EUROPEAN
COMMISSION

Brussels, 18.5.2018
SWD(2018) 198 final

PART 4/6

COMMISSION STAFF WORKING DOCUMENT

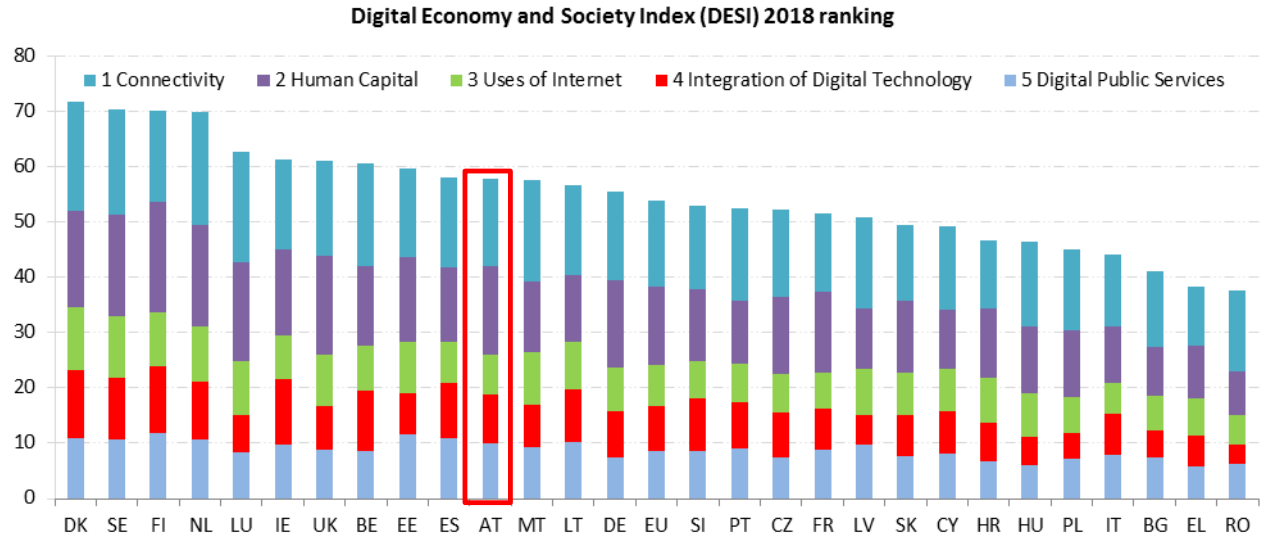
Digital Economy and Society Index (DESI) 2018

Digital Economy and Society Index (DESI)[1] 2018 Country Report Austria

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



Austria		Cluster	EU
rank	score	score	score

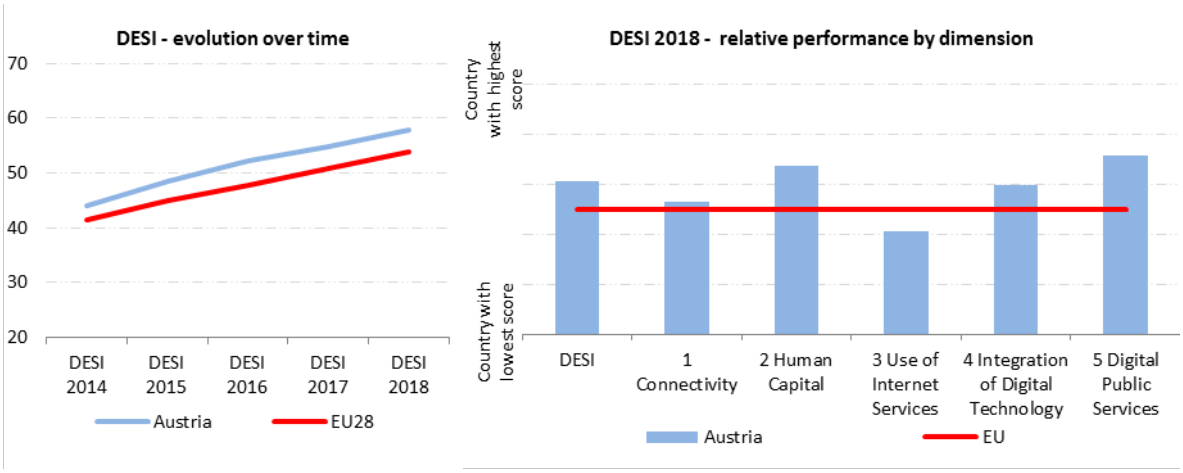
[1] https://ec.europa.eu/digital-single-market/en/desi

DESI 2018	**11**	**58.0**	**54.7**	**54.0**
DESI 2017	11	54.7	51.5	50.8

Over the last year, Austria progressed roughly in line with both the EU average and the average for the cluster of medium performing countries, keeping the 11th place it had in 2017. Its main strengths remain Human Capital and Digital Public Services, but it improved its relative position regarding both the use of Internet services by citizens, where it is lagging behind, and the integration of digital technology by businesses, where it scores significantly above average. These improvements come despite a connectivity ranking still is in the lower half of EU countries, although Austria's score improved considerably. Austria's ranking has also been affected by the introduction of new indicators on ultra-fast broadband, where it performs less well than the majority of other Member States.

Austria belongs to the Medium performing cluster of countries[2].

At the end of December 2017, the new government presented its programme until 2022. The programme identifies digitisation as one of the key priorities, and indeed refers to it as a vector of transformation in every policy field. Nevertheless, the focus is to cybersecurity on digital public services, connectivity and suitable framework conditions.



[2] Medium performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia.

1 Connectivity

1 Connectivity	Austria		Cluster	EU
	rank	score	score	score
DESI 2018	**17**	**63.7**	**62.4**	**62.6**
DESI 2017	17	58.8	58.8	58.5

	Austria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**99%** 2017	→	**13**	**99%** 2016	**12**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**71%** 2017	↑	**18**	**68%** 2016	**20**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**97%** 2017	↑	**11**	**89%** 2016	**18**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**95** 2017	↑	**9**	**77** 2016	**17**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**90%** 2017	↑	**9**	**89%** 2016	**9**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**19%** 2017	↑	**23**	**16%** 2016	**23**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**66%** 2017		**18**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**4.9%** 2017	↑	**24**	**2.7%** 2016	**24**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**90** 2017	↓	**5**	**91** 2016	**6**	**87** 2017

Austria maintainedits 17th place in connectivity in 2017, the same place it held in 2016 (when both years are measured using the DESI 2018 methodology). The area where Austria performs considerably lower is take-up, which in the case of fixed and fast broadband may be attributed to a considerable mobile substitution trend. The Austrian telecommunications market is characterised by price-driven competition and the prominent role of mobile services, on both voice and broadband markets. Nevertheless, Austria performs better than the average in terms of coverage, while price levels are lower than the average in both fixed and mobile services than the average. On the basis of the broadband price index, Austria ranks fifth in the EU.

In 2017, 90 % of all households in Austria were covered by a fast broadband (next-generation access) network, which is well above the average. Around 66 % of households nationwide had ultrafast broadband coverage in 2017. However, fast broadband coverage in rural areas amounts only to 45%, below the EU average of 47%.

The key challenge for broadband roll-out in Austria remains the country's mountainous topography, which greatly increases the cost of deployment. Austria's National Broadband Plan 'Breitbandstrategie 2020' is generally in line with the the targets set in the Digital Agenda for Europe and exceeds them in some aspects. The Austrian government set out an aim is to achieve 70% ultra-fast broadband coverage (defined as 100 Mbps downstream) by 2018, coupled with 99% ultra-fast broadband coverage for all Austrian households by 2020. In addition, there are regional broadband plans (e.g. in Lower Austria). The previous

government programme 'Digital Roadmap Austria', published in January 2017, had already increased Austria's national targets for the availability and take-up of high-speed broadband beyond nation-wide coverage of 100 Mbps by 2020, setting the target of providing high-speed connections for all schools and SMEs and 75% of citizens by 2020. It also required the government to develop a comprehensive 5G roll-out strategy and recognised the importance of 5G for the digital economy. The new government programme (2017-2022) sets out new objectives such as the provision of Gigabit connections nationwide by 2025, establishing Austria as a 5G pilot country by 2021 and providing nationwide mobile 5G coverage by 2025. Detailed deliverables include further investigating the possibilities for the Gigabit network roll-out, the possibility of subsidising of up to 100 Mbit connections, and a commitment to invest future spectrum revenues exclusively in the roll-out of digital infrastructure.

In parallel, the NRA already launched a series of public consultations in 2017 with a view to conducting spectrum award procedures in 2018 for 5G usage in 2018.

The infrastructure funding programmes in the master plan of the current subsidy scheme cover four main areas: access, backhaul, ducts and connect. The Area programme (access) aims to expand the geographical coverage of high-performance broadband networks. The Backhaul programme is focused on connecting of existing stand-alone solutions to efficient data highways. The Ducting programme covers the laying of ducting during construction work for non-discriminatory use for broadband networks, while the Connect programme aims to significantly reduce the costs of establishing fibre-optic connections for SMEs and schools. These programmes are funded mainly from the proceeds of the 2012 spectrum auction often cited as "broadband billion". The four branches are organised into several calls, for Ducts, the 4th call is currently being organised. By the end of 2017, 145 recipients had received funding commitments for 520 projects totalling EUR 330 million Euros. Almost 680.000 residences in over 1.100 municipalities will be supplied with ultra-fast broadband internet in the near future. This is about 36 % of all previously underserved residences (< 30 Mibit/s).By October 2017, Austria had completely adopted and notified the transposition of the Cost Reduction Directive. The new provisions aim to effectively contribute to ensuring high-speed access in new and renovated premises.

Austria continues to show the right ingredients for success: the availability and quality of service is good, the prices are competitive and active policy-making aims to ensure that consumers and enterprises derive maximum benefits from digitisation.

Despite regulatory efforts and a relatively high purchasing power, the take-up of fixed high-speed broadband remained low compared to the EU average. Public policy initiatives to stimulate demand may therefore play an important role in further improving connectivity in Austria.

In addition, the new Austrian federal government needs to keep the pace for developing its 5G strategy, as also indicated in the new government programme that sets out ambitious objectives for 5G. These objectives are underpinned by a series of public consultations held in 2017 with a view to launching spectrum award procedures for 5G.

2 Human Capital

2 Human Capital	Austria		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**64.4**	**58.6**	**56.5**
DESI 2017	7	62.4	56.5	54.6

	Austria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**85%**	↑	**10**	**82%**	**11**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**67%**	↑	**8**	**65%**	**8**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**4.2%**	↑	**6**	**4.0%**	**8**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[3]	**22.1**	↓	**5**	**23.0**	**2**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

Digital skills are one of Austria's competitive advantages but continuous growth in these skills will be required in the coming years in order to maintain this position and develop Austria as a digital frontrunner. Recent developments are quite favourable regarding ICT specialists (an increase of 0.2% in just one year is rather large) but less so concerning science, technology, engineering and maths (STEM) graduates.

The new government programme shows a strong awareness of the need for further digital upskilling. Partly following plans from the previous government, partly introducing new measures, the new programme intends among other things to

- increase continuing education especially with regard to digital learning support;
- equip all school sites with suitable digital infrastructure;
- create a digital track record for students from Kindergarten to the end of schooling;
- further develop the schools 'berufsbildende höhere Schulen' (BHS) and 'Höhere technische Lehranstalt' (HTL) especially regarding STEM and digitisation;
- increase the number of place to study digitalisation and STEM at tertiary level;
- launch a "Digitalisierungsoffensive Bildung" as a training and continuous education strategy which involves
  - ensuring basic digital competences are taught in all schools;
  - introducing programming languages (such as scratch) from primary school;
  - strengthening digital skills of teachers by mandatory training;
  - a comprehensive offer of digital vocational training;
- launch an "Austrian Digital Academy“, i.e. an online platform for training offers for lifelong learning.

However, most of these activities require long-term efforts and are unlikely to produce visible results by next year or even 2020.

[3] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

3 Use of Internet Services

3 Use of Internet Services	Austria		Cluster	EU
	rank	score	score	score
DESI 2018	**19**	**47.6**	**48.3**	**50.5**
DESI 2017	20	43.9	45.0	47.5

	Austria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News	**71%**	↑	**23**	**66%**	**23**	**72%**
% individuals who used Internet in the last 3 months	2017			2016		2017
3a2 Music, Videos and Games	**79%**		**15**	**79%**	**15**	**78%**
% individuals who used Internet in the last 3 months	2016			2016		2016
3a3 Video on Demand	**14%**		**16**	**14%**	**16**	**21%**
% individuals who used Internet in the last 3 months	2016			2016		2016
3b1 Video Calls	**42%**	↑	**22**	**32%**	**26**	**46%**
% individuals who used Internet in the last 3 months	2017			2016		2017
3b2 Social Networks	**58%**	→	**24**	**58%**	**24**	**65%**
% individuals who used Internet in the last 3 months	2017			2016		2017
3c1 Banking	**65%**	↑	**14**	**63%**	**13**	**61%**
% individuals who used Internet in the last 3 months	2017			2016		2017
3c2 Shopping	**70%**	↑	**10**	**68%**	**11**	**68%**
% individuals who used Internet in the last 12 months	2017			2016		2017

Austria remains below the EU average regarding the use of Internet services by individuals However, it made more progress than the EU average, indicating that it is gradually catching up. In particular the use of video calls increased significantly, but also on the consultation of online news Austria also registered larger gains than the EU average. On the other hand, regarding the use of social networks the gap between Austria and the EU average widened. Online banking has been growing at a fairly regular pace of 2 percentage points a year since 2015, keeping Austria just above EU average, Austria is also just above average for online shopping.

4 Integration of Digital Technology

4 Integration of Digital Technology	Austria		Cluster	EU
	rank	score	score	score
DESI 2018	**10**	**44.1**	**42.1**	**40.1**
DESI 2017	12	39.4	38.5	36.7

	Austria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**40%**	↓	**7**	**41%**	**7**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**5.6%**	→	**9**	**5.6%**	**7**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**21%**	↑	**11**	**19%**	**14**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**24.9%**	**7**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**10.6%**	↑	**23**	**9.9%**	**19**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**16.5%**	↑	**14**	**14.5%**	**17**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**6.5%**	↑	**22**	**5.7%**	**24**	**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**13.8%**	↑	**2**	**10.5%**	**6**	**8.4%**
% SMEs	2017			2015		2017

Austrian businesses continue to do relatively well in many aspects of digitisation, although recently there has been little progress in the use of ICTs for internal processes, such as electronic information sharing between different departments or the use of RFID. Nor has the pace of adopting cloud computing been particularly fast. However, there has been considerable improvement in the scores related to e-commerce: an additional 2% of SMEs started selling online, and more than 3% of SMEs were added to the number selling online cross-border, taking advantage of the Digital Single Market.

In order to foster digitisation, an independent funding programme called *'Produktion der Zukunft'* was launched in 2016 to promotes national and transnational cooperative research and development projects in Industry 4.0 technology sectors. It receives approximately EUR 25 million in funding per year and is further enhanced by the Digital Roadmap for Austria which includes concrete plans to set up a network of Digital Innovation Hubs across the country.

The new government programme also includes among the many digital-related items several actions which specifically address the digitisation of business. In particular it provides for

- the development of a country-wide programme to support the digitisation of SMEs, including the extension of "KMU digital";

- measures to attract international top accelerators to Austria in order to support innovative digitalisation start-ups, including an extension of the Global Incubator Network (GIN) programme;
- the creation of regulatory sandboxes for innovative enterprises with new technologies (blockchain, artificial intelligence etc.);
- support for test environments for early trials and market adaptation of emerging technologies and digital applications;
- public participation in digital lighthouse projects (innovation partnerships in the
- development phase).

The significant place which these initiatives occupy in the overall economic strategy reflect the ambition of successive governments to make Austria a technology leader in Europe.

5 Digital Public Services

5 Digital Public Services	Austria		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**66.5**	**58.5**	**57.5**
DESI 2017	7	66.3	54.9	53.7

	Austria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
5a1 eGovernment Users[4] % internet users needing to submit forms	**64%** 2017	↑	**14**	**59%** 2016	**16**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**79** 2017	↑	**5**	**72** 2016	**6**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**96** 2017	↓	**4**	**97** 2016	**2**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**84** 2017	↓	**15**	**90** 2016	**10**	**83** 2017
5a5 Open Data % of maximum score	**77%** 2017	↓	**12**	**78%** 2016	**5**	**73%** 2017
5b1 eHealth Services % individuals	**18%** 2017		**14**	**NA**		**18%**

More than 98 % of the most-used public services are available online, notably via the *Digitales Österreich* platform. Austria is among the top-ranking countries in the EU for availability, including via mobile devices, in terms of EU comparison. Take-up of eGovernment services has increased; it remains above average but still somewhat behind the offer..

In 2017, Austria has introduced the right for citizens and businesses to digitally contact the public administration (*Recht auf elektronischen Verkehr mit Behörden*) and upgraded the existing e-ID (card-based or by using the mobile phone) to a fully-fledged electronic proof of identity (*elektronischer Identitätsnachweis*).

Austria's aim is to have a one-stop-shop platform available and to reduce the need for people and business to actively interact with public authorities or use public services. For instance certain tax claims are automatically handled for the user. Austria also intends to introduce one nation-wide usable "digital identity" managed by a central system which would give users an overview of which data is available and how and by whom it can be used.

The new government programme also sets out to further develop and improve open data and the existing e-health solutions such as the Electronic Health Record (ELGA) which is an information system that offers personalised health data to all citizens and eligible health service providers (hospitals, pharmacies, general practitioners, specialists etc.). A test phase of the electronic medication record started in the district of Deutschlandsberg in Styria in June 2016 and was extended to the whole region of Vorarlberg at the beginning of 2018.

[4] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

Contracted general physicians and specialists are mandated to document prescribed medications within the e-medication record. In February 2018 the Main Association of Austrian Social Security Institutions and the Austrian Medical Chamber signed a contract for the introduction of e-medication, meaning doctors will be able to get reimbursed for their incurring investments and maintenance costs. The aim is to roll out the e-medication system across Austria by September 2019. There are also other ongoing pilot projects running related to telemedicine, such as Gesundheitsdialog Diabetes or HerzMobil Tirol, a tele-monitoring-system for cardiovascular disease. Austria is in the EU average for use of eHealth services, i.e. individuals using health and care services provided online without having to go to the hospital or doctors surgery (for example, by getting a prescription or a consultation online).

Highlight 2018: One-stop-shop enabling the start-up of a one-man business online

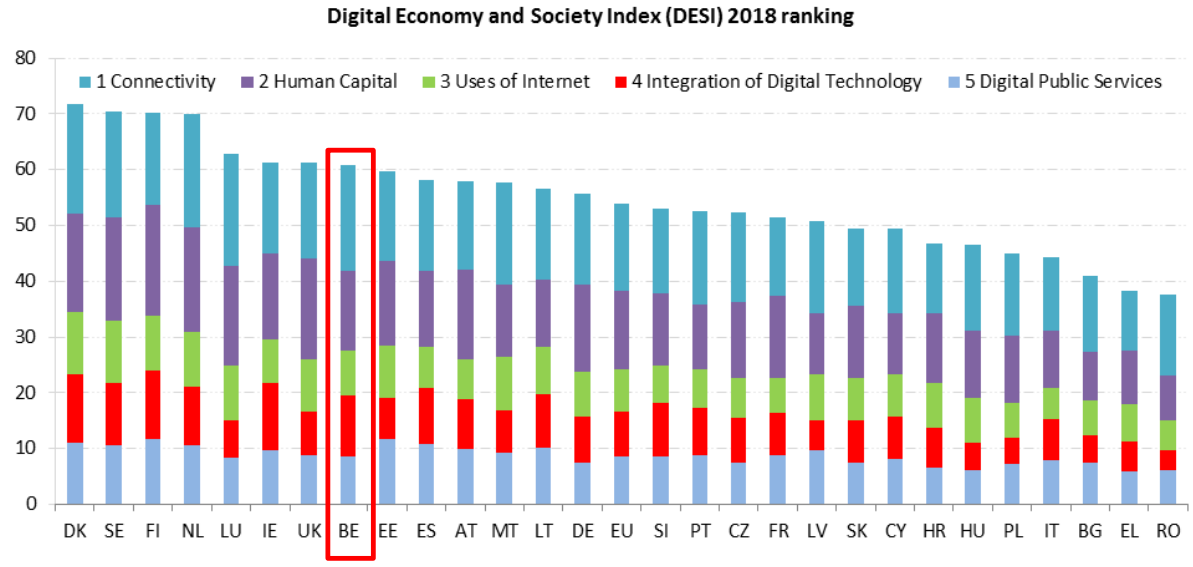
Since the end of July 2017 the Business Service Portal ('Unternehmensserviceportal') has provided information and certain transaction services to help people set up new businesses. It builds on the Austrian public administration's one-stop-shop for business and serves as a single entry point for businesses to the administration.
All administrative actions required to start a one-man business can be conducted via this portal (eGründung). The transaction is free of charge, fast and requires electronic signature (such as the mobile phone signature). Given that one-man companies are the most used form of business in Austria, this will further facilitate the start-up process and reduce the administrative burden for businesses.
However, it is not mandatory to use the online platform. The platform *USP.gv.at* can also be used to deal with administrative processes but not all those necessary to start a business. Once established, the new start-up gets access via the portal to other administrative services such as FinanzOnline, the portal of the social security services and the e-billing system used for the federal administration.

Digital Economy and Society Index (DESI)[5] 2018 Country Report Belgium

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

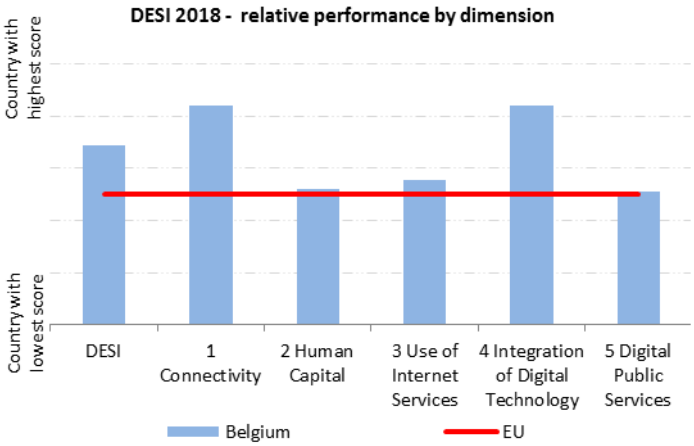
The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.

