



Digital Economy and Society Index (DESI) 2020

Human capital

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Human Capital

The current COVID-19 pandemic has shown how important digital assets have become to our economies and how basic and advanced digital skills sustain our economies and societies. Although already 85% of citizens used the internet in 2019, prior to the COVID-19 crisis, only 58% possesses at least basic digital skills. Therefore, having an internet connection is not sufficient; it must be paired with the appropriate skills to take advantage of the digital society. Digital skills range from basic usage skills that enable individuals to take part in the digital society and consume digital goods and services, to advanced skills that empower the workforce to develop new digital goods and services.

Table 1 Human capital indicators in DESI

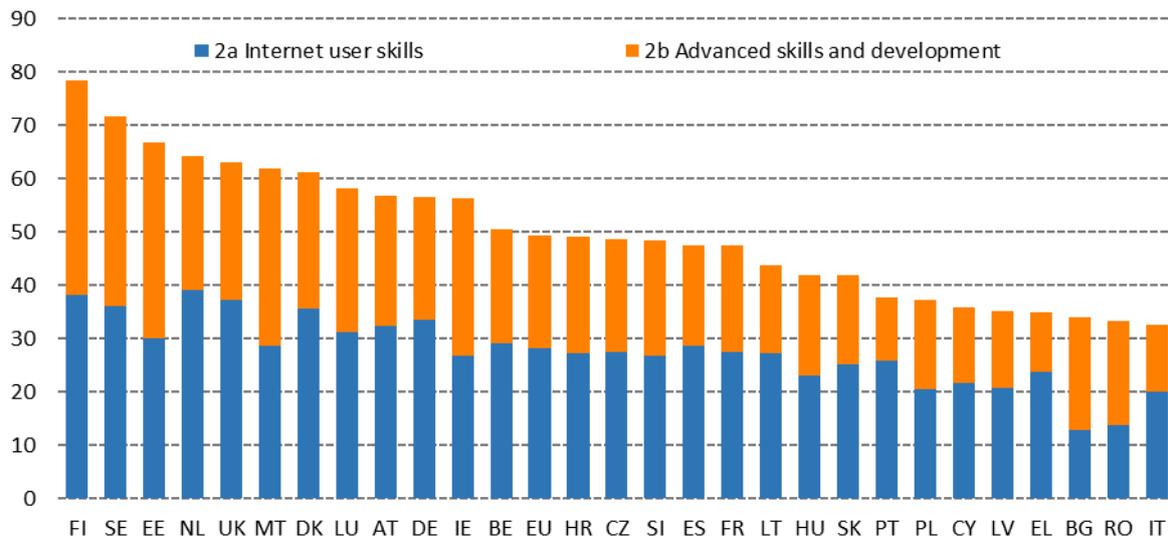
	EU	
	DESI 2018	DESI 2020
2a1 At least basic digital skills	57%	58%
% individuals	2017	2019
2a2 Above basic digital skills	31%	33%
% individuals	2017	2019
2a3 At least basic software skills	60%	61%
% individuals	2017	2019
2b1 ICT specialists	3.7%	3.9%
% total employment	2016	2018
2b2 Female ICT specialists	1.3%	1.4%
% female employment	2016	2018
2b3 ICT graduates	3.5%	3.6%
% graduates	2015	2017

Source: DESI 2020, European Commission.

1. Human capital in 2019

The human capital dimension of the 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, calculated based on the number and complexity of activities involving the use of digital devices and the internet. The latter includes indicators on ICT specialists and ICT graduates. According to the latest data, Finland is leading in both sub-dimensions of human capital, followed by Sweden, Estonia and the Netherlands for overall performance. Italy, Romania and Bulgaria rank the lowest. In comparison to last year, the largest increases in human capital were observed in Malta (+7 percentage points), Bulgaria (+5 percentage points) and Estonia (+4 percentage points).

