Eurobarometer, Special Eurobarometer 460: Attitudes towards the impact of digitisation and automation on daily life, 2017

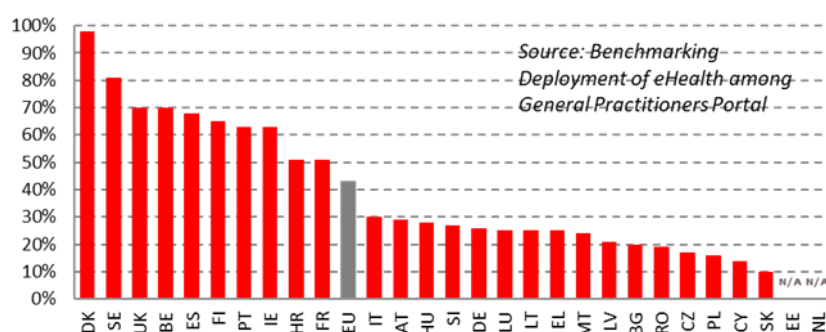
## Almost half of general practitioners used electronic means to exchange medical data and prescribe medicines.

More than 40 % of general practitioners used electronic networks to exchange medical data with other healthcare providers and professionals.

One of the bottlenecks that prevents general practitioners from exchanging patients' data are the compatibility problems that might be encountered with the systems.

Denmark ranked first, having scored 98 %, with Sweden following (81 %). Altogether 10 countries scored over 43 %. The rest had a much worse performance, with Slovakia, Cyprus, Poland, Czechia and Romania having scored below 20 %.

**Figure 6-13 Use of medical data exchange, 2018 (% of general practitioners)**



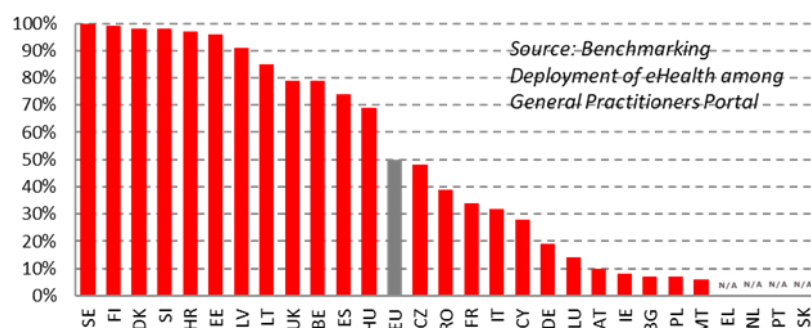
- ❖ The Netherlands did not participate in the exercise for 2018
- ❖ For Estonia the data was removed, because of low reliability

Source: Benchmarking Deployment of eHealth among General Practitioners

The use of electronic prescriptions has been introduced to improve health care in the EU. So far, half of general practitioners have used electronic networks to transfer prescriptions to pharmacists.

Sweden scored 100 %, while Finland, Denmark, Slovenia, Croatia Estonia and Latvia perform very well (above 90 %). However, 7 countries (i.e. Malta, Poland, Bulgaria, Ireland, Austria, Luxembourg and Germany) have a lot of room for improvement. In general, there is a big gap between the countries that performed above the EU average and those that performed below it.

**Figure 6-14 Use of e-prescription, 2018 (% of general practitioners)**



- ❖ The Netherlands did not participate in the exercise for 2018
- ❖ For Greece, Portugal and Slovakia the data was removed, because of low reliability

Source: Benchmarking Deployment of eHealth among General Practitioners