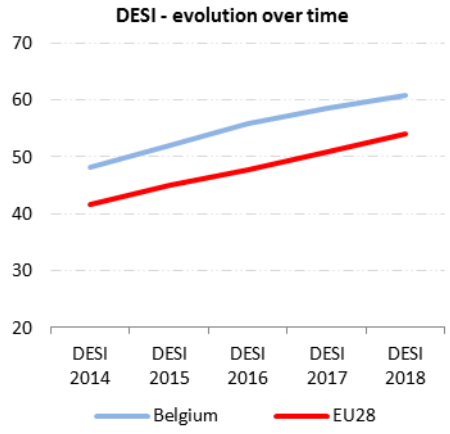


[5] https://ec.europa.eu/digital-single-market/en/desi

	Belgium		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**60.7**	**64.0**	**54.0**
DESI 2017	6	58.6	61.2	50.8

Belgium ranks 8th out of the 28 EU Member States in DESI 2018. While its absolute performance improved in all DESI domains, its ranking slightly slipped compared with 2017, also due to the good performance of other countries in its peer group. Residents of Belgium are well connected: broadband coverage and take-up (fixed and mobile), and next-generation access network (NGA) coverage are high. Furthermore, progress is being made with NGA take-up. Most people in Belgium are now online and make good use of a variety of online services, particularly for shopping, entertainment and social networking. Their digital skills are good but not improving. However, some gaps still exist. The country's key challenges in connectivity are to convince more people to use mobile broadband. Despite a lot of innovative projects being launched to boost digital skills, the impact of these initiatives on human capital is not yet reflected in the statistics. A key challenge in this area is to motivate more young people in Belgium to start a career in digital technology and more generally to attract more pupils to consider studying a subject related to science, technology or mathematics ('STEM'). When it comes to the integration of digital technology by companies, Belgium is doing well, and there are several complementary strategies in place to further digitise Belgian businesses. For digital public services, Belgium shows an overall mixed picture, and progress compared to past years has been lower.The 'Digital Belgium'6 strategy presented in 2015 still defines the digital long-term vision for the country. There are also regional strategies such as 'Digital Wallonia'7.Belgium belongs to the high-performing cluster of countries[8].





[6] http://digitalbelgium.be/

[7] https://www.digitalwallonia.be/

[8] The high-performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.

1 Connectivity

1 Connectivity	Belgium rank	Belgium score	Cluster score	EU Score
DESI 2018	**5**	**75.1**	**71.9**	**62.6**
DESI 2017	4	72.7	67.9	58.5

	Belgium DESI 2018 value		Belgium DESI 2018 rank	Belgium DESI 2017 value	Belgium DESI 2017 rank	EU DESI 2018 value
1a1 Fixed Broadband Coverage % households	**100 %** 2017	→	**7**	**100 %** 2016	**7**	**97 %** 2017
1a2 Fixed Broadband Take-up % households	**81 %** 2017	↑	**7**	**80 %** 2016	**6**	**75 %** 2017
1b1 4G Coverage % households (average of operators)	**97 %** 2017	↑	**12**	**95 %** 2016	**7**	**91 %** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**73** 2017	↑	**24**	**68** 2016	**23**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**99 %** 2017	→	**2**	**99 %** 2016	**2**	**80 %** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**67 %** 2017	↑	**2**	**65 %** 2016	**2**	**33 %** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**97 %** 2017		**3**	**NA**		**58 %** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**41.8 %** 2017	↑	**3**	**29.6 %** 2016	**4**	**15.4 %** 2017
1e1 Broadband Price Index Score (0 to 100)	**82** 2017	↓	**19**	**84** 2016	**17**	**87** 2017

With an overall connectivity score of 75.1, Belgium continues to be among the top performers in 2018. However, it slipped one rank compared to 2017. Belgium has almost universal coverage, and the indicators for fixed broadband and NGA coverage remain stable compared to the previous year. Take-up of fast broadband (30 Mbps and above) increased to 67 % and ultrafast broadband (100 Mbps and above) to 41.83 %. This positions Belgium among the EU leaders in the take-up of these networks. Belgium is performing less well in mobile broadband. Despite 4G coverage increasing to 97 %, mobile broadband take-up remains among the lowest in Europe with only 73 subscriptions per 100 people.

Belgium's connectivity targets are to provide all residents with internet access above 30 Mbps and to achieve internet access speeds of 1 Gbps for half of all households.

To achieve these objectives, reliance is on market-led investment supported by a favourable regulatory environment. Furthermore, a plan to cover 'white zones' in Wallonia with insufficient fixed-line and mobile connectivity is under preparation by the Minister for the Digital Agenda in close cooperation with the federal, regional and municipal levels.

Among the actions envisaged are: (i) measures to reduce the cost of broadband deployment in the context of the implementation of Directive 2014/61/EU, (ii) measures to stimulate

investment in areas where there is still no infrastructure and (iii) the combination of different access technologies including satellite and an increase in the requirements of mobile coverage under spectrum licences.

Furthermore, the Belgian regulator BIPT is currently carrying out new analyses of the wholesale broadband and broadcast markets (markets 3a/2014, 3b/2014 and 18/2003) and is expected to notify the European Commission of its findings in Q2 of 2018. In its earlier analysis — as nationally consulted — BIPT found significant market power (SMP) both for the former copper incumbent and the cable operators and has proposed to continue with access regulation on both networks. The main access seeker in Belgium currently relies on cable access.

Furthermore, the Flemish government announced plans to invest in fibre-to-the home (FTTH) and has asked the leading telecommunications operators for proposals to develop their infrastructures for a long-term future-proof network. A feasibility assessment of these proposals is still ongoing, and it has not been decided yet whether the way forward would be co-investment with different communication operators, or even with utilities, or roll-out by the Flemish government itself.

Summarising, Belgium performs quite well when it comes to achieving connectivity targets, in particular for coverage and uptake of fixed broadband. Further improvements could still be made to mobile connectivity where more competitive prices and demand side efforts could boost uptake. Finally, a favourable environment to facilitate investment in infrastructure development can help to improve competitiveness. For instance, full implementation and consistent application of the Broadband Cost Reduction Directive could provide incentives to invest in the roll-out of high-capacity networks..

2 Human Capital

2 Human Capital	Belgium		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**57.5**	**70.7**	**56.5**
DESI 2017	11	57.3	69.4	54.6

	Belgium				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	Value	rank	value
2a1 Internet Users	**86 %** ↑	**9**	**84 %**	**9**	**81 %**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**61 %** →	**9**	**61 %**	**9**	**57 %**
% individuals	2017		2016		2017
2b1 ICT Specialists	**4.2 %** →	**6**	**4.2 %**	**7**	**3.7 %**
% total employment	2016		2015		2016
2b2 STEM Graduates[9]	**13.3** ↓	**23**	**14.0**	**23**	**19.1**
Per 1000 individuals (aged 20-29)	2015		2014		2015

When it comes to human capital, Belgium performs well but is progressing only slowly. A large proportion of people in Belgium uses the internet regularly (86 % — at least once a week). This figure is well above the average for the European Union. Nevertheless, Belgium faces some digital skills gaps. For basic digital skills, Belgium performs above average in the EU: 61 % of the population had at least basic digital skills in 2017; the EU average was 57 %. However, still a substantial percentage of the population does not have basic digital skills. Belgium also suffers from a shortage of skilled ICT professionals and ranks only 23rd in Europe for graduates in science, technology, engineering and mathematics ('STEM').

While Belgium has an overall qualified workforce with a high participation rate in tertiary education, the persistently low share of STEM graduates is a matter of concern. All regions are developing plans to strengthen STEM and digital competences, which include the digital school plan (2014-2020) in Wallonia and the Flemish STEM action plan (2012-2020) in Flanders. Shortages in these fields could become a major barrier to growth and innovation, with scarcities already emerging for certain functions which require, for example, digital skills. Already today, there is a persistent shortage of qualified ICT experts in all three regions of Belgium[10]. Addressing the shortage of ICT specialists remains crucial to enable the digital transformation of the Belgian economy.

Over the last year, the Belgian federal government has launched several innovative initiatives to boost digital skills and to raise awareness about the need to up-skill and re-skill the labour force. The projects supported, for example, train young people and the

[9] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

[10] In February 2018, there were more than 11 600 open vacancies for ICT experts. Source: real-time online database of the European Commission, http://www.pocbigdata.eu/monitorICTonlinevacancies/general_info/.

unemployed in programming and other digital skills. Landmark projects such as BeCentral[11], a digital education and transformation hub in Brussels, or Molengeek[12], a tech incubator and coding school, can be considered best practice at international level.

Highlight 2018: Digital Skills Fund

To teach young adults basic skills in coding and internet security, the Belgian minister for the digital agenda has earmarked EUR 18 million over 3 years for digital skills training projects. The money is made available through the Digital Belgium Skills Fund to provide digital training to people under the age of 30, with priority given to vulnerable groups. Every project selected is eligible to receive financial support of between EUR 50 000 and EUR 500 000. The first projects started in 2017 with a focus on coding and related digita competences and have already delivered the first results. For instance, BeCode,[13] a free coding school located in the BeCentral digital hub in Brussels' Central Station, targets young people who are neither going to school nor working to help them get the skills they need to become employable.

[11] https://www.becentral.org/

[12] https://molengeek.com/

[13] https://www.becode.org/

3 Use of Internet Services

3 Use of Internet Services	Belgium		Cluster	EU
	rank	score	score	score
DESI 2018	**13**	**53.3**	**63.4**	**50.5**
DESI 2017	11	51.9	60.5	47.5

	Belgium				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News	**64 %** ↓	**26**	**65 %**	**24**	**72 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**72 %**	**23**	**72 %**	**23**	**78 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**12 %**	**17**	**12 %**	**17**	**21 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**46 %** ↑	**20**	**44 %**	**16**	**46 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**82 %** ↑	**3**	**80 %**	**3**	**65 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**76 %** ↑	**7**	**75 %**	**7**	**61 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**67 %** ↑	**11**	**65 %**	**12**	**68 %**
% individuals who used Internet in the last 12 months	2017		2016		2017

On the use of internet services, Belgium's performance is only average, ranking 13th out of the 28 EU Member States. As mentioned above, most people in Belgium are now online (86 %). By far the most popular online activity in Belgium is being active on social networks (82 %). However, online banking (76 %), downloading music, videos and games (72 %), shopping (67 %) and reading online news (64 %) are also activities undertaken by the majority of internet users.

4 Integration of Digital Technology

4 Integration of Digital Technology	Belgium		Cluster	EU
	rank	score	score	score
DESI 2018	**5**	**54.6**	**47.0**	**40.1**
DESI 2017	5	52.4	44.0	36.7

	Belgium					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**54 %**	↑	**1**	**50 %**	**1**	**34 %**
% enterprises	2017			2015		2017
4a2 RFID	**6.7 %**	↑	**4**	**5.5 %**	**8**	**4.2 %**
% enterprises	2017			2014		2017
4a3 Social Media	**24 %**	↑	**10**	**22 %**	**10**	**21 %**
% enterprises	2017			2016		2017
4a4 eInvoices	**18.3 %**	↑	**14**	**15.5 %**	**14**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**NA**			**20.3 %**	**7**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**23.3 %**	↑	**5**	**23.0 %**	**6**	**17.2 %**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**15.4 %**	↓	**3**	**19.6 %**	**3**	**10.3 %**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**12.0 %**	↓	**5**	**13.1 %**	**2**	**8.4 %**
% SMEs	2017			2015		2017

Belgium is doing well overall in the integration of digital technology, making steady progress except for e-commerce turnover and SMEs selling online cross-border where no progress was made.Stimulating the adoption of digital technologies combined with a workforce able to use these technologies could further underpin productivity growth. In view of this potential, the digitisation of businesses and industry are a priority in the digitisation agendas at federal level and in all three Belgian regions.There are several complementary digital industrial policies: Digital Belgium at federal level, Industrie 4.0[14] and Made Different[15] in Flanders, Plan Marshall/Digital Wallonia[16] in the southern region of the country and digital.brussels[17] for the capital region. 'Industrie 4.0' started in 2017 with a focus on streamlining the existing R&I actions in Flanders and connecting to international networks. The aim of Made Different[18] is for the Flemish government, the technology federation Agoria and its joint research centre Sirris to strengthen Flanders' manufacturing industry and make it a world leader.

[14] https://www.vlaanderen.be/nl/vlaamse-regering/industrie-40

[15] http://www.madedifferent.be/

[16] http://planmarshall.wallonie.be/

[17] http://cirb.brussels/fr/quoi-de-neuf/actualites/digital-brussels-une-nouvelle-strategie-numerique-unifiee-pour-la-region-bruxelloise

[18] http://www.madedifferent.be/

5 Digital Public Services

5 Digital Public Services	Belgium		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**57.9**	**63.0**	**57.5**
DESI 2017	15	52.3	60.2	53.7

	Belgium					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	Value
5a1 eGovernment Users % internet users needing to submit forms	**50 %** 2017	↑	**19**	**48 %** 2016	**21**	**58 %** 2017
5a2 Pre-filled Forms Score (0 to 100)	**68** 2017	↑	**12**	**59** 2016	**11**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**84** 2017	→	**16**	**84** 2016	**14**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**81** 2017	↑	**20**	**79** 2016	**19**	**83** 2017
5a5 Open Data % of maximum score	**68 %** 2017	↑	**19**	**48 %** 2016	**21**	**73 %** 2017
5b1 eHealth Services % individuals	**21 %** 2017		**11**	**NA**		**18 %**

For digital public services, Belgium shows a mixed picture overall, and progress has been slower compared to past years. While Belgium scores well in pre-filled forms and eHealth services, other dimensions could be improved. Belgium's federal structure poses specific challenges in establishing coherent and nationwide eGovernment services. Diverse and not necessarily interoperable systems can create friction losses. In certain areas, such as in the judiciary, the full potential of digital technology is not tapped into.

As a result, compared to its peers, Belgium is currently not yet using the full potential of digital public services. A number of initiatives are underway to address this challenge. The Digital Transformation Office19 set up by the federal government started operations last year, and a number of new services have been introduced. For example, it is now possible to log on to certain digital public services via a smartphone with the 'Itsme' application[20].

The Belgian federal government transparently monitors and reports on progress and estimated cost savings in that field[21].

In the judiciary, insufficiencies in the reliability, comparability and uniformity of court data and delayed actions to improve the quality of the judicial system remain a concern. The roll-out of initiatives to digitalise certain court services to all courts has been progressing slowly.

Belgium is performing relatively well in digital health services. ePrescription is widespread and will become mandatory (with a few exceptions) on 1 June 2018. Several actors also

[19] https://dt.bosa.be/en

[20] http://digitalbelgium.be/veilige-mobiele-identificatie-voor-online-diensten-van-de-overheid-dankzij-itsme/

[21] http://digitaldashboard.belgium.be/

recently launched ‘Health Tech Belgium’,[22] an initiative to make Belgium a test country for health tech innovation.

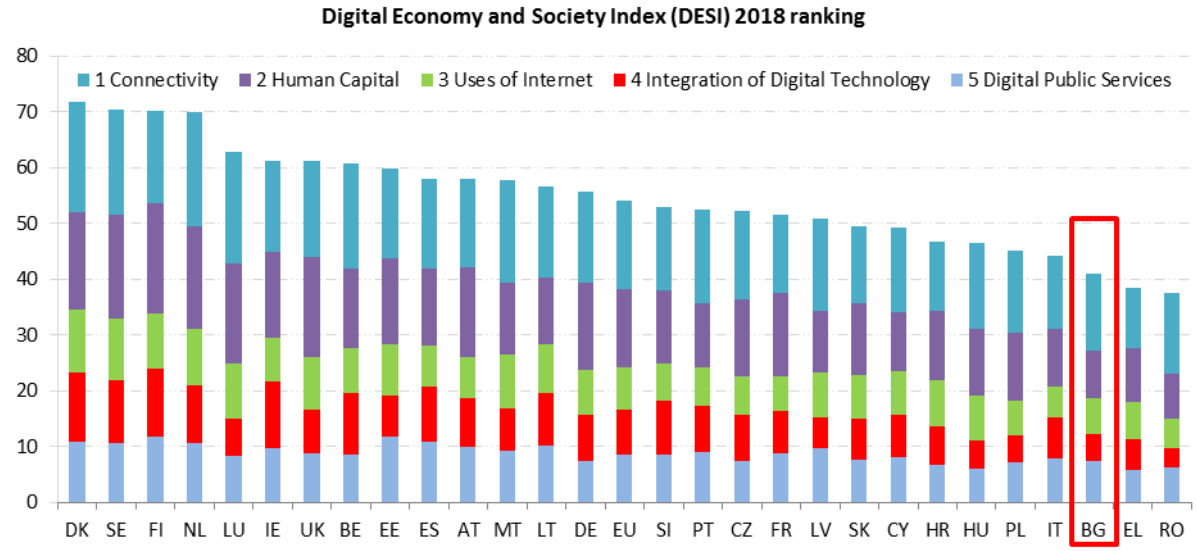
[22] https://www.agoria.be/en/Launch-of-HealthTech-Belgium-Let-s-make-Belgium-THE-world-s-test-country-for-Health-Tech-innovation

Digital Economy and Society Index (DESI)[23] 2018 Country Report Bulgaria

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



[23] https://ec.europa.eu/digital-single-market/en/desi

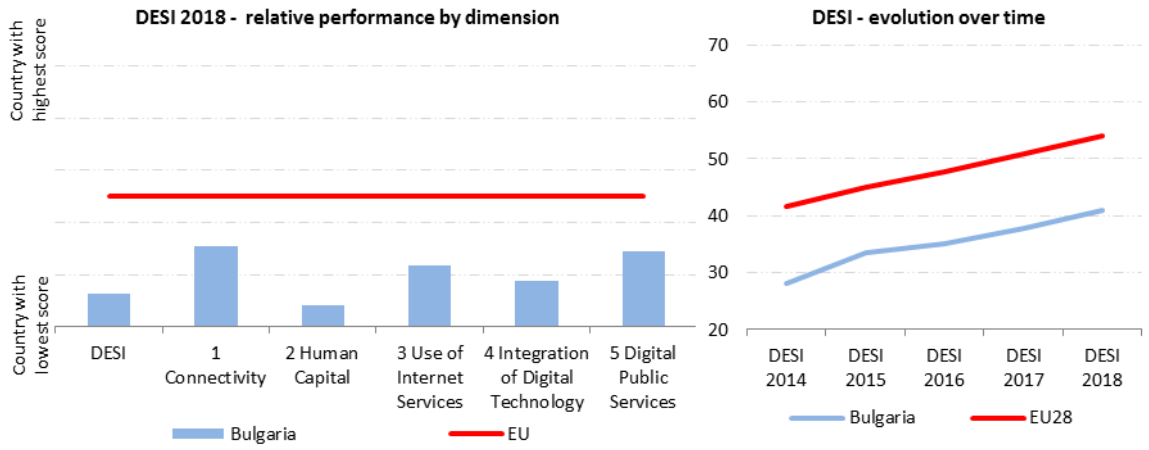
	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**41.0**	**43.5**	**54.0**
DESI 2017	26	37.7	40.4	50.8

Bulgaria ranks 26th out of the 28 EU Member States in DESI 2018. Overall, Bulgaria has retained its ranking from last year with some slight improvements to its score.

Compared to last year, Bulgaria made progress in connectivity and the availability of digital services. In particular digital public services improved, resulting in an increased number of e-government users. Bulgaria's main challenges relate to the very low level of digital skills among its citizens — also among young people — and the low integration of digital technologies by businesses. In particular, the low level of digital skills combined with shortages of ICT specialists and underinvestment in digital infrastructures may be among the reasons why the digitisation process in Bulgaria is slow both in the public and private sector.

Bulgaria has a Broadband strategy[24], an e-skills strategy[25] and a plan for implementing the latter (2015-2017)[26], a concept for the digital transformation of industry[27] and an e-government strategy[28].

Bulgaria belongs to the low-performing cluster of countries[29].



[24] https://www.mtitc.government.bg/en/category/46/next-generation-access-ngn.
[25] http://mon.bg/upload/6543/strategia_efektivno_ikt_2014_2020.pdf.
[26] http://mon.bg/upload/6544/2015_Plan_Strategia_IKT_vnedrjavane.pdf.
[27] https://www.mi.government.bg/files/useruploads/files/ip/kontseptsia_industria_4.0.pdf.
[28] https://www.mtitc.government.bg/sites/default/files/uploads/pdf/e_governance_strategy.pdf (EN).
[29] Low- performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

1 Connectivity

1 Connectivity	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**25**	**54.9**	**55.0**	**62.6**
DESI 2017	23	51.6	50.1	58.5

	Bulgaria				EU
	DESI 2018			DESI 2017	DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**95%** 2017	→	**23**	**95%** 2016	**23**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**59%** 2017	↑	**26**	**57%** 2016	**27**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**72%** 2017	↑	**28**	**66%** 2016	**26**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**87** 2017	↑	**16**	**82** 2016	**13**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**75%** 2017	↑	**23**	**74%** 2016	**22**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**39%** 2017	↑	**15**	**31%** 2016	**15**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**75%** 2017		**12**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**6.5%** 2017	↑	**23**	**4.7%** 2016	**22**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**80** 2017	↑	**20**	**76** 2016	**20**	**87** 2017

Bulgaria ranks 25th in the connectivity dimension of DESI 2018. A small increase for most of the connectivity-related indicators can be observed in Bulgaria. However, this trend is minor and slower than in other EU countries, which drags Bulgaria's overall ranking down compared with last year. Furthermore, its low performance in most of the other connectivity indicators slows down the further development of Bulgaria's digital economy and society.

The total coverage of fixed broadband networks in Bulgaria remains unchanged at 95 % of households, slightly below the EU average (97 %). Broadband take-up has grown slightly to 59 %, but remains far below the EU take-up average of 75 %. On 4G coverage Bulgaria is lagging behind the EU average (91 %) at just 72 %. Take-up of mobile broadband has improved slightly to 87 % and is getting closer to the EU mobile take-up average of 90 %. Networks capable of providing at least 30 Mbps (next-generation access, or NGA) are available to 75 % of Bulgarian homes, slightly below the EU average (80 %). It is worth mentioning that take-up of fast broadband has risen considerably to 39 %, above the EU average of 33 %. Furthermore, Bulgaria has made remarkable progress on ultra-fast broadband coverage (FTTP or Docsis 3.0), reaching 74.6 %, while the EU average is 58 %. However, the take-up of ultra-fast broadband is only 6.54 %, while the EU average is 15.4 %. On the positive side, from the perspective of promoting take-up, the fixed broadband price

index[30] is 80, while the EU average is 87. Nevertheless, because other EU countries are progressing faster for most of the other indicators, Bulgaria remains in a group of countries that are developing rather slowly as regards connectivity.

Only a small part of the spectrum harmonised at EU level for broadband use has been assigned in Bulgaria. This is partially due to the delays in making available some crucial spectrum below 1 GHz for electronic communication services, combined with the lack of commercial interest in some other frequency bands. Finally, the low take-up of fixed broadband might be explained by the subscription price combined with other reasons such as different social interests, consumers' preferences for broadcasting products, the relatively low levels of digital skills and the ageing population in some remote areas.