Figure 1 Human capital dimension (Score 0-100), 2019



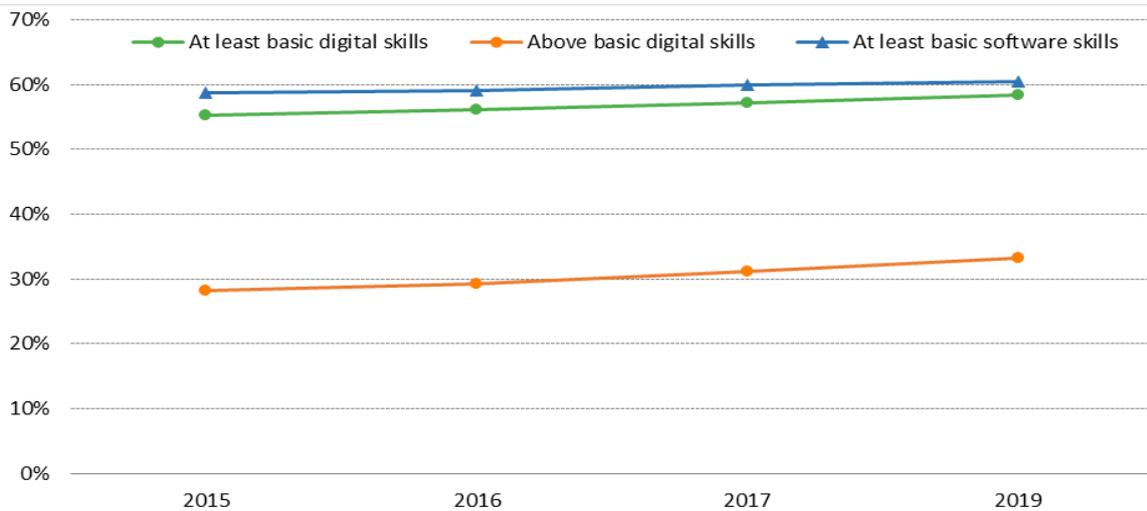
Source: DESI 2020, European Commission.

2. Access barriers

Although already 85% of citizens used the internet in 2019, some barriers still persist. The top reasons for not having internet access at home in 2019 remain the lack of need or interest (46% of households without internet access in 2019), insufficient skills (44%), equipment costs (26%) and high cost barriers (24%). The deterring effect of each of these factors varies significantly in strength across Member States. For example, only 5% of Estonian households without internet access mentioned costs as a barrier, but as many as 53% did so in Portugal. Lack of relevant skills remains by far the most important 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.

3. Digital skills

Throughout the last 4 years, the level of digital skills has continued to grow slowly, reaching 58% of individuals having at least basic digital skills, 33% with above basic digital skills and 61% of individuals having at least basic software skills. The skills indicators are strongly influenced by socio-demographic aspects. For example, 82% of young individuals (16-24), 85% of those with high formal education, 68% of employed or self-employed people and 87% of students have at least basic digital skills. By contrast, only 35% of those aged 55-74 and 30% of the retired and the inactive possess basic skills.