Bulgaria's 2014 broadband strategy, the 'National Broadband Infrastructure for Next Generation Access Plan' (NBP)[9], sets targets for coverage and take-up rate targets, both in line with the Digital Agenda for Europe. However, additional measures are needed to increase customers' interest and to realise the NBP's objectives. The deployment costs should further diminish in order to decrease the digital divide. The tax deduction measures put in place are insufficient to encourage the majority of households to take up higher bandwidths. Despite healthy competition on the market among generally stable players, further efforts are needed to decrease the price levels. It is also essential to combine private financing and financial instruments with European, national and municipal grants in order to achieve the NBP goals, but cooperation between different actors aimed at aggregating demand is not going smoothly and most projects are stuck. Bulgaria does not yet have a 5G strategy, but a dedicated working group was launched in 2017 to revise the NGA plan in order to include it. The new NBP is expected in 2018, with target date of 2030.

Bulgaria is lagging behind the EU average on 4G coverage. The efforts initiated in 2016 to release spectrum in the 800 MHz and 700 MHz bands remained at a standstill, while more difficulties arose in the 1.8 GHz band. Swift, additional efforts to release those bands could hugely improve the deployment of high-quality wireless broadband services in Bulgaria. Furthermore, a 5G strategy is expected to be rapidly included in the NBP and Bulgaria is supposed to ensure that appropriate spectrum is made available in a timely manner to all relevant market players for early 5G trials and deployment. Moreover, focusing more intensively on deploying broadband in rural areas and on developing digital skills and digital services would decrease the digital divide and benefit the country's overall connectivity, in particular for NGA coverage and take-up. Following the decision to refer Bulgaria to the CJEU, Bulgaria finally notified complete transposition of the Broadband Cost Reduction Directive in early 2018, which should improve and speed up broadband roll-out.

[30] The Broadband Price Index measures the prices of 12 representative broadband baskets as the percentage of household income. The baskets include three speed categories (12-30 Mbps, 30-100 Mbps and at least 100 Mbps) and four types of products (standalone internet, internet + TV, internet + fixed telephony and internet + TV + fixed telephony).

2 Human Capital

2 Human Capital	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**27**	**34.8**	**42.2**	**56.5**
DESI 2017	27	31.1	40.6	54.6

	Bulgaria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**62 %**	↑	**27**	**58 %**	**27**	**81 %**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**29 %**	↑	**27**	**26 %**	**28**	**57 %**
% individuals	2017			2016		2017
2b1 ICT Specialists	**2.7 %**	↑	**20**	**2.3 %**	**22**	**3.7 %**
% total employment	2016			2015		2016
2b2 STEM Graduates[31]	**13.9**	↓	**21**	**14.2**	**22**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

In the Human Capital dimension, Bulgaria is progressing slowly. The overall level of digital skills is among the lowest in the EU and it is very diverse among different socio-economic groups. Despite an increase in the number of people with at least basic digital skills from 26 % in 2017 to 29 % in 2018, Bulgaria remains among the lowest-performing countries in the EU. This is also linked to the low number of people using internet, accounting to 62 % of all 16-74 year olds.

An e-skills strategy was elaborated in 2014[32], setting out ways to modernise the education system, improve access to quality education and increase the offer of IT training in formal and non-formal education. More concrete measures were defined in the Plan for Implementation of the Strategy for 2015-2017. Since 2015, a government law regulates IT training in schools. The first IT training courses were carried out in first and fifth grade in 2016-2017; they will continue in seventh grade in 2017-2018 and then gradually be extended in the coming years.

A reform of the higher education system aimed at increasing performance and labour market relevance is ongoing. A list of 32 priority professional fields has been defined in order to prioritise funding in public universities. This includes fields related to science, technology, engineering and mathematics (STEM), in particular ICT and mathematics. In 2018, the number of STEM graduates decreased slightly compared to 2017, but this still remains a positive element compared to the other dimensions of the human capital index. Cedefop found a mismatch between the increasing demand for high-skilled engineering professionals in emerging sectors and a decrease in supply, with the number of STEM students declining

31 The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

32 http://mon.bg/upload/6543/strategia_efektivno_ikt_2014_2020.pdf.

and graduates often lacking job-specific skills[33]. Finally, ICT specialists account for 2.7 % of total employment (1 percentage point less than the EU average).

It is worth noting that the Bulgarian Digital National Alliance[34] continues to carry out several activities for increasing digital skills levels. These activities target different segments of the population, for example young children, girls, or elderly people, and take place in partnership with the private sector, education providers and international stakeholders.

At the same time, several IT companies have set up corporate academies offering digital skills training in order to address the shortages of advanced digital skills in Bulgaria.

Bulgaria would benefit from an updated action plan laying down the measures needed to fully implement the e-skills strategy.

Highlight 2018: Programme EDUCATION FOR IT CAREERS

Education for IT careers is a national programme set up by the Ministry of Education and Science to complement upper secondary school education. The aim is to encourage more students to learn programming, irrespective of the subjects they are studying, while giving the possibility of acquiring an additional Vocational education and training (VET) qualification for a very in-demand profession.

The programme targets pupils in the 10th-12th grades who are interested in improving their digital skills and eventually acquiring a complementary qualification as 'applied programmer'.

Courses are provided by five 'software centres' in Bulgaria, i.e. upper secondary schools that work in cooperation with IT business and higher education institutions, each coordinating another 10-15 schools nearby. The training courses will last 3 years and the learning content is developed in collaboration with representatives from the IT industry. The lectures and exercises will take place outside of school hours — either on-site or online. At the end of the training, the students will sit a state examination in order to obtain certificates for the professional qualification 'application programmer'. The training is free of charge.

The programme implementation will be monitored by a body established by the Ministry of Education and Science.

33 Cedefop Skills Panorama (2017). http://skillspanorama.cedefop.europa.eu/en/countries/bulgaria

34 https://www.digitalalliance.bg/en-home.

3 Use of Internet Services

3 Use of Internet Services	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**41.7**	**41.0**	**50.5**
DESI 2017	26	38.6	38.7	47.5

	Bulgaria				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**74 %** ↑ 2017	**20**	**68 %** 2016	**21**	**72 %** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**64%** 2016	**28**	**64%** 2016	**28**	**78 %** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**8 %** 2016	**23**	**8 %** 2016	**23**	**21 %** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**85 %** ↑ 2017	**1**	**80 %** 2016	**1**	**46 %** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**79 %** ↑ 2017	**5**	**76 %** 2016	**6**	**65 %** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**9 %** ↑ 2017	**28**	**7 %** 2016	**28**	**61 %** 2017
3c2 Shopping % individuals who used Internet in the last 12 months	**27 %** → 2017	**27**	**27 %** 2016	**27**	**68 %** 2017

Use of internet services in Bulgaria varies significantly according to the activities performed online. Bulgarians are intensive users as regards telephone or video calls: 85 % of Bulgarians who used the internet in the last 3 months also used it to make telephone or video calls, the highest value in the EU. The use of social networks is also among the highest in the EU. On the other side, Bulgarian consumers are far from using the full potential of e-commerce. In 2017, the proportion of internet users ordering goods or services over the internet in the previous 12 months was among the lowest in the EU at 27 % (EU average: 68 %). The number of people using banking online is also particularly low, accounting for 9 % of all internet users (which corresponds to 5 % of all individuals).

4 Integration of Digital Technology

4 Integration of Digital Technology	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**24.4**	**29.2**	**40.1**
DESI 2017	26	22.5	26.7	36.7

	Bulgaria					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**23 %** 2017	↓	**25**	**25 %** 2015	**22**	**34 %** 2017
4a2 RFID % enterprises	**9.2 %** 2017	→	**1**	**9.2 %** 2014	**1**	**4.2 %** 2017
4a3 Social Media % enterprises	**9 %** 2017	→	**28**	**9 %** 2016	**26**	**21 %** 2017
4a4 eInvoices % enterprises	**12.0 %** 2017	↑	**21**	**10.2 %** 2016	**21**	**NA** 2017
4a5 Cloud % enterprises	**5.5 %** 2017	↑	**27**	**4.7 %** 2016	**28**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**7.1 %** 2017	↑	**28**	**5.2 %** 2016	**28**	**17.2 %** 2017
4b2 E-commerce Turnover % SME turnover	**3.5 %** 2017	↑	**26**	**1.7 %** 2016	**28**	**10.3 %** 2017
4b3 Selling Online Cross-border % SMEs	**3.4 %** 2017	↑	**27**	**2.8 %** 2015	**27**	**8.4 %** 2017

Uptake of digital technology by enterprises is slow in Bulgaria. A growing ecosystem of digital and tech entrepreneurs has emerged in recent years, but investment in the digitisation of the economy is still limited. This underinvestment, combined with a shortage of ICT specialists, may be among the reasons why the digitisation process in Bulgaria is slower than in other Member States. According to the digital intensity index, the number of digitised enterprises in 2017 was among the lowest in the EU, at 12 %. While Bulgarian companies are major users of radio-frequency identification (RFID), their use of social media or cloud computing services remains among the lowest in the EU, respectively at 9 % and 5.5 % of the total number of enterprises. At 7.1 %, the level of SMEs selling online is also well below the EU average of 17.2 %.

Projects to encourage business innovation and digitisation are being run under the 2014-2020 European Regional Development Fund programmes, supporting the development of innovative digital start-ups. The flagship 'Sofia Tech Park' faces a number of challenges regarding scientific infrastructure and long-term financial sustainability. In 2017, the Council of Ministers adopted a concept note for the digital transformation of Bulgarian industry[35], outlining the need for a modernised Bulgarian economy. The Bulgarian economy would benefit from a concrete strategy on the digital transformation of Bulgarian industry.

[35] Concept for the digital transformation of Bulgarian industry

5 Digital Public Services

5 Digital Public Services	Bulgaria		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**49.7**	**48.0**	**57.5**
DESI 2017	22	45.2	44.2	53.7

	Bulgaria				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[36] % internet users needing to submit forms	**58 %** ↑ 2017	**15**	**57 %** 2016	**18**	**58 %** 2017
5a2 Pre-filled Forms Score (0 to 100)	**25** ↑ 2017	**24**	**19** 2016	**25**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**72** ↑ 2017	**26**	**71** 2016	**23**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**89** ↑ 2017	**11**	**74** 2016	**20**	**83** 2017
5a5 Open Data % of maximum score	**76 %** → 2017	**14**	**76 %** 2016	**7**	**73 %** 2017
5b1 eHealth Services % individuals	**10 %** 2017	**23**	**NA**		**18 %**

In terms of eGovernment, Bulgaria is progressing, but at a slower pace than other EU countries. A number of steps have been taken to improve digital public services. A strategic framework is in place, the State e-Government Agency (SEGA), created in December 2016, is now fully operational and the ICT budget framework has been optimised. The number of eGovernment users has increased compared to last year and it is now in line with the EU average.

In the summer of 2017, the Governance Programme for the period 2017-2021 was adopted, setting out the priorities and the measures related to digital public administration. It includes the introduction of a national scheme for electronic identification; further development of basic infrastructure; connection of key registers and provision of interoperability for an automated/semi-automated exchange of data and electronic documents. Many of these activities will be financed through the European Social Fund. While some activities have already started, many projects are still in the early stages of implementation, for example the centralised IT system for registering citizens and the introduction of new identity documents[15].

Digital public services for businesses shows a significant improvement compared to last year, scoring 89 out of a 100. As of 2018, tax declarations for legal persons are to be submitted only in electronic form. For physical people, this will be optional and will be incentivised via a tax rebate.

[36] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

Bulgaria continues to perform well in the area of open data: there are currently over 7 000 datasets from different national and regional administrations and agencies.

The swift implementation of the eIDAS Regulation[37] would further enhance users' trust in digital transactions, especially through the notification of its national eID under eIDAS, which is currently in development.

Concerning eHealth services, Bulgaria performs below the EU average. The Ministry of Health has initiated a project on the development and implementation of a National Health Information System (NHIS). This system includes developing health registries, implementing a pharmacotherapeutic expert system to flag possible drug interactions, building an online platform of the NHIS, and introducing an electronic health record, referral, and prescription[38].

Overall, Bulgaria showed progress in the area of Digital Public Services. Efficiently implementing the ongoing projects and the eIDAS Regulation would be beneficial. Bulgaria could also start preparing for the forthcoming Single Digital Gateway Regulation, including the once-only principle.

[37] Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market.

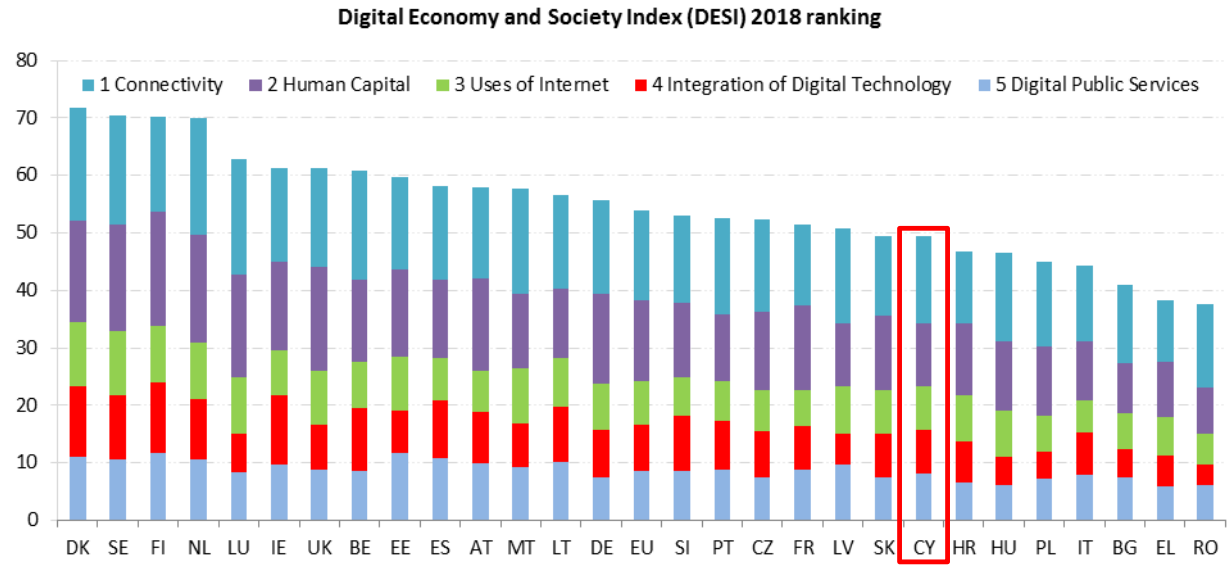
[38] The NHIS is endorsed by the National Health Strategy (2014-2020) and the Strategy on the development of eGovernment in the Republic of Bulgaria (2014–2020). In November 2016, the Ministry of Health issued an Ordinance on unified health information standards, to be applied by healthcare establishments, as a prerequisite for the NHIS implementation.
http://www.hspm.org/countries/bulgaria22042013/countrypage.aspx.

Digital Economy and Society Index (DESI)[39] 2018 Country Report Cyprus

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



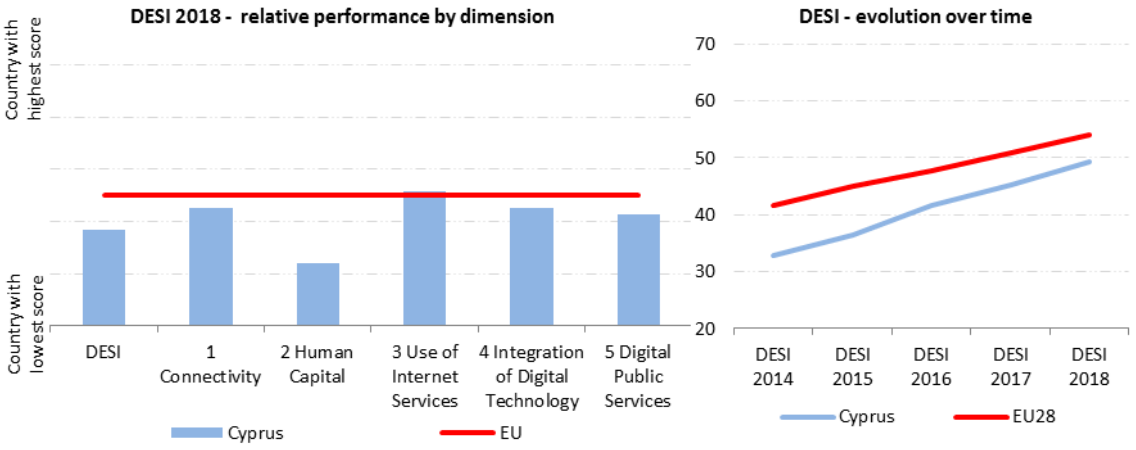
[39] https://ec.europa.eu/digital-single-market/en/desi

	Cyprus		Cluster	EU
	rank	score	score	score
DESI 2018	**21**	**49,3**	**43,5**	**54,0**
DESI 2017	21	45,2	40,4	50,8

Cyprus ranks 21st out of the 28 EU Member States. Overall, Cyprus progresses slowly but steadily. It shows improvements in all the dimensions of DESI, and even though it is ranked 21st, Cyprus is relatively in line with the EU average. Improvement in digital skills is crucial, since, despite the fact that Internet users engage in a wide variety of online activities, low levels of digital skills risk acting as a brake on the further development of its digital economy and society. Moreover, despite some progress observed in the past few years, Cyprus still lags behind the EU average in the demand and the supply of e-government services.

Cyprus belongs to the low performing cluster of countries[40].

In 2017, "Cyprus' new holistic and integrated national industrial strategy 2017-2030"[41] was announced by the Ministry of Energy, Commerce, Industry and Tourism (MoECIT). The strategy focuses on increasing innovation and productivity of the industry through digitisation and the development of digital skills.



[40] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

[41] http://www.mcit.gov.cy/mcit/sit/sit.nsf/All/FBC207AE9BC8BE69C225819C0040030F?OpenDocument

1 Connectivity

1 Connectivity	Cyprus		Cluster	EU
	rank	score	score	score
DESI 2018	**19**	**60.6**	**55.0**	**62.6**
DESI 2017	20	55.5	50.1	58.5

	Cyprus					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**100%** 2017	→	**4**	**100%** 2016	**3**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**76%** 2017	↑	**12**	**72%** 2016	**12**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**77%** 2017	↑	**25**	**64%** 2016	**27**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**101** 2017	↑	**8**	**89** 2016	**9**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**88%** 2017	→	**12**	**88%** 2016	**10**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**9%** 2017	↑	**27**	**3%** 2016	**28**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**85%** 2017		**8**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**0.2%** 2017	↑	**27**	**0.1%** 2016	**27**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**65** 2017	↑	**27**	**62** 2016	**26**	**87** 2017

Cyprus ranks 19th in terms of connectivity (compared to 20th in 2017) and this position is at par with its overall DESI ranking (20th). It performs well in fixed, fast and ultrafast broadband coverage as well as in fixed and mobile broadband take-up. In all these categories Cyprus exceeds the EU average and presents improving values (with the exception of fixed broadband coverage that approaches 100%). On the other hand, it lags behind when it comes to 4G coverage, fast and ultrafast broadband uptake and the broadband price index. In all these categories the ranking of Cyprus is among the lowest (25th for 4G coverage and 27th for the other three indicators). Improvements are visible and promising when it comes to 4G coverage (77% in 2017, compared to 64% in 2016, improving its ranking by 2 positions). Taking into account investments of mobile network operators (MNOs), it is likely that Cyprus will further bridge the gap in the next years. Fast broadband take-up is also improving, reaching 9% in 2017 compared to 3% in 2016. On the other hand ultrafast broadband uptake remains at a negligible level (0.2% in 2017), despite very widespread coverage of networks with such capacity, and this is unlikely to change, while the current lack of attractive retail offerings persists.

The current Cyprus Broadband Plan sets targets in line with the Digital Agenda for Europe but is not yet adjusted to the targets of the European Gigabit Society[42] or to the 5G Action Plan[43]. The Plan does not provide for supply side measures, taking into account the market players' stated intention to expand their broadband networks. However, it is acknowledged that the deployment of fast and ultra-fast broadband networks in remote, rural areas is not commercially viable. Most actions, ongoing and planned, focus on stimulating demand. Furthermore, the relevant Action Plan 2015-17 within the framework of the Digital Strategy includes awareness campaigns, training programmes, building of confidence in the security of online transactions, crucial reduction on broadband prices, the digitalisation of the government and the provision of (limited) free wi-fi access in public buildings and all villages. The implementation of the plan lags behind schedule and for some of the projects the money still has to be committed. Among the challenges faced in its timely execution are the court actions customarily taken during most public procurements and causing delays (e-government projects), until relevant decisions are issued.

Fixed network coverage is among the factors that enhance Cyprus' ability to exploit the benefits of the digital economy. The effective implementation of the Broadband Cost Reduction Directive (already transposed into national law) and the accelerated launch of additional spectrum assignment procedures in the first semester of 2018 can further underpin fixed and mobile coverage, particularly for high and ultra-high speed networks, and enhance coverage in rural areas. The main challenge however remains to foster the take-up of high speed broadband, influenced by factors, such as pricing, lack of compelling content and low digital literacy. The launch of new, high-speed products and the corresponding wholesale VULA offering (as recently announced by the incumbent operator CYTA) can promote the competitive uptake of fast and especially ultra-fast services. Updating the Broadband Plan as foreseen provides an important opportunity to bring it in line with the objectives of the Gigabit Society and the 5G action plan, to define focused actions, effectively utilising instruments available at European level, and to set-out its efficient and closely monitored execution.

[42] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: Connectivity for a Competitive Digital Single Market — Towards a European Gigabit Society (COM (2016) 587 final)

[43] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions — 5G for Europe: An action plan (COM (2016) 588 final)

2 Human Capital

2 Human Capital	Cyprus		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**43,0**	**42,2**	**56,5**
DESI 2017	25	37,5	40,6	54,6

	Cyprus					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**79%**	↑	**14**	**74%**	**19**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**50%**	↑	**19**	**43%**	**26**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**2,2%**	→	**25**	**2,2%**	**24**	**3,7%**
% individuals	2016			2015		2016
2b2 STEM Graduates[44]	**9,8**	↑	**28**	**7,5**	**28**	**19,1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

In Human Capital, Cyprus's performance is below the EU average, but progress is being made. In 2017, 79% of the Cypriot population used the internet regularly (versus 74% in 2016), but only 50% possessed at least basic digital skills. Nowadays, digital skills and competences are needed for nearly all jobs where digital technology complements existing tasks, and shortages can be an important barrier to the country's economic development. Moreover, Cyprus has a low share of Science, Technology, Engineering and Math (STEM) graduates (9,8), ranking last among EU countries. The country has also a lower share of ICT specialists (2,2%) in the workforce than the EU average (3,7%).

The National Coalition for Digital Jobs[45] is the main lever for addressing the shortage of digital skills. Students can acquire digital certification without any cost. Additionally, various competitions are taking place in schools in the area of coding, robotics etc. The Ministry of Education and Culture (MoEC) places particular emphasis on the development of actions that can contribute to the acquisition of the necessary digital skills by the younger generation. (e.g. teaching the subject of Computer Science in All-day Schools in Primary Education; participation in the organisation of the Cyprus Digital Championship etc.) In this endeavour, Cyprus has to overcome some important barriers. ICT professionals do not receive the necessary IT training, because the academic programs do not meet the needs of the industry with regard to ICT qualifications. In this vein, MoEC has established a committee to analyse in depth the performance of Cyprus' students. After discussion with academic stakeholders, an action plan has been developed in order to improve educational outcomes, prioritising STEM graduates. Its implementation will be initiated in the new school year 2018-19.

[44] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.
[45] http://www.digitaljobs.cyprus-digitalchampion.gov.cy/el/page/home

3 Use of Internet

3 Use of Internet	Cyprus		Cluster	EU
	rank	score	score	Score
DESI 2018	**17**	**51,1**	**41,0**	**50,5**
DESI 2017	13	50,9	38,7	47,5

	Cyprus					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	Value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**80%** ↑ 2017		**14**	**73%** 2016	**19**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**86%** 2016		**7**	**86%** 2016	**7**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**12%** 2016		**20**	**12%** 2016	**20**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**70%** ↓ 2017		**3**	**72%** 2016	**2**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**78%** ↓ 2017		**6**	**79%** 2016	**4**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**34%** ↓ 2017		**26**	**37%** 2016	**25**	**61%** 2017
3c2 Shopping % internet users (last year)	**39%** ↑ 2017		**26**	**38%** 2016	**26**	**68%** 2017

Cypriots are active Internet users engaging in a wide range of online activities, such as reading news online, listening to music, watching films and playing games online, using the Internet to communicate via voice or video calls and participating in social networks. For most of these activities, engagement among Cypriots is higher than overall in the EU.

On the other hand, regarding online interactions Cyprus does not progress compared to last year, with 34% of individuals using eBanking services and 39% shopping online. The "ICT Household survey for Cyprus " carried out by the statistical Service of Cyprus (CYSTAT), shows that the main factor holding back the development of e-commerce is the preference of 48.3% of Cypriots using the Internet, to shop in person. The second reason is the lack of a payment card for payments over the Internet, with 25.3%. The third reason is the lack of digital skills, with 18.4%, while security and privacy concerns is the fourth reason with 15.6%."

The rank of Cyprus (17th) in the Use of Internet is the most declined dimension compared to last year (13th in 2016). In order to increase the number of online transactions, it is important that the national Cybersecurity strategy[46] places particular emphasis on the development of actions for improving the confidence in the security of the online transactions

[46] http://www.ocecpr.org.cy/content-menu/7-stratigiki/3-kyvernoasfaleia

4 Integration of Digital Technology

4 Integration of Digital Technology	Cyprus		Cluster	EU
	rank	score	score	score
DESI 2018	**17**	**37,7**	**29,2**	**40,1**
DESI 2017	18	34,2	26,7	36,7

	Cyprus					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**35%** 2017	↓	**14**	**43%** 2015	**6**	**34%** 2017
4a2 RFID % enterprises	**6,1%** 2017	↑	**5**	**3,1%** 2014	**18**	**4,2%** 2017
4a3 Social Media % enterprises	**37%** 2017	↑	**3**	**35%** 2016	**4**	**21%** 2017
4a4 eInvoices % enterprises	**8,8%** 2017	↑	**25**	**6,0%** 2016	**26**	**NA** 2017
4a5 Cloud % enterprises	**12,3%** 2017	↑	**20**	**8,7%** 2016	**22**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**11,4%** 2017	↓	**21**	**12,4%** 2016	**19**	**17,2%** 2017
4b2 E-commerce Turnover % SME turnover	**6,3%** 2017	↑	**23**	**4,7%** 2016	**25**	**10,3%** 2017
4b3 Selling Online Cross-border % SMEs	**8,8%** 2017	↑	**13**	**8,3%** 2015	**14**	**8,4%** 2017

When it comes to the Integration of Digital Technologies by businesses, Cyprus progresses slowly. Companies do engage in the use of social media and do trade online, but are less prone to take up new technologies such as Cloud and RFID. SMEs' online selling services declined comparing to last year, scoring 11,4% versus 12,4% of last year. On the other hand, the e-commerce turnover has increased from 4,7% to 6,3%.

E-commerce is considered one of the top priorities of the MoECIT. With a one-year delay, the Action Plan for Growth[47], which was prepared by the Presidency's Unit for Administrative Reform, approved by the Council of Ministers in February 2015, was again approved, as updated, in November 2016. It includes e-commerce support actions with the aim of enhancing the competitiveness of the economy. The main goal is to establish a competitive and dynamic environment to develop the basic infrastructure by encouraging enterprises to take advantage of the new technological opportunities. The strategy will be co- financed by the Republic of Cyprus and the European Union with a total budget of €3.3 million (period 2014-2020), and the first call should be announced during the first semester of 2018.

Cypriot companies would also benefit from specific digitalisation plans for industry. A unified industry strategy is currently under preparation by the MoECIT in cooperation with the Cyprus Chamber of Commerce and Industry (CCCI). Finally, a new law approved in December 2016 foresees tax incentives for investing in innovative SMEs and start-ups.

[47] https://ec.europa.eu/info/sites/info/files/2017-european-semester-national-reform-programme-cyprus-en.pdf

5 Digital Public Services

5 Digital Public Services	Cyprus rank	Cyprus score	Cluster score	EU score
DESI 2018	**18**	**54,8**	**48,0**	**57,5**
DESI 2017	17	50,0	44,2	53,7

	Cyprus DESI 2018 value		Cyprus DESI 2018 rank	Cyprus DESI 2017 value	Cyprus DESI 2017 rank	EU DESI 2018 value
5a1 eGovernment Users[48] % internet users needing to submit forms	**49%** 2017	↑	**21**	**48%** 2016	**20**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**58** 2017	↑	**13**	**52** 2016	**14**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**76** 2017	↑	**23**	**73** 2016	**22**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**91** 2017	→	**10**	**91** 2016	**8**	**83** 2017
5a5 Open Data % of maximum score	**75%** 2017	↑	**15**	**57%** 2016	**14**	**73%** 2017
5b1 eHealth Services % individuals	**9%** 2017		**25**	**NA**		**18%**

In Digital Public Services, Cyprus remains overall below EU average. However, regarding pre-filled forms offered for public services, Cyprus has progressed compared to last year, scoring 58, while the EU average is 53. Online service completion and digital public services for businesses that are active cross border remained at the same level as in 2016. Open data, on the other hand, is steadily advancing with Cyprus scoring 75%, almost 20 p.p. comparing to last year's scores. The number of users of eGovernment services remained at the same level compared to last year, while the EU average is 9 p.p. higher.

Cyprus considers eGovernment as a priority in tandem with the Public Service Administration Reform. Thus, one of the pillars of the Growth Reform is eGovernment. Within this context, the Presidency has established an eGovernment Team, which is part of the Unit of Administrative Reform, and which has the responsibility to coordinate and facilitate the provision of eGovernment, to accelerate the implementation of the actions of the eGovernment strategy and to support the eGovernment Board. The eGovernment Board with membership at the highest level is responsible to approve eGovernment actions, monitor their progress, give solutions on significant problems that affect the implementation of eGovernment actions and take political decisions regarding eGovernment.

The goal of the eGovernment strategy in Cyprus is triple: offer even more eServices in a simple and user-centric way; satisfy citizens, businesses and public administrations by providing services through different channels (e.g. end-to-end public services, call centres, implementation of the Point of Single Contact for businesses); and increase the efficiency of

[48] The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration

public administrations by reducing administrative burden, simplifying the Regulatory Framework and improving administrative procedures.

The government has already started an awareness campaign to inform citizens and businesses about the benefits of using ICT and Internet in order to increase take up. In addition, training programs will be introduced to improve citizens' digital skills, putting emphasis on the use of digital services.

Highlight 2018: Cyprus Government Secure Gateway "ARIADNI"[49]

ARIADNI provides the foundation for delivery of the vision for a 'Joined-up Government'. ARIADNI will constitute the central passage of all electronic transactions between citizens, businesses, institutions and the Government, available 24/7. Currently, the system provides around 65 eServices. The Action Plan on digitisation that is in progress includes new public eServices to be provided through ARIADNI.

ARIADNI is enriched with information related to governmental procedures and services that are provided to both citizens and businesses. Users are able to find a full set of information for each governmental procedure including its description, relevant legislation, required certifications, fees, etc. The government procedures are categorised by sectors.

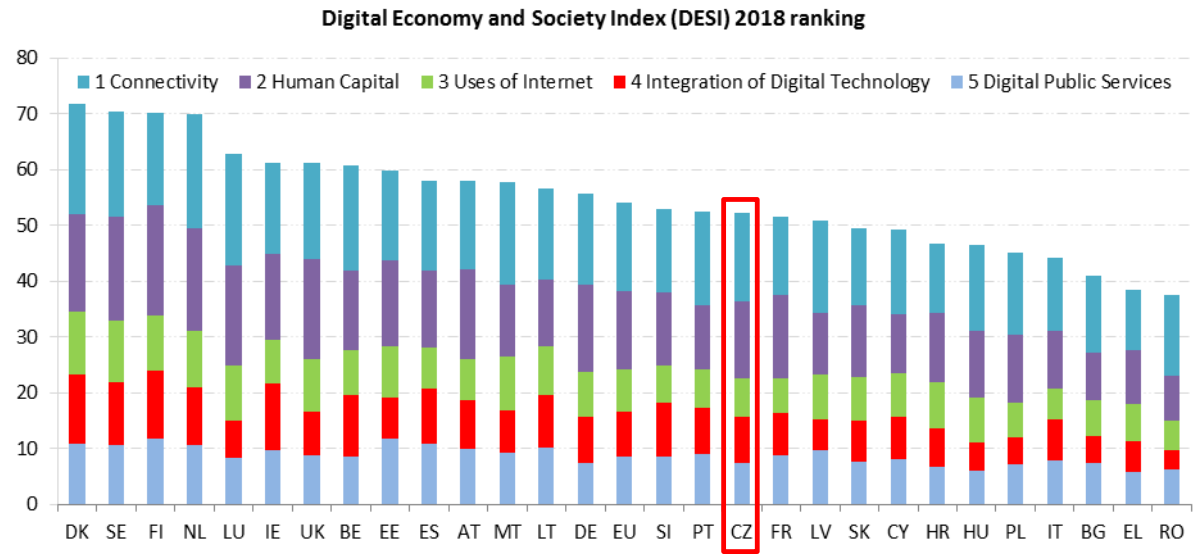
[49] https://cge.cyprus.gov.cy/re/public/

Digital Economy and Society Index (DESI)[50] 2018 Country Report Czech Republic

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



Czech Republic | **Cluster** | **EU**

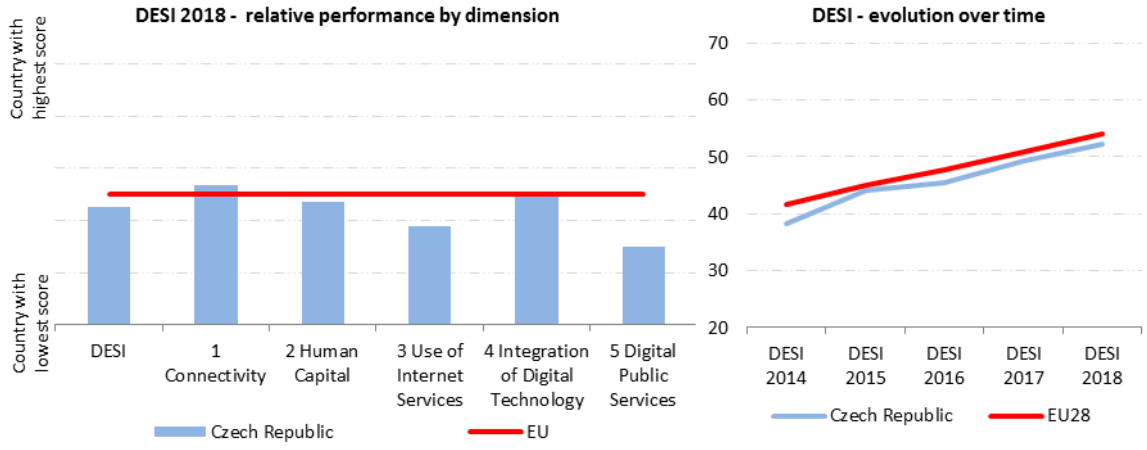
[50] https://ec.europa.eu/digital-single-market/en/desi

	rank	score	score	score
DESI 2018	**17**	**52,3**	**54,7**	**54,0**
DESI 2017	17	49,3	51,5	50,8

The Czech Republic ranks 17th out of the 28 EU Member States. Over the last year, the country progressed across all dimensions, with the exception of the Integration of Digital Technologies where its score was slightly lower than in 2017. The Czech Republic is very well positioned in terms of 4G coverage (99%). Take-up of mobile broadband is growing at a slower pace though.

The Czech Republic belongs to the Medium performing cluster of countries[51].

In 2017, the National coordinator of the digital agenda at the Government office continued activities of engaging with the relevant Ministries, with stakeholders and the general public, and ensured the coordination of national and European digital activities. Also last year, the Alliance Society 4.0 was established; the Action Plan Society 4.0, and the Principles for Creating Digitally Friendly Legislation[52] were approved by the government. The Action Plan formulates the priority tasks in relation to the impact of digital technologies on the economy and society, around the five Pillars of Connectivity and Mobility; Education and Labour Market; Computerization of Public Administration; Security and Industry, Business and Competitiveness. Furthermore everyone involved in creating or evaluating legislation needs to respect ten principles necessary to take into account the digital aspects of legislation.



[51] Medium performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia.

[52] https://ria.vlada.cz/prvni-krok-k-digitalne-privetive-legislative/

1 Connectivity

1 Connectivity	Czech Republic		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**63,9**	**62,4**	**62,6**
DESI 2017	16	59,0	58,8	58,5

	Czech Republic					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**98%** 2017	↓	**15**	**99%** 2016	**14**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**73%** 2017	↑	**14**	**71%** 2016	**16**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**99%** 2017	↑	**5**	**94%** 2016	**9**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**81** 2017	↑	**21**	**77** 2016	**18**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**89%** 2017	↑	**11**	**75%** 2016	**20**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**32%** 2017	↑	**17**	**26%** 2016	**17**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**60,4%** 2017		**20**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**15,82%** 2017	↑	**14**	**13,9%** 2016	**12**	**15,4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**87** 2017	↓	**11**	**88** 2016	**11**	**87** 2017

The Czech Republic's overall performance in the Connectivity dimension has been stagnating relative to the EU ranking. While the target for fixed broadband full coverage is almost met, next generation access (NGA) coverage increased above the EU average. This is equally due to the deployment of fibre by alternative operators as well as the upgrade of the incumbent of its copper network to VDSL. With regard to the take up of fast broadband (32%) and ultrafast broadband (15.8%), the Czech Republic is performing close to the EU average of 33% and 15.4% respectively. The ultrafast broadband uptake is exclusively catered for by new entrants. The digital divide is best illustrated by NGA coverage, where urban areas are much better served than rural ones. In terms of mobile broadband, 4G coverage is almost ubiquitous (99%). Take-up is growing at a slower pace though. The growth of subscriptions to fast fixed broadband is achieved mainly in the (well-developed) urban areas.

In rural areas, the lack of infrastructure is expected to be tackled through structural intervention co-financed with EU funds within the Operational Programme Enterprise and Innovations for Competitiveness (OPEIC). The OPEIC was approved by the Commission in April 2015 to support NGA roll-out in rural areas where market mechanisms cannot be relied

upon to deliver NGN infrastructure. European Structural and Investment Funds (ESIF) will support this OPEIC objective with approximately EUR 521 million (CZK 14 billion). Thanks to this programme, there should be 500 000 additional households with broadband access of at least 30 Mbps by 2023. A first call for tender was organised in September 2017. However, the implementation of the subsidy scheme has suffered substantial delays and encountered a number of issues with regard to the design of the tender that will need to be addressed swiftly in order to prepare the second call in 2018.

The effective implementation of the Cost Reduction Directive, in particular, the Single Information Point, would contribute to the deployment of broadband infrastructure to bridge the digital divide. More generally, ultrafast broadband coverage is ensured exclusively through FTTB/FTTH (fibre access networks) and cable deployment. While ESIF funds are used for deployment of NGA in rural areas, it remains to be seen whether the current approach is sufficient to achieve Digital Agenda targets in terms of take-up. Therefore, next to funding in areas of market failure, targeted policies and measures might also be useful in order to increase user demand.

2 Human Capital

2 Human Capital	Czech Republic		Cluster	EU
	rank	score	score	score
DESI 2018	**13**	**55,1**	**58,6**	**56,5**
DESI 2017	13	53,1	56,5	54,6

	Czech Republic				EU
	DESI 2018			DESI 2017	DESI 2018
	value	rank	value	rank	value
2a1 Internet Users	**81%** ↑	**12**	**79%**	**13**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**60%** ↑	**11**	**54%**	**14**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**3,5%** ↓	**15**	**3,7%**	**10**	**3,7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[53]	**17,2** ↑	**14**	**16,6**	**16**	**19,1**
Per 1000 individuals (aged 20-29)	2015		2014		2015

In the Human Capital dimension, the Czech Republic ranks 13th, a stable position compared with last year, and one of the two dimensions in which the country performs best. In 2017, more people are online and use internet regularly compared to 2016. There is also an increase in the level of the population's digital skills. On the other hand, the country scores lower than the previous year with regards to the percentage of ICT Specialists. In an economy close to full employment and where demand for technical profiles is high, recruitment of ICT specialists is increasingly difficult: in 2017, 67% of enterprises[54] reported having had difficulties in hiring ICT specialists, the second highest level in the EU and up from 47% in 2012.

The development of digital competencies is a priority for the country, both in terms of increasing citizens' digital skills and qualifications from their early age, to the preparedness of the workforce to the 4th Industrial Revolution. To this end, the Czech Republic has in place a Digital Education Strategy, focused on digital literacy, computational thinking, open education for children and teachers; a Digital Literacy Strategy, for long life education of every adult; and an Action Plan for Society 4.0, which covers among others issues such as Work 4.0 and Industry 4.0.

The "National Coalition for Digital Jobs[55], set up in 2016, counts nowadays 77 members, including employers and associations from the ICT sector, public sector authorities,

[53] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.
[54] Of all the enterprises which recruited/tried to recruit personnel for jobs requiring ICT specialist skills. Source: European Commission, Digital Scoreboard.
[55] http://www.digikoalice.cz/

universities and education providers, NGOs and civil society organisations. Some stakeholders linked to the strategy Industry 4.0 (Průmysl 4.0) are also involved. The Coalition supports stakeholders' dialogue by organizing round tables and conferences on various topics connected to digital skills development, as well as sharing of best practices.

The successful implementation of the actions above will greatly benefit the country's human capital.

Highlight 2018: Supporting the development of computational thinking (Project PRIM)[56]

The development of computational thinking is one of the three main targets of the Digital Education Strategy. Funded by the European Social Fund and with a budget of €4.25 million, the project PRIM (Podpora rozvíjení informatického myšlení) will prepare conceptual materials that will enable the curriculum documents to be upgraded from the point of view of involving digital technologies.

The project. The aim is to promote the conditions for open education and to contribute to the creation of an education system that ensures that every individual is equipped with the necessary competences to apply to the information society and to use open learning offers. Conceptual materials will consistently take into account the needs of joint learning.

The project started in October 2017 and will run until September 2020. It relies on the partnership of the National Institute of Education (NÚV), 9 (all) pedagogical faculties preparing primary teachers, almost all faculties preparing secondary ICT teachers.

The main expected outputs are:

- 11 educational materials for computational thinking for all school degrees (incl. kindergarden)
    A. Algorithmization, programming
    B. Unplugged computing, basics of theoretical informatics
    C. Robotics (building sets, toys)
- Lessons of didactics of computing at the universities
- 2 courses for in-service teachers
    - Created, piloted, offered for educational organizations
    - For primary, for secondary informatics teachers, Blended learning
- 2 MOOC courses
    - What is CT, What is robotics
- Popularizational campaigns (TV, social networks, schools)

[56] https://www.muni.cz/vyzkum/projekty/38424

3 Use of Internet Services

3 Use of Internet Services	Czech Republic		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**46.5**	**48.3**	**50.5**
DESI 2017	21	43.0	45.0	47.5

	Czech Republic				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**91%** 2017	**3**	**NA** 2016		**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**72%** 2016	**24**	**72%** 2016	**24**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**4%** 2016	**28**	**4%** 2016	**28**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**42%** ↑ 2017	**23**	**40%** 2016	**19**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**57%** ↑ 2017	**26**	**55%** 2016	**26**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**67%** ↑ 2017	**13**	**63%** 2016	**14**	**61%** 2017
3c2 Shopping % internet users (last year)	**65%** ↑ 2017	**13**	**57%** 2016	**15**	**68%** 2017

In terms of the propensity of individuals to use Internet services, the Czech Republic over the last year made a good progress and advanced from rank 21 to rank 20. In 2017 91% of Czech Internet users read news online, well above the EU average. Czech internet users also performed banking transactions online more than other Europeans (67% compared to 63%) and increasingly shopped online, although still not in line with the EU average (65% compared to 68%). They used internet for entertainment (music and video) and communication (social networks) less than the average European. With no changes from the previous year, video on demand use was especially low, placing the country at the bottom of the ranking in the EU.