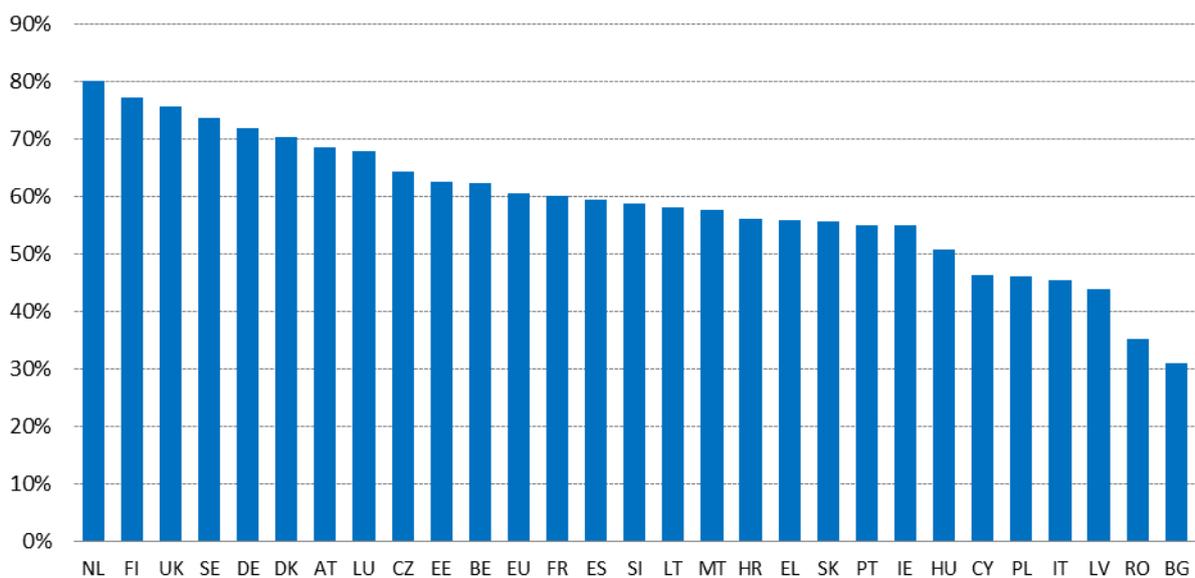
Figure 2 Digital skills (% of individuals), 2015–2019⁽¹⁾

Source: Eurostat, Community survey on ICT usage in Households and by Individuals.

4. Software skills

Software skills are becoming a prerequisite for entry into many jobs. Looking at the *internet users skills* sub-dimension of DESI, the largest skills deficit, both among the active labour force and the population at large, is in the use of software for content manipulation. 61% of Europeans have at least basic software skills. In Member States like the Netherlands, Finland and the UK, three out of four individuals have at least basic software skills (80%, 77% and 75% respectively). In contrast, only 31% of Bulgarians and 35% of Romanians have at least basic software skills. This indicator is also strongly influenced by socio-demographic aspects. For example, 85% of young individuals (16-24), 87% of those with high formal education, 70% of employed or self-employed people and 91% of students possess at least basic software skills. Nevertheless, only 38% of those aged 55-74 and 32% of the retired and the inactive possess basic skills in this domain.

Figure 3 At least basic software skills (% of individuals), 2019



Source: Eurostat, Community survey on ICT usage in Households and by Individuals.

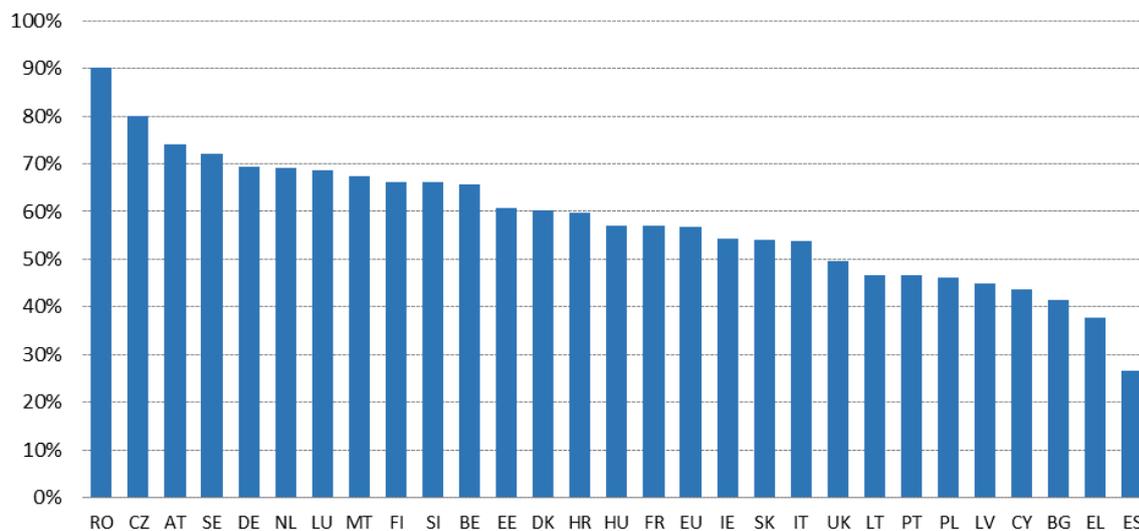
⁽¹⁾ From 2017 the digital skills indicators are collected biennially.