4 Integration of Digital Technology

4 Integration of Digital Technology	Czech Republic		Cluster	EU
	rank	score	score	score
DESI 2018	**13**	**40.4**	**42.1**	**40.1**
DESI 2017	11	40.8	38.5	36.7

	Czech Republic					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**28%** 2017	↓	**20**	**30%** 2015	**18**	**34%** 2017
4a2 RFID % enterprises	**2.0%** 2017	↑	**27**	**1.3%** 2014	**28**	**4.2%** 2017
4a3 Social Media % enterprises	**13%** 2017	↑	**23**	**12%** 2016	**24**	**21%** 2017
4a4 eInvoices % enterprises	**18.4%** 2017	↑	**13**	**12.9%** 2016	**18**	**NA** 2017
4a5 Cloud % enterprises	**14.4%** 2017	↑	**17**	**9.9%** 2016	**20**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**22.9%** 2017	↓	**6**	**25.7%** 2016	**4**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**16.3%** 2017	↓	**2**	**21.7%** 2016	**2**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**12.1%** 2017	↑	**4**	**11.8%** 2015	**3**	**8.4%** 2017

Over the past year, the Czech Republic dropped several ranks in the dimension concerning the Integration of Digital Technology by businesses. However, this is one of the two dimensions where the country performs best. Although still above the EU average, the percentage of Czech SMEs selling online decreased over the last year. Likewise, the e-commerce turnover went down, although the country still ranks second in the EU. Over 2017, there has been an increase in the use of RFID, cloud and social media, but the sharing of electronic information has decreased and so the country's ranking in this dimension.

As part of the Initiative Industry 4.0[57], approved by the Government in August 2016, a revision of the organisational structure of the National Application Oriented Research Centres for Industry 4.0 is being undertaken, aimed at the definition of the scope of activities of the various centres. There are dedicated programmes for Industry 4.0 solutions and process development such as "Technology – Industry 4.0", "Innovation Vouchers" and others. Also as part of the initiative, a number of instruments to deal with the capital intensive aspects of implementation of industry 4.0 actions, systems and processes are being considered. The Operational Program Enterprise and Innovation, with a total allocation of CZK 120 billion (4,5 B€), is to become a key financial instrument immediately available for applying Industry 4.0 in the current programming period. The implementation of these programmes would be a significant benefit for the Czech economy.

[57] "Průmysl 4.0"

5 Digital Public Services

5 Digital Public Services	Czech Republic		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**50,2**	**58,5**	**57,5**
DESI 2017	23	44,7	54,9	53,7

	Czech Republic				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[58] ↓ % internet users needing to submit forms	**33%** 2017	**27**	**35%** 2016	**27**	**58%** 2017
5a2 Pre-filled Forms ↑ Score (0 to 100)	**49** 2017	**16**	**43** 2016	**15**	**53** 2017
5a3 Online Service Completion ↑ Score (0 to 100)	**81** 2017	**18**	**77** 2016	**20**	**84** 2017
5a4 Digital Public Services for Businesses ↑ Score (0 to 100) - including domestic and cross-border	**81** 2017	**17**	**73** 2016	**21**	**83** 2017
5a5 Open Data ↑ % of maximum score	**68%** 2017	**20**	**55%** 2016	**17**	**73%** 2017
5b1 eHealth Services % individuals	**15%** 2017	**16**	**NA**		**18%**

This is the dimension where the Czech Republic progressed the most, although it is still below EU average in all indicators. Online interaction between public authorities and citizens is one of the lowest in the EU.

Despite an increase in all indicators, the performance (50.2) of the Czech indicator for Digital Public Services remains below the EU average (57.5). It ranks 22nd among EU countries, a slight year-to-year improvement.

Although in 2017, the amount of data prefilled in public services' online forms and the share of administrative steps related to major life events that can be done online, increased, the use of e-government services remains well below the EU average.

In 2017 two laws on secure access to e-government services have been adopted. These are the laws on electronic identification[59] and the law on citizens' identity card[60]s. As they enable online identification of citizens they have the potential to boost e-government services and help to foster digital society beyond the public administration. The national e-ID, which should serve as a key enabler for the use of e-government services, is set to be introduced in July 2018.

[58] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.
[59] Act No. 250/2017 Coll.
[60] Act No. 195/2017 Coll.

The government also plans to launch an interactive citizen's portal, acting as a national gateway for personalised e-government services. To improve accessibility, classification of the available public sector digital services (some 700) is ongoing, with a view to cataloguing them. This should raise awareness of e-government services from current low levels, which is one of the barriers to their broader usage. Work is also ongoing to improve interoperability of e-government infrastructure[61], which should help address the fragmentation of services and databases.

Despite the progress in both demand and supply of eGovernment services over the past year, the performance of the Czech Digital Public Services remains below EU average. The actions put in place by the Czech Republic to improve availability, quality and promotion of eGovernment services could contribute to improvements in this dimension.

Regarding eHealth, since January 2018, ePrescriptions are compulsory for all health care providers and physicians. This is part of the National eHealth Strategy published and approved by the government in 2016. Currently the Czech Republic, with the support of the Structural Reform Support Service, is building-up a National eHealth Centre.

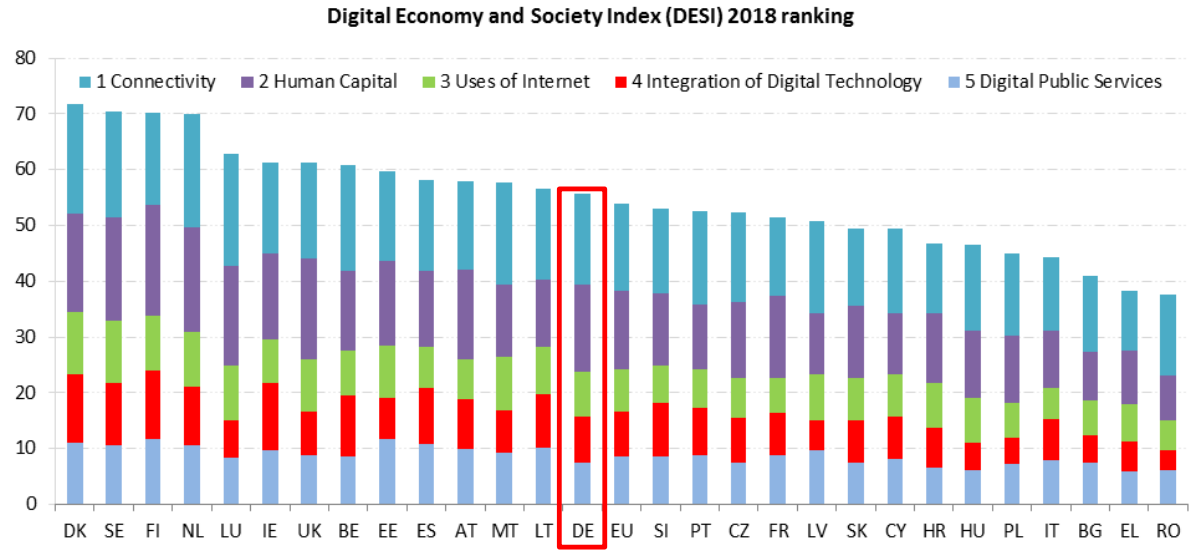
[61] Such as the base registers, data boxes, the network of CzechPOINTs and the public administration portal.

Digital Economy and Society Index (DESI)[62] 2018 Country Report Germany

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.

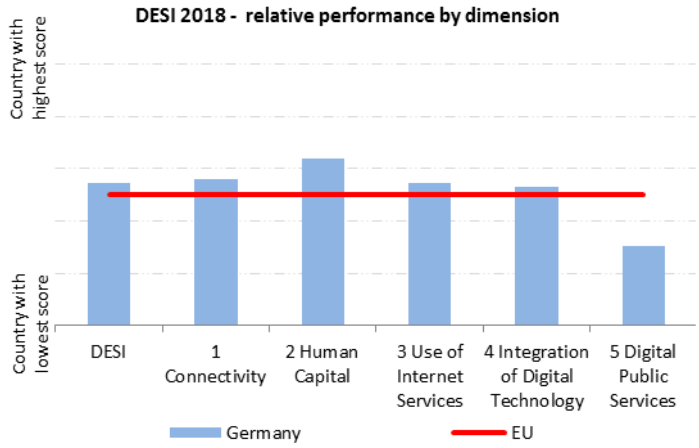


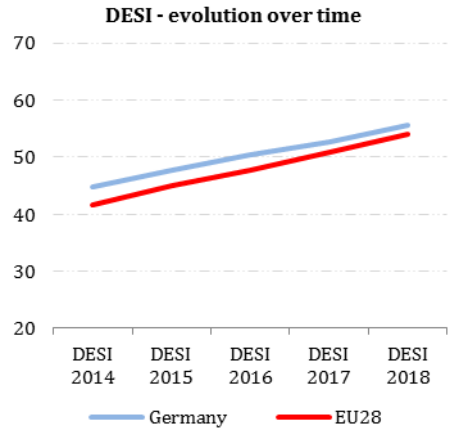
Germany | **Cluster** | **EU**

62 https://ec.europa.eu/digital-single-market/en/desi

	rank	score	score	score
DESI 2018	**14**	**55.6**	**54.7**	**54**
DESI 2017[63]	14	52.7	51.5	50.8

Germany ranks 14th out of the 28 EU Member States. Overall, it progressed over the last year. It is performing well as regards fixed broadband take-up and prices. However, there is an obvious urban-rural digital divide as regards fast Internet coverage and the share of fibre connections is very low throughout the country. Germans have good digital skills (7th rank), although a shortage of ICT professionals may hamper the potential of Germany's economy. German Internet users are very active online shoppers and German enterprises are active in selling online. The country's greatest digital challenge is to improve the online interaction between public authorities and citizens. With only 19% of the population being eGovernment users, Germany ranks 23rd among the Member States in this respect. Germany belongs to the Medium performing cluster of countries[64].In 2014, Germany adopted its Digital Agenda 2014-2017[65] and in March 2016 the Federal Ministry for Economic Affairs and Energy presented the Digital Strategy 2025[66]. A state minister for digital affairs attached to the Chancellor's Office has become part of the new government established in March 2018.





63 The DESI was re-calculated for 2017 for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings have changed for Germany from the previous publication, where it ranked 11th. The main changes are new indicators on ultrafast broadband and eHealth.

64 Medium performing countries are Latvia, Czech Republic, Slovenia, France, Portugal, Spain, Lithuania, Malta, Germany and Austria.

65 http://www.bmwi.de/EN/Topics/Technology/digital-agenda.html

66 https://www.bmwi.de/English/Redaktion/Pdf/ict-strategy-digital-germany-2015,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf

1 Connectivity

1 Connectivity	Germany		Cluster	EU
	rank	score	score	score
DESI 2018	**13**	**64,7**	**62,4**	**62,6**
DESI 2017	11	62,1	58,8	58,5

	Germany					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**98%** 2017	→	**17**	**98%** 2016	**16**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**88%** 2017	↑	**3**	**86%** 2016	**4**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**88%** 2017	↑	**23**	**86%** 2016	**20**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**79** 2017	↑	**22**	**73** 2016	**21**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**84%** 2017	↑	**15**	**82%** 2016	**11**	**80%** 2017
1c2 Fast broadband take-up % homes subscribing to >= 30Mbps	**36%** 2017	↑	**16**	**26%** 2016	**16**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**64.9%** 2017		**19**	**NA**		**58%** 2017
1d2 Ultrafast Broadband take-up % homes subscribing to >= 100Mbps	**11,1%** 2017	↑	**19**	**7,8%** 2016	**20**	**15,4%** 2017
1e1 Broadband price index Score (0 to 100)	**91** 2017	↓	**4**	**94** 2016	**3**	**87** 2017

In 2017, Germany progressed slowly on almost all Connectivity indicators. Since other countries were progressing faster, however, it fell from rank 11 to rank 13. Fixed broadband coverage in Germany is stable at 98%. Although rural next-generation access (NGA) coverage has improved since last year, from 49% to 54%[67], and is above the EU average (47%), the digital divide between urban and rural areas is still obvious (total fixed NGA coverage was 84% in Germany in 2017). There was a significant improvement in the uptake of fast broadband (>=30 Mbps) connections from 26% in 2016 to 36% in 2017. The Broadband Pricing Index (based on several fixed broadband offers and also income) was the fourth best in the EU. The share of DSL connections, which is the main source of connectivity, was 74.8% as of July 2017, followed by cable connections with 22.8% market share. The market share of FTTH/B connections was still at a very low level of only 2.1% in July 2017, compared to a significantly higher EU average of almost 12.9%[68].

Germany is the only Member State that had already assigned 100% of the overall harmonised spectrum for broadband in 2015. 4G coverage in Germany is slightly below the EU average: 88% versus 91%. However, mobile broadband take-up is lower than elsewhere in the EU: 79 versus 90 subscriptions per 100 inhabitants (EU average).

67 Source: Broadband Coverage Study (IHS and Point Topic). Data as of October 2016 and October 2017.

68 Source: Communications Committee. Data as of July 2017.

On 7 March 2017, the Network Alliance and the Federal Ministry of Transport and Digital Infrastructure (BMVI) set out the Zukunftsoffensive Gigabit-Deutschland strategy[69], declaring the need to install fibre infrastructure on a large scale. Altogether the Network Alliance plans to invest around EUR 100 billion until 2023 in order to realise gigabit capable converged infrastructures by 2025. On 12 July 2017, the Federal Government published its 5G strategy for Germany. The aim is to position Germany as a lead market for 5G applications and to support the rapid and successful introduction of 5G technology. Following the 2017 elections in Germany, a EUR 10-12 billion Gigabit Investment Fund was included in the new Federal Government coalition agreement[70], to be spent by 2021 (i.e. in the next four years). Also, part of the coalition agreement is the legal right to fast internet from 1 January 2025, to be designed by 2019, and direct fibre connections for socio-economic drivers (schools, hospitals, business parks etc.) by 2021.

The Federal Government will face several challenges on the German telecom markets. There is an obvious urban-rural digital divide as regards fixed NGA coverage (rural coverage at 54%, still above EU average of 47%) in Germany, where targeted broadband funding would seem to be crucial. The share of fibre connections is very low (only 2%), so Germany is lagging behind several other Member States. The incumbent's focus on vectoring technology could further delay deployment of very-high-speed connections. Commitments from the Federal Government and from operators to deliver nationwide high-speed infrastructures will help to improve the very low availability and take-up of gigabit connections. The 2018 coalition agreement includes a commitment to full coverage with gigabit-ready networks and prioritises fibre.

[69] http://www.bmvi.de/SharedDocs/DE/Artikel/DG/eckpunkte-zukunftsoffensive-gigabit-deutschland.html
http://www.bmvi.de/SharedDocs/DE/Publikationen/DG/netzallianz-digitales-deutschland.pdf?__blob=publicationFile

[70] https://www.bundesregierung.de/Content/DE/StatischeSeiten/Breg/koalitionsvertrag-inhaltsverzeichnis.html

2 Human Capital

2 Human Capital	Germany		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**62.9**	**58.6**	**56.5**
DESI 2017	8	61.6	56.5	54.6

	Germany					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**87%**	→	**7**	**87%**	**7**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**68%**	→	**7**	**68%**	**7**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**3.7%**	→	**12**	**3.7%**	**10**	**3.7%**
% employed individuals	2016			2015		2016
2b2 STEM Graduates[71]	**20.5**	↑	**10**	**19.3**	**11**	**19.1**
Per 1000 individuals (aged 20-29)	2015/16			2014		2015

On Human Capital, Germany is performing well and making progress. The inhabitants are regular users of the Internet, and generally possess above-average digital skills. However, there is a significant skills shortage. 3.7% of the workforce are ICT specialists but, as in most European countries, demand exceeds supply. In October 2017, there were 55 000 open ICT positions[72].

An element of the German Digital Agenda is the Digital Knowledge Society. At Länder level, the Conference of Education Ministers (KMK) in December 2016 adopted the 'Education in the digital world' strategy[73]. Concrete steps for implementation are being discussed. In October 2016, the Federal Ministry for Education and Research (BMBF) presented its 'Education Offensive for the Digital Knowledge-based Society' strategy and proposed a DigitalPakt#D with the Länder. In its coalition treaty, the new federal government agreed to invest EUR 5 billion (of which EUR3.5 billion in the current legislative period) to provide schools with the necessary digital infrastructure, technologies and a school-cloud. In return, the Länder are to provide teachers with the necessary training.

As to safeguarding the future supply of skilled personnel, science, technology, engineering and mathematics (STEM) studies in general and ICT in particular are increasingly popular. Also, migration of skilled personnel to Germany could mitigate the shortage of ICT specialists.

[71] In DESI 2018 the most recent data have been used, which refer to 2015 or 2016 depending on the Member State. The DESI 2018 ranking is based on the most recent data, too. Historical data have been updated by Eurostat.

[72] https://www.bitkom.org/Presse/Presseinformation/55 000-Jobs-fuer-IT-Spezialisten-sind-unbesetzt.html

[73] https://www.kmk.org/themen/bildung-in-der-digitalen-welt/strategie-bildung-in-der-digitalen-welt.html

A national digital skills and jobs coalition could facilitate the building of synergies between different stakeholders for the design and implementation of strategies addressing the shortage of people with digital skills.

3 Use of Internet Services

3 Use of Internet Services	Germany		Cluster	EU
	rank	score	score	score
DESI 2018	**14**	**52.7**	**48.3**	**50.5**
DESI 2017	18	47.3	45.0	47.5

	Germany					EU
	DESI 2017			DESI 2016		DESI 2017
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**74%** ↑ 2017		**21**	**72%** 2016	**20**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**78%** 2016		**17**	**78%** 2016	**17**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**23%** 2016		**11**	**23%** 2016	**11**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**54%** ↑ 2017		**11**	**31%** 2016	**27**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**56%** → 2017		**27**	**56%** 2016	**25**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**62%** ↑ 2017		**16**	**59%** 2016	**16**	**61%** 2017
3c2 Shopping % internet users (last year)	**82%** → 2017		**6**	**82%** 2016	**3**	**68%** 2017

In terms of individuals' propensity to use Internet services, Germany made good progress over the last year, in particular when it comes to Video Calls, and overall it moved from rank 18 to rank 14. German Internet users read news online (74%), listen to music, watch videos and play games online (78%), watch films (23%) and make Video Calls over the Internet (54%). They use social networks (56%) and online banking (62%). Users in Germany tend to use Internet for online shopping more than Europeans 82% as compared with 68% for the EU as a whole.

4 Integration of Digital Technology

4 Integration of Digital Technology	Germany		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**41.3**	**42.1**	**40.1**
DESI 2017	14	38.8	38.5	36.7

	Germany					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**38%** 2017		**11**	**NA** 2015		**34%** 2017
4a2 RFID % enterprises	**3.6%** 2017	↓	**19**	**4.0%** 2014	**15**	**4.2%** 2017
4a3 Social Media % enterprises	**16%** 2017	↓	**20**	**18%** 2016	**15**	**21%** 2017
4a4 eInvoices % enterprises	**17.2%** 2017	↑	**17**	**15.6%** 2016	**13**	**NA** 2017
4a5 Cloud % enterprises	**NA** 2017			**9.3%** 2016	**21**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**23.5%** 2017	↓	**4**	**25.6%** 2016	**5**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**11.4%** 2017	↑	**9**	**7.0%** 2016	**19**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**11.3%** 2017	↑	**7**	**9.2%** 2015	**11**	**8.4%** 2017

Germany made good progress as regards the Integration of Digital Technology by businesses. In particular, German enterprises are taking advantage of the possibilities offered by online commerce: 23.5% of SMEs sell online and 11.3% do so across borders. However, SMEs are slow adopters of digital technologies and 34.6 % of them have a very low level of digitisation[74]. Only 5.3 % of German SMEs used big-data analytics in 2016, for example, as compared with almost 10 % of SMEs in the EU as a whole[75].

To help SMEs catch up with digitisation, the government is extending a network of SME competence centres. The main purpose of the centres is to inform SMEs about the potential that digitisation offers. The centres support SMEs in testing advanced technologies and in training staff. Since July 2017, the 'go digital' support programme has been providing SMEs all over the country with consultancy services via innovation vouchers to advance their own digitisation in the areas of IT security, digital marketing and digitised business processes. Digital hubs are promoting closer cooperation between start-ups, SMEs, industry, science and administration. One reason why businesses do not invest more in new digital business models is the lack of skilled personnel. In 2016, SMEs were asked what was preventing them from digitising their business. 67 % replied that there was a lack of ICT skills in their

[74] https://ec.europa.eu/digital-single-market/en/digital-scoreboard
[75] https://ec.europa.eu/digital-single-market/en/digital-scoreboard

workforce, while 55 % replied that they lacked skilled employees. In October 2017, 23 700 business parks were not connected to a fibre network and 28 % of all companies did not have access to networks of at least 50 megabits.

In 2017, the previous government published a 'White Book on Digital Platforms', which presents practical proposals for 'digital governance', and a number of measures and projects have been launched. Germany does not have a strategy on the collaborative economy. Policy and regulation differ considerably across regions and cities, for example regarding short-term accommodation and passenger transport.

In order to improve the digital transformation of the economy, it will be important continuously to raise awareness of the importance of digital transformation strategies, in particular for medium-sized companies. In that context, continuous investment in ICT skills and infrastructure is key.

Highlight 2017: Darmstadt won Germany's first ever Digital City award.

Initiated by Germany's digital association, Bitkom, in collaboration with the German Association of Towns and Municipalities, the Digital City contest was for medium-sized German cities that have a decent infrastructure, an urban character and a nearby university. Darmstadt's holistic approach and its focus on cybersecurity helped it to win the award. The Digitisation of the city will focus on 10 areas: Public administration, IT infrastructure, commerce, energy and environment, education, security, data platforms, transport, society and health. At the end of the process, Darmstadt could be an exemplary smart city. https://digitalstadt-darmstadt.de/

Darmstadt is one of Europe's leading IT hubs. The science city, with a population of almost 160,000, had already received a Digital Leader Award in 2016 for its open data project on traffic flow improvement. Darmstadt is also the first city in a decade to switch its entire tram power supply to 100% green electricity. In 2018, the city will be launching a connected parking app, designed to help residents and visitors to find and reserve parking spots. Special sensor-equipped antennae will measure each district's environmental factors and make the resultant readings available as open data.

A trading platform will offer regional products with same-day delivery by cargo e-bike.

In closed areas, Darmstadt is experimenting with autonomous buses and in the near future it will run semi-autonomous trams.

5 Digital Public Services

5 Digital Public Services	Germany		Cluster	EU
	rank	score	score	score
DESI 2018	**21**	**50.2**	**58.5**	**57.5**
DESI 2017	21	46.2	54.9	53.7

	Germany					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
5a1 eGovernment Users % internet users needing to submit forms	**39%** 2017	↑	**25**	**38%** 2016	**25**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**38** 2017	→	**19**	**38** 2016	**17**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**87** 2017	↑	**15**	**83** 2016	**17**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-bord	**84** 2017	→	**14**	**84** 2016	**14**	**83** 2017
5a5 Open Data % of maximum score	**70%** 2017	↑	**17**	**51%** 2016	**20**	**73%** 2017
5b1 eHealth Services % individuals	**7%** 2017		**26**	**NA**		**18%**

This is the area in which Germany is performing worst. Germany ranks 21st among EU countries for Digital Public Services. It is improving its score and making progress. Germany is one of the EU countries with the lowest online interaction between public authorities and citizens. Only 7 % of Germans use online health services from time to time and Germany ranks 26th in the EU in that respect.

The plan, based on the Online Access Act (*Onlinezugangsgesetz* – OZG) adopted in June 2017, is significantly to expand and improve eGovernment services and to provide easy, secure and mobile access for citizens and businesses. In order to make this possible, an exclusive legislative competence of the Federal Government was incorporated into Article 91c (5) of the Constitution (*Grundgesetz*). The OZG obliges the federal government and the *Länder* to offer their administrative services online within five years and to link their respective portals in a portal network. The IT architecture for this network is currently under construction. The federal level sets the necessary IT standards and IT components that are to be used in the portal network and, if possible, strives for a mutually acceptable solution with the regions. There will be an associated citizen's account where the citizen can handle personal data and see what data are available to which state authority. Under the Coalition Treaty of the new Federal Government, the plan is to provide EUR 500 million for the implementation of the OZG and to set up an e-government agency to develop standards and pilot projects.

The extremely low use of eHealth services reflects the comparatively low adoption of eHealth among both general practitioners and hospitals. *Inter alia*, the federal government's eHealth law sets milestones for the deployment of a digital eHealth infrastructure and the

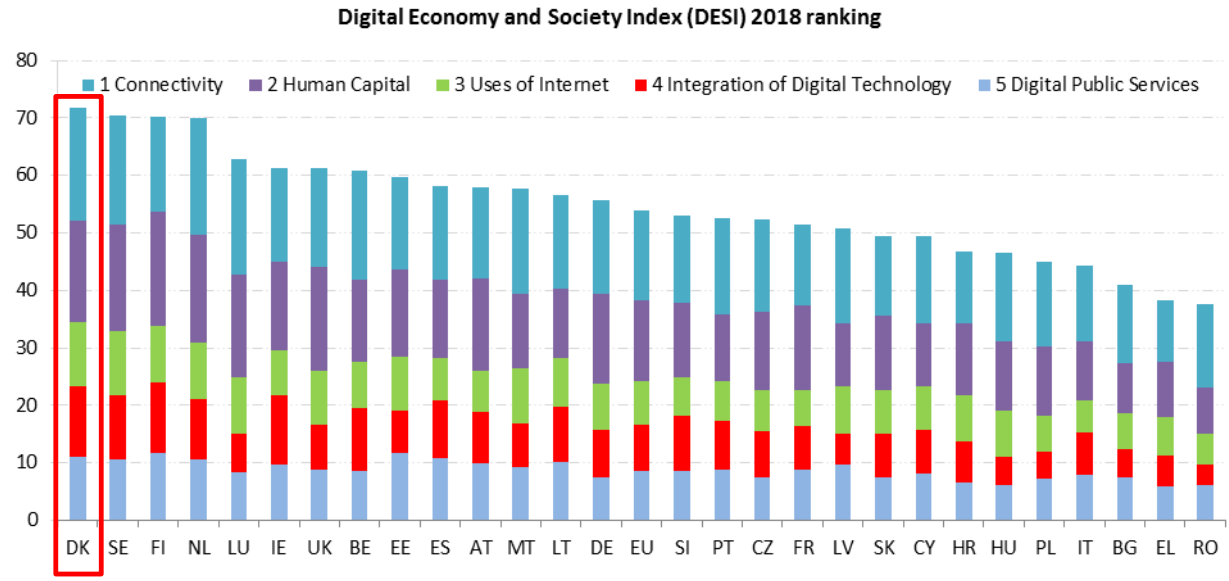
comprehensive use of the electronic health card in all medical establishments as from mid-2018, but it is still unclear whether this objective will be met.

Digital Economy and Society Index (DESI)[76] 2018 Country Report Denmark

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.

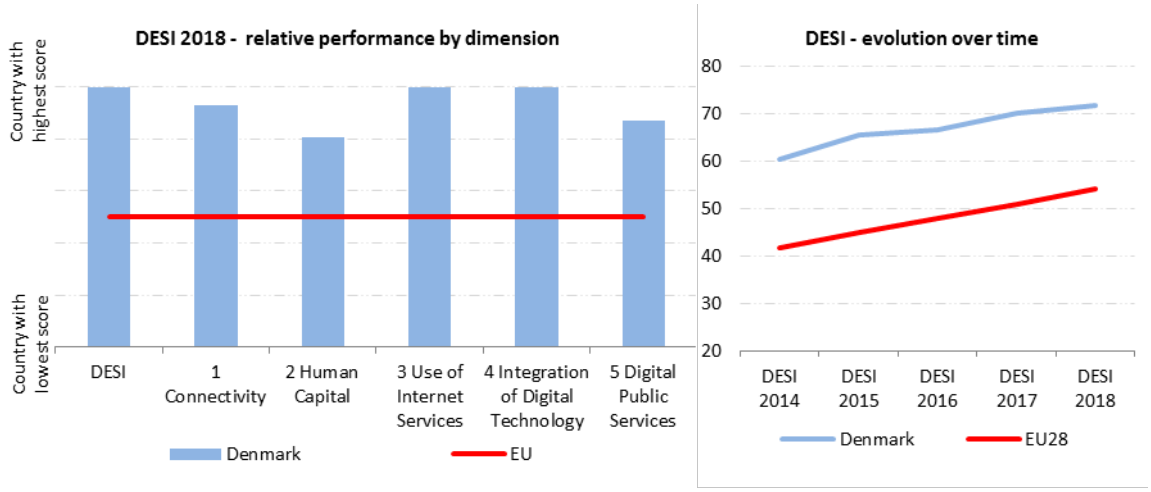


	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**1**	**73.7**	**63.8**	**53.3**

[76] https://ec.europa.eu/digital-single-market/en/desi

DESI 2017	1	72.1	61.1	50.2

Denmark ranks 1st out of the 28 EU Member States in DESI 2018. Denmark made progress in most dimensions, with the exception of Integration of Digital Technology. As a leader in digitisation, Denmark performed very well in connectivity, thanks to the widest 4G coverage in Europe and the increase in coverage and take-up of fast and ultrafast fixed broadband connections. Almost all Danish citizens are online and make good use of a variety of online services, particularly for banking, shopping and accessing online entertainment. The percentage of ICT specialists is slowly increasing and a high percentage of Danes have at least basic digital skills. However, some gaps still exist with more than a fourth of citizens who do not have basic digital skills. On the supply side, Denmark made outstanding progress in the use of digital technologies by enterprises, leading the EU and the world rankings. However, some indicators show areas for potential improvement. Denmark is strong in the delivery of online public services thanks to a consistent long-term national strategy. Denmark belongs to the High performing cluster of countries.[77] In January 2018, following the political agreement between the Danish People's Party and the Danish Social-Liberal Party, the Danish government launched a new digital strategy, Strategy for Denmark's Digital Growth[78] that consists of 38 initiatives, structured under seven main pillars[79]. The strategy aims at bringing Denmark to the forefront of the digital development, to create the best foundation for Danish companies and to exploit new sources of digital growth. The Ministry in charge is the Ministry of Industry, Business, and Financial Affairs. It allocates DKK 1 bn (approx.. EUR 134 million) for initiatives running from 2018 to 2025. Several of the initiatives will be based on private funding.



77 High performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.

78 https://em.dk/nyheder/2018/01-30-ny-strategi-skal-gore-danmark-til-digital-frontlober

79 i) Digital Hub Denmark; ii) SME:Digital; iii) The Technology Pact; iv) Strengthened Computational Thinking in Elementary School; v) Data as a Driver of Growth; vi) Agile Regulation for New Business Models; and vii) Strengthened Cyber Security in Companies.

1 Connectivity

1 Connectivity	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**3**	**78.5**	**71.9**	**62.6**
DESI 2017	3	74.5	67.9	58.5

	Denmark					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**>99.5%** 2017	↑	**9**	**99%** 2016	**9**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**86%** 2017	↑	**5**	**83%** 2016	**5**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**100%** 2017	→	**1**	**100%** 2016	**1**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**129** 2017	↑	**3**	**120** 2016	**2**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**95%** 2017	↑	**5**	**93%** 2016	**6**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**52%** 2017	↑	**7**	**41%** 2016	**8**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**86%** 2017		**7**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**18.5%** 2017	↑	**10**	**10.7%** 2016	**14**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**89** 2017	→	**7**	**89** 2016	**9**	**87** 2017

Denmark is a leader in the Connectivity dimension and has improved its score in line with the the cluster speed. 4G and next-generation (NGA) coverage and mobile and fixed broadband take-up are among the best in the EU (100 % and 95 %, respectively) while ultrafast broadband coverage (85.9 %) is well above EU-average (58 %). As to rural NGA coverage, the situation has improved, but with 66 % coverage these remote areas are still lagging considerably behind total NGA coverage which stands at 95 %. In ultrafast broadband, there is a sharp increase in take-up which increased from 10.7% to 18.5% in 2017, but there are still more than two thirds of Danish households with access that do not subscribe.

To meet its targets for high-speed broadband access, the government has committed itself to improving network quality in rural areas. It aims to ensure full high-speed coverage of 100 Mbps download and 30 Mbps upload speeds by 2020. While high for the country as a whole, fixed network quality is lower in rural areas. Denmark allocated DKK 200 million (approx.. EUR 27 million) of public funds to a small broadband fund. The fund was increased with DKK 60 million in 2017. Since 2016 a tax deduction is available for the labour cost connected with upgrades or establishment of broadband connections. The overall limited relevance of both national and EU funding in broadband deployment reflects overwhelming reliance on private investment, facilitated by regional and local organisations. Some of the operators perform 5G

trials and have achieved significantly high data rates. The Innovation Fund Denmark has allocated funds to several major 5G projects involving universities, industry and operators.

In order to further improve its connectivity ratings and realise its ambitions of fast broadband everywhere, an improvement of both take-up of higher speed products and coverage in terms of rural NGA wireline networks would be desirable. As Denmark overwhelmingly relies on private investment, more clarity on the issue of access to fibre networks could help investors to assess potential benefits and risks more reliably. Additional demand-side evolution may be further stimulated by enhancing the transparency and comparability of electronic communication service offers to end users, mainly in terms of contractual information.

2 Human Capital

2 Human Capital	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**70.4**	**70.7**	**56.5**
DESI 2017	6	69.0	69.4	54.6

	Denmark				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
2a1 Internet Users	**95%** ↑	**2**	**94%**	**2**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**71%** ↓	**5**	**78%**	**2**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**4.2%** ↑	**6**	**3.9%**	**9**	**3.7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[80]	**23.3** ↑	**3**	**20.8**	**8**	**19.1**
Per 1000 individuals (aged 20-29)	2016		2014		2015

In the Human Capital dimension, Denmark is performing very well and making progress in particular regarding the percentage of STEM – science, technology, engineering and maths - graduates. Almost all Danish citizens are regular users of the Internet (95 %). In 2017, 71 % of Danes reported having at least basic digital skills, well above the EU average of 57 %. 51 % of Danish citizens who are between 55 and 74 years old are also digitally skilled, which is much higher than in the rest of the EU (34 %). The increasing in the share of ICT specialists places Denmark well above the EU average. In the same period the share of tertiary STEM graduates has improved substantially. The Danish Government views ICT specialists and new STEM graduates as important components in order foster digital and technology driven growth and innovation in companies.

A key priority for Denmark is thus to improve a better match between the digital skills required by companies and the supply thereof. The new Strategy for Denmark's Digital Growth (*Strategi for Danmarks digitale vækst*) includes action areas related to digital skills: one relies on the Danish Technology Pact while another focuses on computational thinking in elementary school.

The Technology Pact has been established by the government in cooperation with, inter alia, business, educational institutions and public actors with a vision to create competencies for a digital future. The Technology Pact intends to attract more students to STEM-field degrees to meet business demands, create innovation, boost new business models, and thereby increasing growth. A total of DKK 15 million (approx.. EUR 2 million) in 2018 and an annual amount of DKK 20 million (approx.. EUR 2.7 million) between 2019 and 2022 have been budgeted.

[80] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

The Government, together with a Technology Pact Council, will outline the strategic direction and take the initiative further. In addition, an advisory body, consisting of institutions and large companies, is being established. It will actively contribute to the development of new initiatives, increase visibility and arrange networking activities. All companies, educational institutions and other relevant actors are encouraged to engage in the Technology Pact, for example by participating in efforts to inspire and develop skills for future digital jobs. Additionally, the government will initiate a project of DKK 43.4 million (approx.. EUR 5.8 million) under the National Fund of Structural Funds to strengthen the coordination of digital education and training across the business, education and employment systems. Furthermore, the government has drawn up a national science strategy for primary, secondary and university level education that emphasizes cooperation with the private business sector. The strategy is a follow-up to the upper secondary school reform, that came into force in 2017.

In the area of teaching computational skills in elementary school, the government will introduce a 4-year trial program, which will test different models for how technology understanding can be strengthened in primary and lower secondary schools. A total of DKK 10 million (approx.. EUR 1.34 million) for the trial in 2018 and an annual budget of DKK 58 million (approx.. EUR 7.8 million) for the period 2019 – 2021 have been allocated.

Furthermore, the October 2017 agreement between the government and social partners on adult education and vocational training is expected to stimulate digital skills training. The new Danish Committee on University Education also aims to ensure that education addresses digital learning needs.

All citizens should be able to reap the benefits of the digital transformation. Addressing the rising demand for digital skills and reversing the stagnating availability of ICT specialists remains crucial for supporting the digital transformation of the Danish economy.

3 Use of Internet Services

3 Use of Internet Services	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**1**	**75.1**	**63.4**	**50.5**
DESI 2017	1	73.9	60.5	47.5

	Denmark				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**86%** 2017	**9**	**NA** 2016		**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**90%** 2016	**3**	**90%** 2016	**3**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**49%** 2016	**1**	**49%** 2016	**1**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**62%** ↑ 2017	**5**	**60%** 2016	**4**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**78%** ↑ 2017	**7**	**77%** 2016	**5**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**92%** ↑ 2017	**3**	**91%** 2016	**3**	**61%** 2017
3c2 Shopping % individuals who used Internet in the last 12 months	**82%** ↓ 2017	**3**	**84%** 2016	**2**	**68%** 2017

In terms of the share of individuals using Internet services, Denmark ranks 1st. Danish Internet users read news online (86 %), listen to music, watch videos and play games online (90 %) well above the EU average. They are also eager users of video calls with 62 % of internet users. They rank first in Europe when it comes to Video on Demand services (49 %). They are heavy users of social networks (78 %). The use of online banking (92 %) and online shopping (82 %) are well above the rest of the EU. This shows a high level of trust in online activities.

4 Integration of Digital Technology

4 Integration of Digital Technology	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**1**	**61.3**	**47.0**	**40.1**
DESI 2017	1	62.4	44.0	36.7

	Denmark					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**40%** 2017	↓	**6**	**47%** 2015	**2**	**34%** 2017
4a2 RFID % enterprises	**2.0%** 2017	↓	**26**	**3.2%** 2014	**17**	**4.2%** 2017
4a3 Social Media % enterprises	**29%** 2017	↑	**5**	**27%** 2016	**6**	**21%** 2017
4a4 eInvoices % enterprises	**NA** 2017			**64.0%** 2016	**2**	**NA** 2017
4a5 Cloud % enterprises	**37.7%** 2017	↑	**3**	**29.6%** 2016	**3**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**27.8%** 2017	↑	**3**	**27.0%** 2016	**2**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**14.5%** 2017	↓	**5**	**18.0%** 2016	**4**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**9.2%** 2017	↓	**11**	**9.8%** 2015	**8**	**8.4%** 2017

Denmark over the last year made progress the Integration of Digital Technology by businesses dimension, leading the EU ranking. Danish enterprises took advantage of the possibilities offered by online commerce: 28 % of SMEs sell online, well above the 17 % EU average. 10 % of SMEs sold cross-border and their e-commerce turnover was high (14.5 %). A large number of Danish enterprises embraced digital technologies, such as cloud (38 %) and social media (29 %) while making good use of the electronic information sharing technologies (40 %).

Denmark placed SMEs and innovation at the forefront of the Strategy for Digital Growth (*Strategi for Danmarks digitale vækst*). First, the pillar on Digital Hub Denmark aims to accelerate the use of new digital technologies within Danish firms by matching firms and digital frontrunners through a digital platform. Moreover, Digital Hub Denmark will focus on how firms can benefit from new business models linked to digital technologies The Danish government has assigned DKK 20 million (approx.. EUR 2.7 million) to the creation of Digital Hub Denmark in 2018 and an annual amount of DKK 25 million (approx.. EUR 3.4 million) for the period 2019 – 2021. Second, under the pillar called SME:Digital, the government wants to provide targeted digitisation support to small and medium sized enterprises. Examples of concrete support activities include the preparation of business cases for digital conversion, exploring opportunities for e-commerce and e-exports through an e-commerce center, strengthening business leaders skills and giving advice on digital design. A budget of DKK 10

million (approx.. EUR 1.34 million) in 2018 and annual DKK 20 million (approx.. EUR 2.7 million) for the period 2019-2021 is foreseen.

Digital trust is a requisite for digital growth. Based on the business council for cybersecurity recommendations, the Danish Government will strengthen cyber security by establishing an information portal and a digital interface for companies to report cyber security incidents and safety breaches of personal data.

The collaborative economy is also part of this new strategy. Under the pillar Agile Regulation for New Business Models, the government has launched an online portal[81], where users and companies can clarify the rules that affect them in this new business concept.

Danish policies have succeeded in delivering an environment for businesses and SMEs to flourish. However, in order to further advance the digital transformation of the economy, it will be important to keep focus on the advantages of digitisation and ensure strong commitment from actors throughout the digital value chain.

Highlight 2018: World's first blockchain solution for ship registrations
Denmark will become the first country in the world to apply blockchain technology for processing ship registrations. This is one of the concrete initiatives under the pillar *Data as a growth driver in business* of the newly launched Denmark's Digital Growth Stratgy (*Strategi for Danmarks digitale vækst).* The ship registration process is currently analogue and extremely resource-intensive. Applying blockchain technology for ship registrations sets the basis for an effective and cost-saving system. This will enable companies to access data, including registration type and number of application, which was not possible before. The digital blockchain solution will also provide authorities with a record of useful data for planning and control purposes. The Maritime Authority will implement the new digital ship register in the near future. A total budget of DKK 32 million (approx.. EUR 4.3 million) for the period 2019-2023 has been allocated.

[81] https://deleoekonomien.dk/

5 Digital Public Services

5 Digital Public Services	Denmark		Cluster	EU
	rank	score	score	score
DESI 2018	**3**	**73.2**	**63.0**	**57.5**
DESI 2017	3	71.3	60.2	53.7

	Denmark				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[82] % internet users needing to submit forms	**86%** ↓ 2017	**4**	**89%** 2016	**3**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**71** → 2017	**10**	**71** 2016	**7**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**94** ↓ 2017	**6**	**95** 2016	**5**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**100** → 2017	**1**	**100** 2016	**1**	**83** 2017
5a5 Open Data % of maximum score	**58%** ↑ 2017	**24**	**41%** 2016	**24**	**73%** 2017
5b1 eHealth Services % individuals	**42%** 2017	**3**	**NA**		**18%**

In terms of digital public services, Denmark performs very well. The country is a frontrunner in the the delivery of Digital Public Services among EU countries with a score of 73.2, two points more than last year. Denmark scores the highest (100 points) in availability of domestic and cross-border online public services for businesses. The country has also succeeded to a great extent in shifting citizens to digital channels with 86 % of internet users having to submit forms doing so. In terms of Open Data, Denmark continued to make considerable progress over the last year (after launching the new platform). Thanks to a high score in their completeness of online services (94 out of 100), Denmark provides a good and user-friendly framework for eGovernment service for their citizens. As to eHealth Services, Denmark is performing well and ranks 3rd amongst EU Member States when it comes to people who used these services online without having to go to the hospital or doctors surgery (for example, by getting a prescription or a consultation).

In 2016, Denmark successfully launched its eGovernment strategy — known as The Digital Strategy 2016-2020[83] — which aimed to strengthen Denmark's worldwide leading position on Public Service Digitisation. This strategy aims to tackle remaining issues such as user-friendlier life-events. Exemptions from digital-by-default legislation of mandatory use of online services and Digital Post has steadily fallen to 9.1 % and 90.6 % are now registered citizens of 15 years of age and above.

[82] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.
[83] http://www.digst.dk/Strategier/Strategi-2016-2020

Digital administration has helped to minimise the administrative burden. Consequently, it is easier to start and run a business in Denmark, with little bureaucracy in the start-up and operational phases. The registration process for companies is fully digitalised.

Regarding e-health, Denmark has a strong infrastructure. The country ranks first for general practitioners using electronic health records and fourth in terms of eHealth records in hospitals[84] in the EU. It also has a well-established set of disease registries. The eGovernment national strategy places eHealth services at the core, targetting public digital services available and customised to all Danes.

Having a consistent and long-term national strategy in eGovernment where digital welfare and life-event journey principle are at its core is of the utmost importance. Further improving the quality of eGovernment services, such as increasing accessibility, will depend on exploring the usability of smart technologies in new use cases.