5. ICT specialists

The *advanced skills and development* sub-dimension looks at the workforce and its potential to work in and develop the digital economy. This takes into account the percentage of people in the workforce with ICT specialist skills and includes a separate indicator on female ICT specialists. At the same time, it looks at the share of ICT graduates.

In 2018, some 9.1 million people worked as ICT specialists across the EU. The highest number was reported in the UK and Germany (both 1.6 million), followed by France (1.1 million). In 2019, 20% of enterprises employed ICT specialists to develop, operate or maintain ICT systems or applications. This ratio is 75% for large enterprises as opposed to 19% of SMEs. At the same time during 2018, 57% of enterprises that recruited or tried to recruit ICT specialists reported difficulties in filling such vacancies; it was experienced by 64% of large enterprises and 56% of SMEs. The problem is even more widespread in Romania and Czechia, where at least 80% of enterprises that recruited or tried to recruit ICT specialists reported such difficulties.

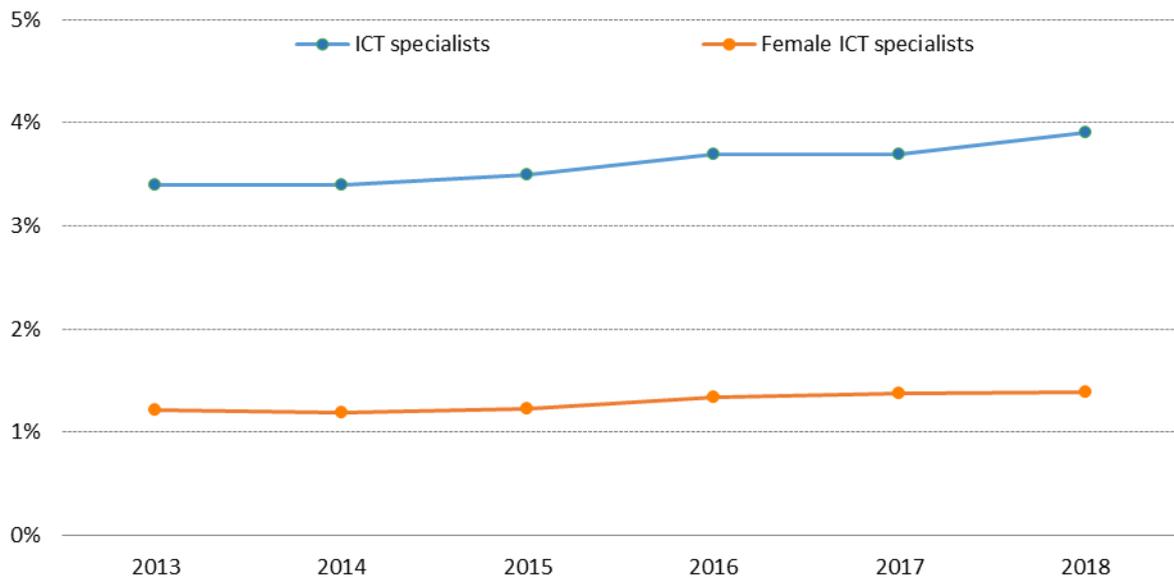
Figure 4 Hard to fill vacancies (% of enterprises that recruited or tried to recruit ICT specialists), 2019



Source: Eurostat, Community survey on ICT usage and e-commerce in enterprises.

The share of ICT specialists is slowly progressing and reached 3.9% of total employment in 2018. 83.5% of ICT specialists were male in 2018, 5.7 percentage points higher than in 2008. In Hungary and Czechia, 9 out of 10 ICT specialists were men, while in and Bulgaria and Lithuania one in four were female.

Figure 5 ICT specialists (% of total employment), 2018



Source: Eurostat, European Union Labour Force Survey.

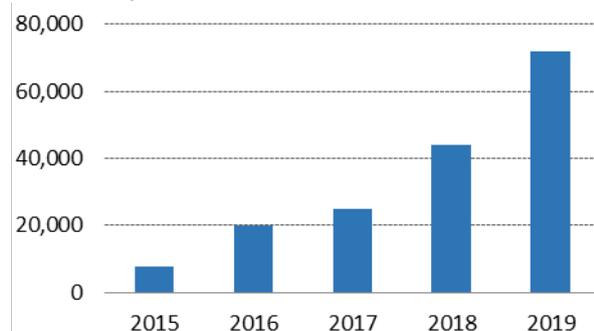
Enterprises are providing more and more training to their personnel to develop or upgrade their ICT skills. During 2018, overall 24% of enterprises provided ICT training for their personnel. The leaders in this domain are Finland (37%) and Belgium (36%). In countries like Poland (13%), Lithuania (11%), Bulgaria (10%) and Romania (6%), the provision of such a training was considerably lower. When looking at company size, 70% of large enterprises actively provided the training, while only 23% of SMEs did so.

6. EU Code Week

Europe and the world saw further increases in EU Code Week activities in 2019. EU Code Week is a grassroots movement run by volunteers, ambassadors, leading teachers and coding enthusiasts around the world. It is backed by the European Commission and education ministries in the EU and Western Balkan countries. The European Commission supports EU Code Week as part of its Digital Single Market strategy and through the Digital Education Action Plan.

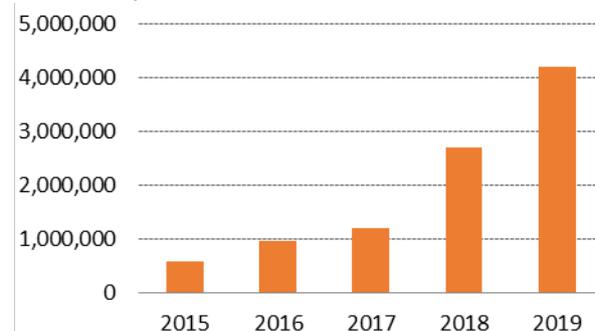
EU Code Week provides teachers with free resources, ready-made lesson plans, online introductory courses and other materials to help them bring coding and technology to all subjects and classrooms. In the 2019 edition, which proved to be the largest ever, a total of 4.2 million participants took part in more than 72,000 activities in over 80 countries around the world.

Figure 6 EU Code Week (number of activities worldwide) 2015-2019



Source: European Commission.

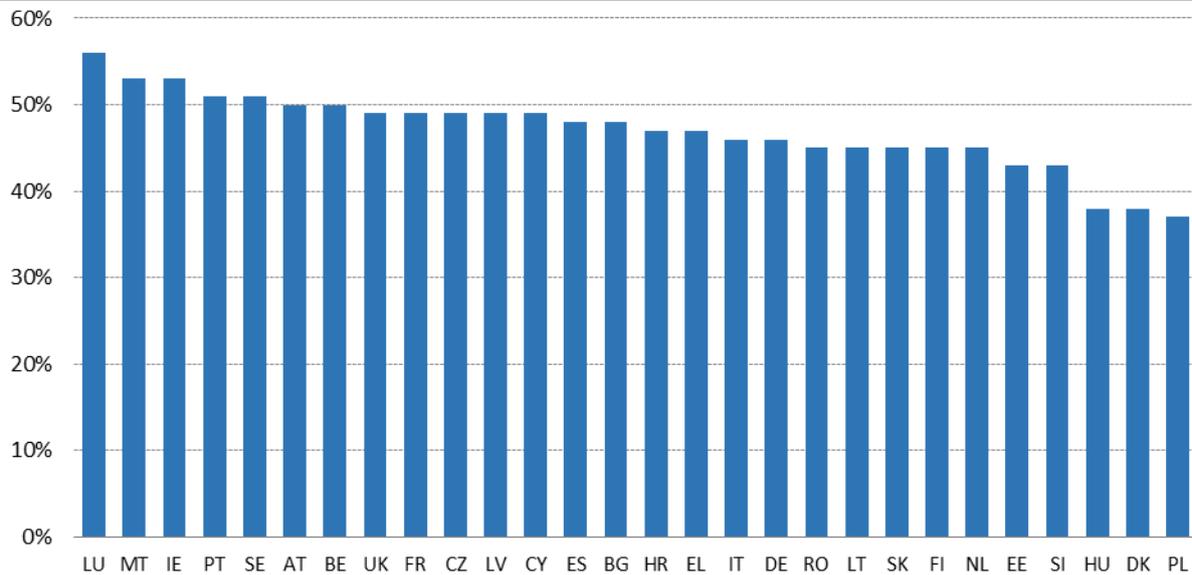
Figure 7 EU Code Week (number of participants worldwide) 2015-2019