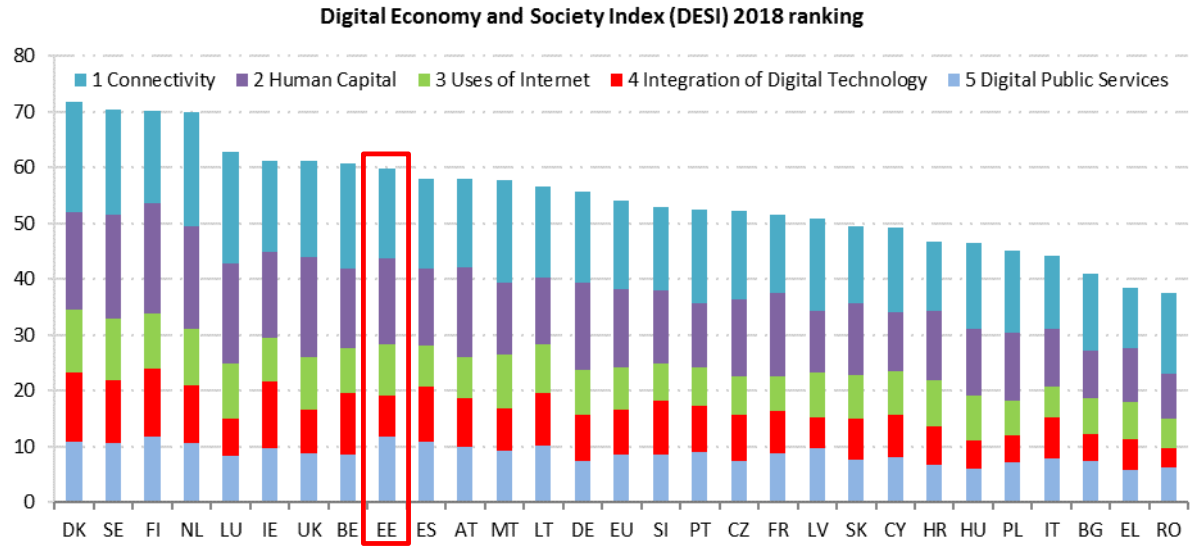
[84] OECD/European Observatory on Health Systems and Policies, 2017

Digital Economy and Society Index (DESI)[85] 2018 Country Report Estonia

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



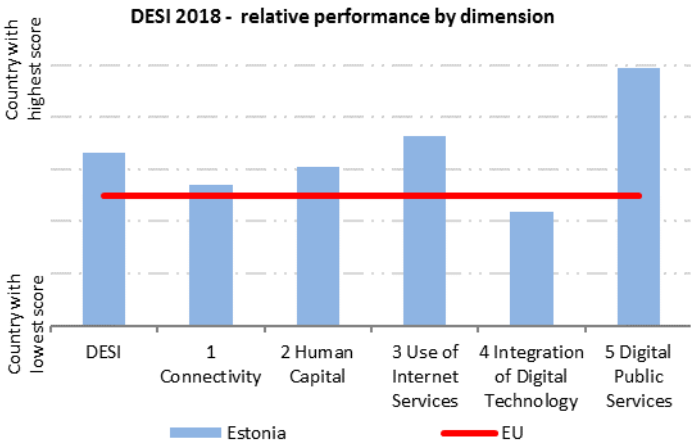
[85] https://ec.europa.eu/digital-single-market/en/desi

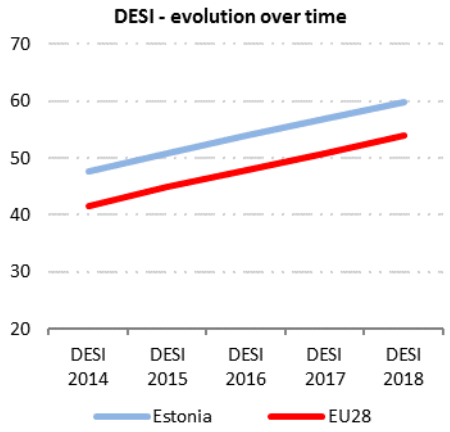
	Estonia		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**59.7**	**64.0**	**54.0**
DESI 2017	8	57.0	61.2	50.8

Estonia ranks 9th out of the 28 EU Member States. The country progressed over the last year but more slowly than the EU average. Estonia remains a leading country in Europe for digital public services, as it has been for many years. Its citizens are well-skilled in the use of digital technologies and are keen users of a variety of internet services. Regarding connectivity, fixed broadband coverage is very low (partially compensated by mobile coverage), as is the take-up of ultrafast broadband. The key challenge in the Estonian economy remains the digitisation of companies.

Estonia belongs to the high-performing cluster of countries.[86]

The current Estonian Digital Agenda 2020[87] sets out the general objective to "contribute to achieving higher growth, more jobs and increased welfare by creating an environment supporting the use and development of ICT solutions". It sets out a vision, principles, sub-objectives and measures with targets, indicators and action lines. The implementation of the strategy in Estonia is steered by the e-Estonia Council led by the Prime Minister.





[86] Denmark, Finland, Sweden, the Netherlands, Belgium, the UK, Ireland, Luxembourg and Estonia.

[87] https://www.mkm.ee/sites/default/files/digital_agenda_2020_estonia_engf.pdf

1 Connectivity

1 Connectivity	Estonia		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**64.1**	**71.9**	**62.6**
DESI 2017	10	62.1	67.9	58.5

	Estonia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage ↓ % households	**89 %** 2017	**25**	**91 %** 2016	**25**	**97 %** 2017
1a2 Fixed Broadband Take-up ↑ % households	**78 %** 2017	**9**	**77 %** 2016	**8**	**75 %** 2017
1b1 4G Coverage ↑ % households (average of operators)	**96 %** 2017	**14**	**94 %** 2016	**8**	**91 %** 2017
1b2 Mobile Broadband Take-up ↑ Subscriptions per 100 people	**125** 2017	**5**	**116** 2016	**4**	**90** 2017
1c1 Fast Broadband (NGA) Coverage ↑ % households covered by VDSL, FTTP or Docsis 3.0	**80 %** 2017	**19**	**79 %** 2016	**17**	**80 %** 2017
1c2 Fast Broadband Take-up ↑ % homes subscribing to >= 30 Mbps	**29 %** 2017	**19**	**24 %** 2016	**19**	**33 %** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**71 %** 2017	**16**	**NA**		**58 %** 2017
1d2 Ultrafast Broadband Take-up ↑ % homes subscribing to >= 100 Mbps	**9.0 %** 2017	**22**	**6.6 %** 2016	**21**	**15.4 %** 2017
1e1 Broadband Price Index ↑ Score (0 to 100)	**85** 2017	**17**	**83** 2016	**18**	**87** 2017

- With an overall Connectivity score of 64.1, Estonia did not progress and dropped a few ranks compared to 2017, meaning it is now in 15th position among EU countries.

Estonia continues to lag behind on the fixed broadband market with a coverage of 89 %, mainly due to low rural availability. The slight decrease in fixed broadband coverage is caused mainly by the closing of wireless local loop services that used obsolete CDMA 450 technology. These fixed wireless networks have been taken over by mobile network data services.

Remarkably, most of the households that are covered in Estonia by NGA networks have access to speeds of 100 Mbps or above. Indeed, ultra-fast coverage in Estonia outperforms the EU average by 13 percentage points. However, take-up of these fast networks still remains low and below the EU average.

- By contrast, Estonia performs very well when it comes to mobile coverage: 4G has already reached 96 % of the population and Estonia is a leader in mobile broadband take-up with 125 subscriptions per 100 people.

- Estonia's connectivity targets are to provide all residents with internet access above 30 Mbps and to achieve at least 60 % household subscription rates for speeds above 100 Mbps by 2020. The Estonian regulator ETRA has developed a website www.netikaart.ee

with information about fixed and mobile connectivity capabilities at household level. This website was made publicly available in October 2017.

One key measure to achieve the national targets is the "Estonian Wideband Infrastructure Network" (EstWin) project, launched in 2009 by the Estonian Ministry of Economic Affairs and Communications. The objective of the project is to roll out 6 600 km of optical cables (backhaul) in rural areas and settlements with fewer than 10 000 inhabitants, where optical networks did not exist and are not planned by operators. The target is that by 2020, 98 % of households, enterprises and institutions should be no further than 1.5 km from the EstWin network and all existing network nodes should be connected with core networks. These networks are rolled out by non-profit organisations required to provide wholesale access on equal terms to all operators and public authorities. Approximately 85 % of the project costs are financed by the European Regional Development Fund (ERDF), while the remaining 15 % of the network construction cost is co-financed by backhaul network operators.

By the end of 2017, 5 300 km of backhaul network had been rolled out and approximately 1 700 network nodes had been connected, 500 of them located in buildings belonging to local governments (schools, libraries, etc.). Most of the remaining kilometres will be built in 2018. The Estonian government plans to carry out a public tender in 2018 to find a provider for the last mile access part in NGA white areas, and is currently working out the conditions for this tender. The government is creating a support mechanism that will allocate EUR 20 million rto carry out this project.

Estonia is a frontrunner for mobile coverage and uptake. In 2017, it continued to expand its 4G mobile deployment, meaning it remains amongst EU's top performers in this regard. Estonia can also boast of high coverage with ultra-fast broadband and in the presence of this widespread supply, more demand-side incentives and more competitive prices could also improve its take-up.

Deploying broadband in rural areas continues to be a challenge in Estonia. The successful completion of the EstWin project is therefore of high importance. Furthermore, the last mile project, which is going to be carried out in the coming years, provides an opportunity to improve connectivity even in remote parts of the country.

2 Human Capital

2 Human Capital	Estonia rank	Estonia score	Cluster score	EU score
DESI 2018	**10**	**61.4**	**70.7**	**56.5**
DESI 2017	9	58.0	69.4	54.6

	Estonia DESI 2018 value		Estonia DESI 2018 rank	Estonia DESI 2017 value	Estonia DESI 2017 rank	EU DESI 2018 value
2a1 Internet Users	**86%**	↑	**8**	**85%**	**8**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**60%**	→	**10**	**60%**	**10**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**5.3%**	↑	**3**	**4.4%**	**6**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates	**12.8**	↓	**25**	**13.5**	**25**	**19.1**
Per 1000 individuals (aged 20-29)	2015			2014		2015

Estonia is progressing as regards Human Capital dimension. It ranks 10th and performs better than the EU average. Both the number of internet users and the percentage of individuals with at least basic digital skills remain stable and at higher levels than the EU-28 average. The percentage of people with at least basic digital skills is higher among the employed persons (67.8 %) than the unemployed (53.5 %) and among those living in urban areas (66 %) compared to those in rural ones (56.4 %).

Estonia recognises the importance of digital skills for competitiveness and economic growth, and digital skills are a policy priority in both the Digital Agenda 2020 for Estonia and the Estonian Lifelong Learning Strategy 2020. Specifically, the very good availability of online services has been complemented by efforts to improve the digital skills of the population. As a result, Estonia is one of very few countries where there is no gender gap, and groups that are often disadvantaged are less exposed to the risk of digital exclusion. The percentage of people with at least basic digital skills is almost twice the EU average for less-educated people (58.5 % against 30.8 % at EU level) and it is higher for people with a disadvantage factor (44.2 % against 40 % at EU level), the unemployed (53.5 % against 44.8 %) and people living in rural areas (56.4 % against 49.3 %).

The share of ICT Specialists as a percentage of the workforce (5.3 %) is well above the EU average and Estonia now ranks 3rd in the EU. Nevertheless, the number of graduates in science and technology (STEM), which includes not just ICT but also other technical disciplines, is below the EU average and is decreasing over time (now ranking 25th).

The Estonian Lifelong Learning Strategy 2020 has 'A digital focus on lifelong learning' as one of five priorities and there are several action lines that will be implemented through the strategy. The government is supporting general education and vocational education and training (VET) schools, trying to incentivise cooperation between schools and an exchange of best practices to make learning more practical and modern. Through the Estonian IT

Foundation for Education, the Ministry of Education and Research also helps basic schools acquire digital equipment.

The digital plans of basic schools for improving the organisation of courses and developing skills with digital tools were made public in autumn 2017. These plans map opportunities for improving the organisation of courses with digital equipment and for developing the digital skills of teachers and pupils. The publication of these digital plans will allow schools to share their best practices and find the smartest solutions for the use of digital tools in the organisation of studies (see the Development in Academic Year 2017/2018).

For the first time, standard tests of digital competence will be carried out among 9th and 12th year students in VET schools in the 2017/2018 academic year. This stresses the importance of students developing digital skills and competences, and follows up on the 2014 decision to include digital competences in national curricula, as a cross-curricular competence. Analysing the results of the standardised tests will help schools develop their pupils' digital competences.

Estonia recognises the importance of enhancing citizens' digital skills since they are a pre-condition for inclusive labour markets, improved productivity and sustained economic growth. In 2017, two projects were implemented that are directly targeted at improving citizens' digital skills. The e-Community project aims to develop a sustainable network of training centres based in local libraries. Over a three-year period, more than 1 000 librarians will be trained and equipped with training materials related to basic technology usage but also e-services, social media, cybersecurity, etc. The Digital ABC project focuses on people working in the manufacturing industry and provides training in basic digital skills in order to raise their confidence in using technology.

3 Use of Internet

3 Use of Internet	Estonia		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**61.6**	**63.4**	**50.5**
DESI 2017	6	60.0	60.5	47.5

	Estonia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**90 %** ↑ 2017		**5**	**89 %** 2016	**3**	**72 %** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**84 %** 2016		**9**	**84 %** 2016	**9**	**78 %** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**24 %** 2016		**9**	**24 %** 2016	**9**	**21 %** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**50 %** ↑ 2017		**15**	**47 %** 2016	**12**	**46 %** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**68 %** ↑ 2017		**20**	**66 %** 2016	**20**	**65 %** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**90 %** → 2017		**4**	**90 %** 2016	**4**	**61 %** 2017
3c2 Shopping % internet users (last year)	**65 %** ↑ 2017		**12**	**64 %** 2016	**13**	**68 %** 2017

- Compared to the EU average, Estonians are very active users of internet services. They are very confident in using internet banking (90 %), scoring 29 points above the EU average, but they are also intensive consumers of various online services including news, video on demand, music and games. The percentage of people shopping online among those who used the internet in the last year is also increasing and is comparable with the EU average.

-

4 Integration of Digital Technology

4 Integration of Digital Technology	Estonia		Cluster	EU
	rank	score	score	score
DESI 2018	**19**	**37.1**	**47.0**	**40.1**
DESI 2017	20	31.6	44.0	36.7

	Estonia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**28 %** 2017	↑	**21**	**22 %** 2015	**23**	**34 %** 2017
4a2 RFID % enterprises	**4.4 %** 2017	↑	**17**	**2.7 %** 2014	**25**	**4.2 %** 2017
4a3 Social Media % enterprises	**13 %** 2017	↑	**24**	**12 %** 2016	**23**	**21 %** 2017
4a4 eInvoices % enterprises	**19.7 %** 2017	↑	**10**	**18.5 %** 2016	**12**	**NA** 2017
4a5 Cloud % enterprises	**NA** 2017			**16.5 %** 2016	**8**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**15.4 %** 2017	↑	**17**	**15.3 %** 2016	**16**	**17.2 %** 2017
4b2 E-commerce Turnover % SME turnover	**11.4 %** 2017	↑	**10**	**10.7 %** 2016	**8**	**10.3 %** 2017
4b3 Selling Online Cross-border % SMEs	**8.3 %** 2017	↑	**15**	**6.1 %** 2015	**19**	**8.4 %** 2017

Although Estonia still lags behind in the integration of digital technologies compared to the EU average, the country made progress over the last year. This is the dimension in which Estonia performs least well and ranks 19th (from 20th) in DESI 2018. Estonia is performing relatively better in e-commerce compared to eBusiness. In fact, the percentage of SMEs selling online is slightly above the EU average (15.4 % compared to 10.7 %). E-commerce proves to be a channel that can guarantee significant turnover (11.4 % of their turnover versus 10.3 % in the EU), including by looking for opportunities in markets abroad (8.3 % of SMEs are selling online cross-border). 17.1 % of the enterprises selling online to other EU countries reported that the high cost of delivery is the main trade barrier. On the other hand, 75.9 % of the enterprises reported no difficulties.

The country shows a good performance in ICT start-ups[88]. Regarding the specific ICT sector, companies do not report any difficulties in recruiting ICT specialists. However, enterprises in manufacturing sectors encounter problems in finding specialists such as experts in mechatronics or robotics. This might be a reason for the mixed performance in terms of Integration of Digital Technologies. Estonia does not have a specific strategy in place for the digitisation of its economy. Emphasis is rather put on creating an enabling environment for digital innovation, including the necessary infrastructure and skills.

[88] Digital Transformation Scoreboard 2018.

5 Digital Public Services

5 Digital Public Services	Estonia		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**78.1**	**63.0**	**57.5**
DESI 2017	1	77.4	60.2	53.7

	Estonia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[89] % internet users needing to submit forms	**96 %** ↑ 2017	**1**	**93 %** 2016	**1**	**58 %** 2017
5a2 Pre-filled Forms Score (0 to 100)	**88** ↓ 2017	**2**	**89** 2016	**2**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**96** ↓ 2017	**3**	**97** 2016	**2**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**93** → 2017	**5**	**93** 2016	**5**	**83** 2017
5a5 Open Data % of maximum score	**58 %** ↑ 2017	**23**	**55 %** 2016	**17**	**73 %** 2017
5b1 eHealth Services % individuals	**49 %** 2017	**1**	**NA**		**18 %**

- Estonia has for years been at the forefront of the online provision of public services, and this remains the dimension in which the country is performing best. Estonia progressed over the last year but slipped one rank. The share of eGovernment users (96 %) is the highest in Europe (double the EU average) and the country is among the top five when it comes to using pre-filled forms, online service completion and the range of digital services available for business. The availability of open data stands at 58 % and even more could be made available.

- The country is also leading in eHealth services. Each person in Estonia who has visited a doctor has an online eHealth record that can be tracked through a central system (see box). Indeed 95 % of the health data are digitised, 99 % of prescriptions are digital as is 100 % of billing. The e-Prescription system draws on data from the national health insurance fund, meaning that if the patient is entitled to any state medical subsidies, the medicine is discounted accordingly. Moreover, people no longer need to visit a doctor or hospital for repeat prescriptions.

- The success in making public services available online is mainly based on the widespread use of electronic identification cards and the creation of a digital information infrastructure, the X-Road, on which a secure internet data exchange layer allows

[89] The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

decentralised databases and information systems to communicate with each other. X-Road parties share information to produce services that people can access with their e-ID[90].

- The flexibility provided by this open set-up has allowed new components to be added over the years. The system is fed with information from both the public (i.e. population register, health insurance register, vehicle register, etc.) and the private sector (mainly energy, telecom and banks) and allows Estonians to use services including e-voting, online tax returns , online medical prescriptions, but also to sign a binding contract or open a bank account via a mobile phone from anywhere in the world.

- On top of the easy availability of the services, the process implies efficiency improvements that allow users and public officials to make large gains in terms of money and time saved. For example, filing a tax declaration takes on average 5 minutes and a refund is issued within 5 days (compared to 3 to 6 months for a declaration on paper).

- A recent paper by the World Bank quantified the time savings coming from the adoption of the X-Road as an impressive 2.8 million total hours for 2014, or 3 225 years. In other words, the productivity gain from eGovernment services is equivalent to 3 225 people working 24/7 for a whole year[91].

-

- **Highlight 2018: Estonian eHealth record**

- The Electronic Health Record (eHealth Record) is a nationwide system integrating data from Estonia's different healthcare providers to create a common record that every patient can access online. It works similarly to a centralised, national database that retrieves data as necessary from various providers, who may be using different systems, and presents it in a standard format via the e-Patient portal. Through the record, a doctor can easily access a patient's records from a single electronic file, and read test results, including image files such as X-rays.

- To ensure the integrity of retrieved electronic medical records as well as system access logs, blockchain technology is used.

- The system compiles data for national statistics that are used to measure health trends, track epidemics, or review how health resources are being spent.

- Patients have access to their own records, as well as those of their children. By logging into the e-Patient portal with an electronic ID-card, the patient can review doctor visits and current prescriptions, and check which doctors have had access to their files.

- Currently, 97 % of the patients have a digital record and the system receives 300 000 patient queries a year.

[90] Since 2015 Estonia and Finland have developed a joint data exchange platform based on Estonia's X-Road. It allows databases in both countries to interface, assist with cross-border services, and make e-services accessible to Estonian and Finnish citizens.

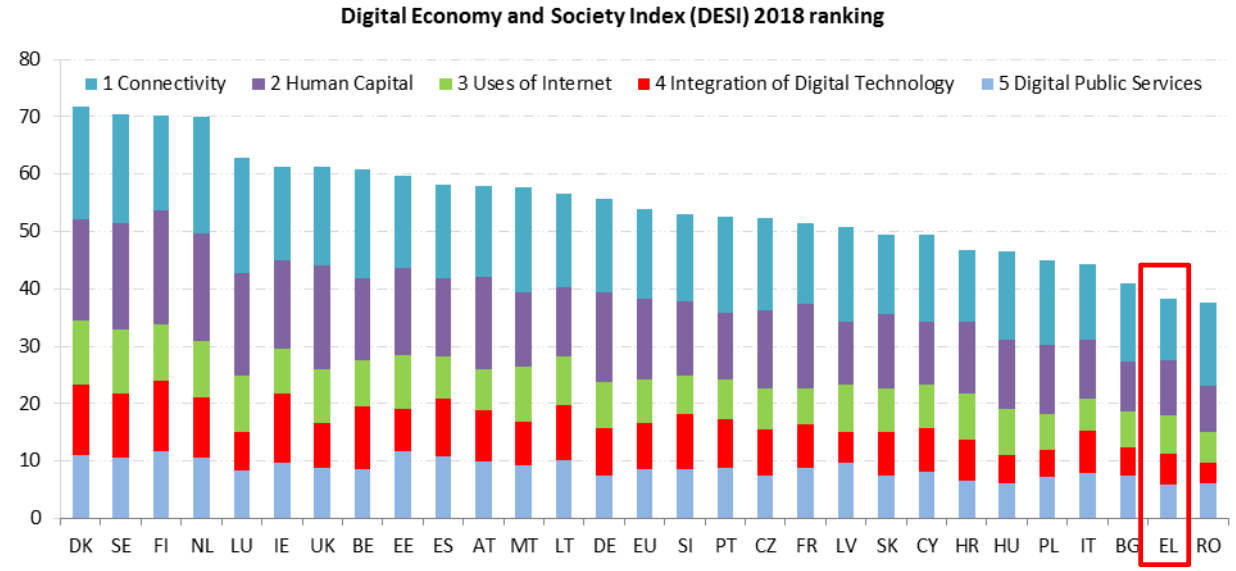
[91] See WB (2016) *Estonian e-Government Ecosystem: Foundation, Applications, Outcomes,* background paper to the world development repost 2016: Digital dividends.

Digital Economy and Society Index (DESI)[92] 2018 Country Report Greece

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



[92] https://ec.europa.eu/digital-single-market/en/desi

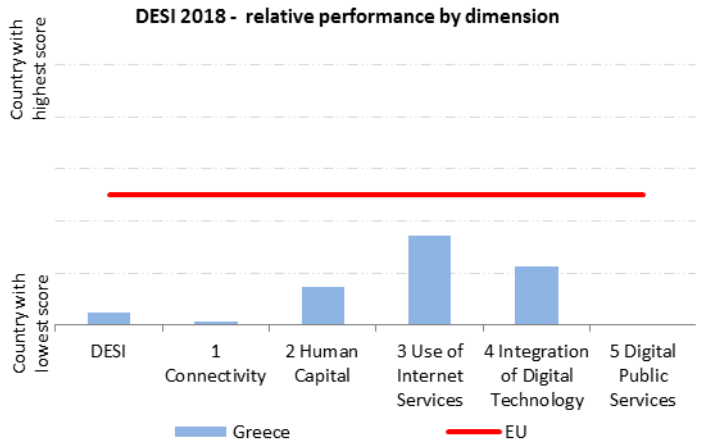
	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**27**	**38.4**	**43.5**	**54.0**
DESI 2017	27	35.5	40.4	50.8

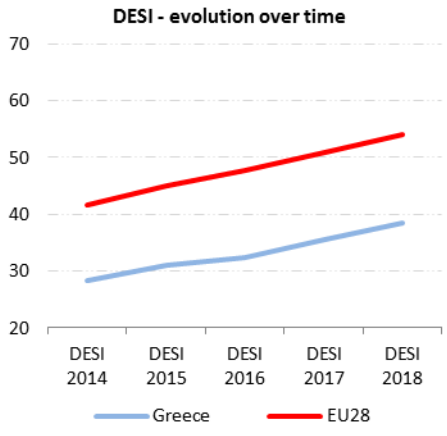
Greece ranks 27th out of the 28 EU Member States. Overall, in recent years, Greece has not made much progress relative to other EU Member States. It progressed slightly slower than the EU average over the last year.