Source: European Commission.

47% of participants in the EU in the 2019 edition of EU Code Week were female. Luxembourg was the European champion in women's participation at 56%. In countries like Poland, Denmark and Hungary, men constituted more than 60% of all participants in EU Code Week activities in 2019.

Figure 8 Female participation in EU Code Week (% of participants), 2019



Source: European Commission.

The next edition of Code Week will take place between 10 and 25 October 2020; organisers can already start registering their activities on the EU Code Week map.

Given the difficult and unpredictable situation around COVID-19, an important part of EU Code Week 2020 will move online. Teachers, students, parents, librarians and other tech enthusiasts will find even more resources, tips and best practices on the codeweek.eu website. They will also get the possibility to participate in more online networking events, workshops and remote coding challenges.

ANNEX I Abbreviations

Abbreviation	Explanation
4G / 5G	Fourth/Fifth generation technology standard for cellular networks
AI	Artificial Intelligence
BCO	Broadband competence office
BERD	Business expenditure on R&D
CAGR	Compound annual growth rate
CEF	Connecting Europe Facility
CRM	Customer Relationship Management
CSA	Coordination and Support Actions
DIH	Digital Innovation Hubs
DII	Digital Intensity Index
DOCSIS	Data over cable service interface specification
DSL	Digital subscriber line
DTT	Digital terrestrial television
EBP	European Blockchain Partnership
EBSI	European Blockchain Services Infrastructure
eForm	Electronic Form
EFSI	European Fund for Strategic Investments
eID	Electronic Identification
eider's	Electronic Identification, Authentication and Trust Services
EIF	European Investment Fund
ERA-NET	European Research Area
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
Euro HPC JU	Euro High Performance Computing Joint Undertaking
FET	Future & Emerging Technologies
FTTB	Fibre-to-the-building
FTTH	Fibre-to-the-home
FTTP	Fibre-to-the-premises
FWA	Fixed wireless access
GBARD	Government Budget Allocations for R&D
GDP	Gross Domestic Product
GHz	Gigahertz
HES	Secondary and Higher Education Establishments
HPC	High Performance Computing
IA	Innovation Action
IaaS	Infrastructure as a service
ICOs	Initial Coin Offerings
ICT	Information and communication technology
IMSI	International mobile subscriber identity
IoT	Internet of Things
JRC	Joint Research Centre
LEIT	Leadership in Enabling and Industrial Technologies
LTE	Long-term evolution
Mbps	Megabits per second
MHz	Megahertz
MNO	Mobile network operator
MVNO	Mobile virtual network operator

NACE	Statistical Classification of Economic Activities in the European Community
NBP	National broadband plan
NGA	Next generation access
NRA	National regulatory authority
OTT	Over-the-top
PaaS	Platform as a Service
PCP	Pre-Commercial Procurement
PERD	R&D personnel
PPI	Public Procurement for Innovation
PPS	Purchasing Power Standards
PRC	Private for-Profit Companies
PSAP	Public safety answering point
QCI	Quantum Communication Infrastructure
R&D	Research and Development
R&I	Research and Innovation
REC	Research Organisations
SaaS	Software as a Service
SMEs	Small and Medium Enterprises
USO	Universal service obligation
VDSL	Very-high-bit-rate digital subscriber line
VHCN	Very high capacity network