In connectivity, the transition to fast broadband connections is slower than in other EU Member States. On the positive side, in terms of mobile broadband, 4G coverage has increased in Greece and is now close to the EU average. Greeks are active users of internet services, and companies use social media at the level of the EU average. But the integration of more sophisticated digital technologies remains at a low level, though the use of eInvoices progressed to some extent. Greece's performance in digital public services and digital skills remains low and can act as a brake on the further development of the digital economy and society.

Greece belongs to the Low-performing cluster of countries[93].

Greece has a Ministry for Digital Policy, Telecommunications, and Media since November 2016, and has a National Digital Strategy (2016–2021)[94] as well as a National Strategy for the Administrative Reform (2017-2019) including guidelines for e-government and development of digital skills for all.





[93] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

[94] http://www.mindigital.gr/index.php/κείμενα-στρατηγικής/220-digital-strategy-2016-2021

1 Connectivity

1 Connectivity	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**28**	**43.1**	**55.0**	**62.6**
DESI 2017	28	39.8	50.1	58.5

	Greece					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**99%** 2017	→	**11**	**99%** 2016	**10**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**69%** 2017	↑	**21**	**66%** 2016	**21**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**88%** 2017	↑	**22**	**80%** 2016	**22**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**59** 2017	↑	**27**	**50** 2016	**27**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**50%** 2017	↑	**28**	**44%** 2016	**28**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**7%** 2017	↑	**28**	**5%** 2016	**27**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**0.4%** 2017		**28**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**0.01%** 2017	→	**28**	**0.01%** 2016	**28**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**67** 2017	↓	**25**	**69** 2016	**24**	**87** 2017

With an overall connectivity score of 43.1 Greece ranks last among the EU Member States. In Connectivity, Greece features wide availability of fixed broadband with 99% coverage (97% EU average) but take-up (69%) is still progressing slowly. The prices remain relatively high compared to the EU average and did not improve over the year. The transition to fast broadband connections is slower than in other EU Member States. In terms of mobile broadband: 4G coverage has positively increased by 8 points percentage to 88%, close to the EU average (91%); but take-up, despite 9 points increase (59/100) is below EU average 90/100. Subscriptions to fast broadband have progressed by 2 p.p. to 7%, remaining well below the EU average (33%). Despite a progress of 6 p.p., Greece remains last amongst the Member States in NGA coverage per household (50%), far from the EU average (80%). Finally, Greece has close to zero ultrafast broadband coverage and take-up comparing to the EU average which has progressively increased since last year.

There is however reasonable expectation that as far as NGA network deployment is concerned there will be positive developments in the near future as the market has already entered a phase of deployment, thanks to the new regulatory measures adopted in the markets for wholesale local access and wholesale central access for mass-market products. The initially accepted Next Generation Network (NGN) plan included two main projects: a Superfast Broadband Project for individuals and one for business (SMEs) and the extension of the Rural Broadband Project. There have been a number of discussions about the

"Superfast Broadband Projects" amongst the Greek authorities and the European Commission. None of the projects has started yet[95]. The projects, the financial allocations and the form are still under discussion with all parties involved.

Greece lags considerably behind in relation to the Digital Agenda for Europe targets established in the Broadband Strategy. In order to close the gap with the other Member States, the right conditions for private investment and for a prompt release of public financing resources need to be created. After the complete transposition of the Broadband Cost Reduction Directive in 2017, Greece needs now to focus on tackling the big delays on permit granting proceedings and promoting synergies across sector in order to achieve an effective implementation of the Directive with significant benefits for the NGA rollout.

Highlight 2018: " Broadband Network Development in White Rural Areas[96]: Winner of a European Broadband Award 2017

The Greek RURAL Project is a PPP (Public Private Partnership) expected to be finalised in May 2018 but more than 80% of the project has been implemented. This large-scale, EU funded project provides broadband coverage to remote and scarcely populated areas (white areas) with gradual increases to 30 Mbps and a future proof infrastructure for greater speeds. It provided connectivity to more than half a million people. The total cost of the project is EUR 199.7 million (of which EUR 143.8 million from EU Structural funds). The project aimed at closing the “broadband gap” between remote, disadvantageous, traditionally “white rural areas” and the rest of the country, providing good connectivity services at affordable costs.

[95] The project planning has been updated, taking account of the new connectivity targets of Gigabit Society 2025, as well as the experienced gain from the operators’ network development and the broadband penetration, so far.

[96] https://ec.europa.eu/digital-single-market/en/content/broadband-network-development-white-rural-areas-greece

2 Human Capital

2 Human Capital	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**38.2**	**42.2**	**56.5**
DESI 2017	26	36.7	40.6	54.6

	Greece					EU
	DESI 2018			DESI 2017		DESI 2018
	Value		rank	value	rank	value
2a1 Internet Users	**67%**	↑	**26**	**66%**	**26**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**46%**	→	**25**	**46%**	**22**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**1.4%**	↑	**28**	**1.2%**	**28**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[97]	**NA**			**16.2**	**18**	**19.1**
Per 1000 individuals (aged 20-29)	2015			2014		2015

In Human Capital, Greece's performance remains well below EU average but Greece is making progress. In 2017, the percentage of the Greek population using the internet on a regular basis (67%) is one of the lowest among European countries (EU average is 81%). The number of individuals having at least a basic level of digital skills is stagnating at 46% and Greece remains far lower than EU average (57%). Greece still has the lowest proportion of ICT specialists (1.4%) in the EU, but the share of ICT specialists has been relatively steady over the last few years.

Greece continues to suffer from a "brain drain", and addressing the shortage of ICT specialists is crucial for supporting the digital transformation of the economy. According to estimations, the use of ICT is needed in more than 90% of workplaces. The low percentage of people that have at least basic digital skills can act as a break for the country's economic development. In March 2017, a protocol of cooperation was signed between the Minister of Digital Policy and the Hellenic Open University (HOU) to start activities (i.e. open MOOCs) to acquire basic digital competences. SEPE[98] is implementing a programme to train and certify young unemployed aged 18-24 in ICT sector.

Greece would benefit from accelerating the implementation of the strategy for the development of digital skills. A good cooperation between all public sector authorities who can play a role in digital skills and the relevant market players would accelerate the development of digital skills. The proposed Greek National Coalition for Digital Skills and Jobs[99] if rapidly and concretely translated into actions could contribute to address the digital skills gap, in particular the 50% of individuals who do not have basic digital skills, and contribute to the digital transformation of the economy and society.

[97]The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat..
[98] SEPE is the Association of Information and Communication Technology industry in Greece
[99] http://www.nationalcoalition.gov.gr

3 Use of Internet Services

3 Use of Internet Services	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**45.2**	**41.0**	**50.5**
DESI 2017	22	42.0	38.7	47.5

	Greece					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**87%** ↑ 2017		**8**	**85%** 2016	**9**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**77%** 2016		**20**	**77%** 2016	**20**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**12%** 2016		**19**	**12%** 2016	**19**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**48%** ↑ 2017		**17**	**46%** 2016	**13**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**72%** ↑ 2017		**14**	**68%** 2016	**17**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**36%** ↑ 2017		**25**	**28%** 2016	**26**	**61%** 2017
3c2 Shopping % internet users (last year)	**45%** → 2017		**23**	**45%** 2016	**22**	**68%** 2017

A large percentage of the Internet users in Greece engage in online activities such as reading news online, listening to music, watching films and playing games online, using the Internet to communicate via voice or video calls and participating in social networks. For many of these activities, engagement among Greeks is higher or equal than overall in Europe.

However, even if more and more users have been engaging in online banking in 2017 (36%) compared to the previous year (28%), the percentage remains far below the EU average (61%). The same is observed for shopping on line which stagnates at 45% of internet users.

4 Integration of Digital Technology

4 Integration of Digital Technology	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**26.9**	**29.2**	**40.1**
DESI 2017	23	24.4	26.7	36.7

	Greece					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**37%** 2017	→	**12**	**37%** 2015	**11**	**34%** 2017
4a2 RFID % enterprises	**3.1%** 2017	↑	**21**	**2.6%** 2014	**26**	**4.2%** 2017
4a3 Social Media % enterprises	**21%** 2017	↑	**12**	**20%** 2016	**11**	**21%** 2017
4a4 eInvoices % enterprises	**6.5%** 2017	↑	**27**	**2.7%** 2016	**28**	**NA** 2017
4a5 Cloud % enterprises	**5.5%** 2017	→	**28**	**5.5%** 2016	**25**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**10.7%** 2017	↑	**22**	**10.0%** 2016	**22**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**3.4%** 2017	↓	**27**	**5.9%** 2016	**23**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**6.6%** 2017	↑	**21**	**3.5%** 2015	**26**	**8.4%** 2017

Greece's overall performance in integration of digital technology by businesses is below par, progressing slower than the EU average. However, the use of electronic information sharing by enterprises (37%) is above the EU average of 34%. The social media are used by enterprises in Greece to the same level (21%) as the EU average (21%). In 2017, the percentage of enterprises using eInvoices (6.5%) progressed (2.7%), while the use of cloud services by enterprises stagnated (5.5%) at a low level. The e-commerce turnover of Small and Medium Size Enterprises (SMEs) is low, but 60% of the companies selling on-line do so cross-border to other countries.

The integration of digital technologies by businesses is an important driver of labour productivity and growth. It needs to be strengthened to take advantage of all the opportunities of digital transformation. An Industry 4.0 strategy to develop specific digitisation plans for the industry would contribute to the up-take of digital opportunities by businesses in all sectors of the economy. The Ministry of Digital Policy, Telecommunications and Media plans to reinforce investments towards developing a strong national network of Digital Innovation Hubs while two digital manufacturing platforms have already been developed facilitating the digitisation of the manufacturing process.

In November 2017, Greece is the 12th country to join the European effort to build the next generation of computing and data infrastructures by signing the High-Performance Computing declaration (EuroHPC declaration).

5 Digital Public Services

5 Digital Public Services	Greece		Cluster	EU
	rank	score	score	score
DESI 2018	**28**	**39.2**	**48.0**	**57.5**
DESI 2017	27	35.0	44.2	53.7

	Greece					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	Value
5a1 eGovernment Users[100] % internet users needing to submit forms	**38%** ↓ 2017		**26**	**42%** 2016	**24**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**14** ↑ 2017		**27**	**5** 2016	**28**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**75** ↑ 2017		**24**	**63** 2016	**25**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**60** ↑ 2017		**27**	**59** 2016	**26**	**83** 2017
5a5 Open Data % of maximum score	**72%** ↓ 2017		**16**	**73%** 2016	**10**	**73%** 2017
5b1 eHealth Services % individuals	**10%** 2017		**23**	**NA**		**18%**

In Greece, Digital Public Services remain one of the most challenging areas of the digital economy and society. Greece is progressing but Greece's performance is well below EU average and it ranks last of the 28 EU Member States. The percentage of internet users who have to submit forms to the public administration and did it online is low (38%) compared to the EU average (58%). On the supply-side, in the provision of online public services, Greece made some progress in 2017 with 14/100 pre-filled forms compared to 5/100 in 2016 but it remains far below the EU average (53/100) and ranks 27th.

In July 2017, the Ministry of Administrative Reconstruction published a National Strategy for Administrative Reform 2017-2019[101]. The strategy includes measures for smart administration and the development of an e-public sector, involving the development of digital skills for human resources in public administrations and the use of ICT for administrative and public services. The revision of the eGovernment strategy and Action Plan (2014-2020) is on-going.

In September 2017, the Ministry of Digital Policy progressed in the preparation of the new authentication system with the launch of a project for a digital system for managing documents and work flow, incorporating remote digital signatures of future users (citizens and enterprises). Once implemented, it will allow users to submit a request to the portal with an electronic signature. In this way security, validity and legality of digital transactions are being ensured.

[100] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.
[101] http://www.minadmin.gov.gr/?p=24473

In May 2016, the National Telemedicine Network (known as EDIT) began operating to connect remote locations with regional and central hospitals. It consists of 43 telemedicine units which interconnect health centres in the Aegean islands with central hospitals of the 2nd Regional Healthcare Administration (RHA) of Piraeus and the Aegean. The telemedicine units are installed in 30 health centres on Aegean islands, in 12 regional and central.

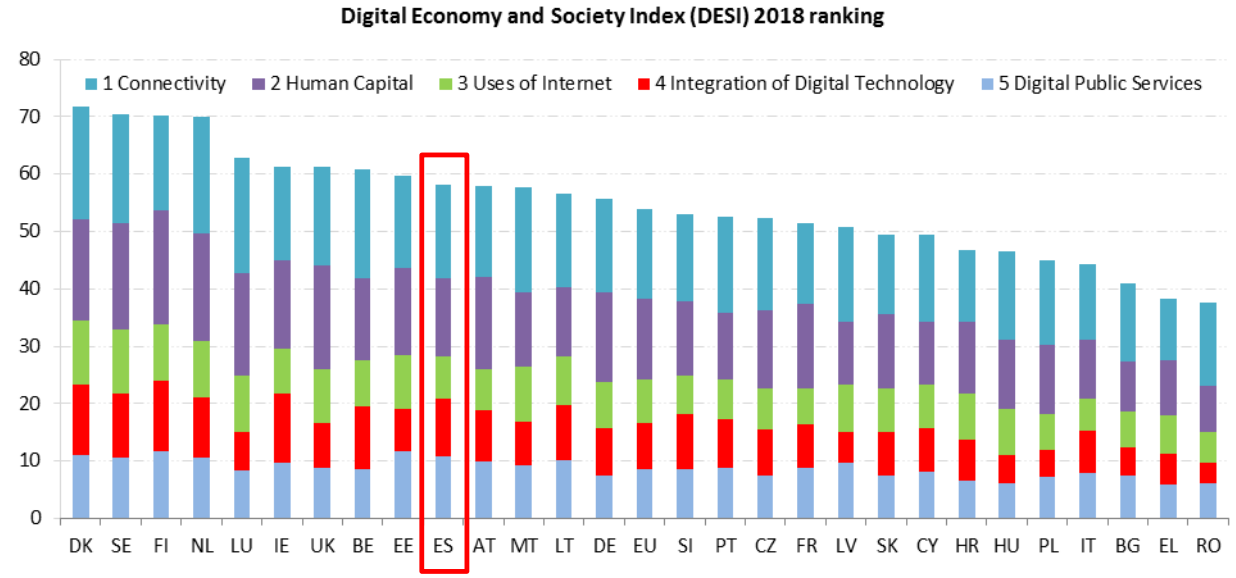
Continuing the effort undertaken to modernise public administration using ICT could be highly beneficial to enable greater citizen trust and accountability. Plans for the future such as the establishment of digital systems for management of human resources in public administrations, the interlinkage of information systems throughout Greece's public sector, the possibility for citizens to use all electronic government services from a single access point will represent significant progress.

Digital Economy and Society Index (DESI)[102] 2018 Country Report Spain

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



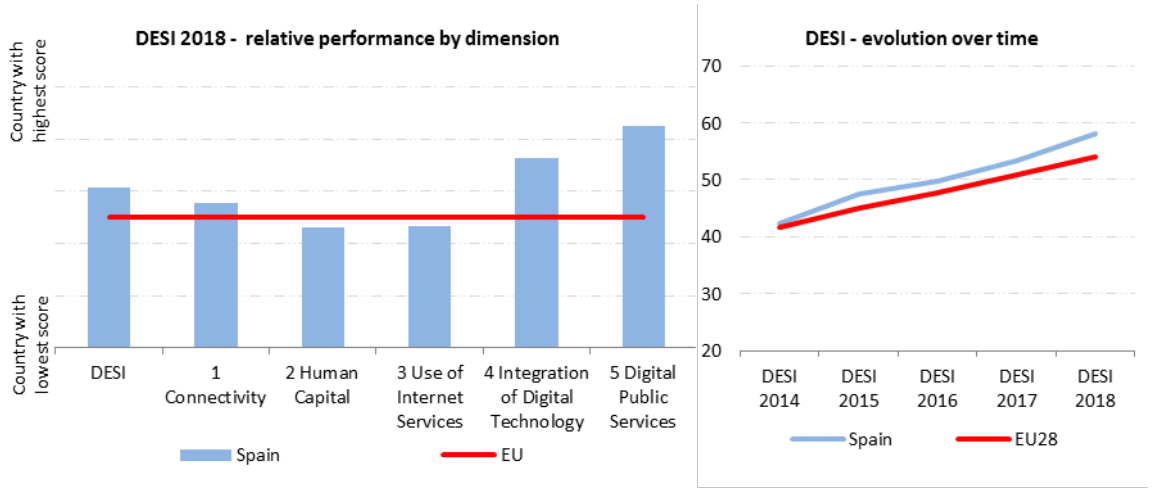
[102] https://ec.europa.eu/digital-single-market/en/desi

	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**10**	**58.0**	**54.7**	**54.0**
DESI 2017	12	53.3	51.5	50.8

Spain ranks 10th out of the 28 EU Member States in the European Commission Digital Economy and Society Index (DESI) 2018[103]. Its score increased due to an improved performance in all of the DESI dimensions measured. Spain performs well in connectivity, thanks to the wide availability of fast and ultrafast fixed and mobile broadband networks and to the increasing take-up. Most Spaniards make good use of a variety of online services. Spain improved with regards to human capital, but still scores slightly below the average. In particular, one fifth of Spanish citizens are not yet online and close to half of its citizens still do not have basic digital skills. Despite growing demand on the labour market, the supply of ICT specialists are still below the EU average. Spain made the most progress in terms of use of digital technologies by businesses. More Spanish businesses use social media, eInvoices, cloud and e-commerce. Among all dimensions, Spain ranks highest in the eGovernment domain.

Spain belongs to the medium performance cluster of countries[104].

In 2017, the Ministry of Energy, Tourism and Digital Agenda launched a public consultation for the development of a new national strategy (provisionally called "Estrategia para una Espana inteligente")[105], an updated version of their Digital Agenda with more ambitious targets and policy areas, in line with the Digital Single Market Strategy proposals and 2025 targets. For this purpose, the government has set up an high level group for the digital transformation of Spanish economy where the main ministries are represented106. Giving priority to good connectivity and investing in human capital will help reaping the full benefits of the digital transformation.



[103] DESI: https://ec.europa.eu/digital-single-market/en/scoreboard/Spain.
[104] Medium performing countries are Spain, Austria, Malta, Lithuania, Gemany, Slovenia, Portugal, Czech Republic, France and Latvia.
[105] http://www.minetad.gob.es/telecomunicaciones/es-ES/Participacion/Paginas/Cerradas/consulta-estrategia-digital.aspx
[106] http://www.minetad.gob.es/es-es/gabineteprensa/notasprensa/2018/Paginas/transformaci%C3%B3n-digital20180216.aspx

1 Connectivity

1 Connectivity	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**14**	**64.7**	**62.4**	**62.6**
DESI 2017	14	60.2	58.8	58.5

	Spain				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**96%** ↑ 2017	**21**	**95%** 2016	**21**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**73%** ↑ 2017	**15**	**71%** 2016	**15**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**92%** ↑ 2017	**16**	**86%** 2016	**21**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**92** ↑ 2017	**11**	**86** 2016	**10**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**85%** ↑ 2017	**14**	**81%** 2016	**15**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**43%** ↑ 2017	**12**	**35%** 2016	**14**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**84%** 2017	**9**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**17.6%** ↑ 2017	**11**	**15.4%** 2016	**9**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**74** ↑ 2017	**22**	**70** 2016	**23**	**87** 2017

Spain performs particularly well in terms of fixed NGA coverage. Currently, 85% of households have access to fast broadband networks capable of providing at least 30 Mbps, although with significant differences between regions and between urban and rural areas. The deployment of fibre networks (FTTP) continues to be an important feature of the Spanish digital society, covering 83.6 % of population, only surpassed in terms of total percentage of households covered by Portugal. Mobile broadband and fixed broadband take-up ratios are one of the two main sources of improvement in the DESI, although fixed broadband take-up remains still below the EU average. 4G coverage has advanced significantly (from 86 % to 92 %), 1 p.p. above the EU average (91 %). The fixed broadband price index for Spain shows an improvement (from the 23rd to the 22nd position) but prices in Spain remain still more expensive than the EU average. The context is a converging market dominated by bundles and characterized by increasing internet access speeds (supported by the above-mentioned deployment of FTTP networks) where price increases in the flagship-bundled products of the main operators are generally linked to different improvements. Mobile broadband prices for handset offers[107] have substantially decreased in the past year (from €39 to €21), and are even below the EU average (€24).

[107] Offers from February 2017 including 1 GB, 300 calls and 225 SMS.

The national 'Programme for the extension of next-generation broadband networks' (Programa de Extensión de la Banda Ancha de Nueva Generación, PEBA-NGA), continues to provide financial support for the roll-out of broadband networks in areas where high speed connectivity is neither available nor planned in the next three years. Since 2013, this programme has provided high-speed connectivity to 2.8 million households. In 2017 this support increased by 58 %, reaching 100 million Euros and focused on the roll-out of very high speed access networks providing at least 100 Mbps download speeds. Several regions are also implementing complementary support actions[108].

In addition, in 2017 a new initiative was adopted supporting the subscription by users, including SMEs and municipalities, to connectivity offering at least 30 Mbps download speeds in rural areas. These include areas where no connectivity offering at least 10 Mbps download speeds with a latency of less than 100 milliseconds was available.

A National Plan for 5G (2018-2020) has also been published in December 2017. With this approval, Spain appears to be preparing the appropriate regulatory environment to enable 5G rollout in Spain. According to the National Plan roadmap, in 2018 it is foreseen to auction the core L band, 1452-1492 MHz and the 3.6-3.8 GHz band109. Other actions in the Plan include several pilot projects calls[110] and the 700MHz band roadmap definition. Particular attention will need to be paid to the definition of the national 700 MHz-band roadmap expected in the first semester of 2018.

Building on widely deployed fibre networks and significant efforts in 4G coverage, Spain is well positioned to deliver further on the aim of ensuring that all Spanish citizens benefit from a future-proof and innovative digital economy. Spain should however tackle, within the context of ultrafast broadband technology, the interrelated broadband pricing and take-up issues while closely monitoring the convergent bundling trend.

108 The government announced in 2018 an ambitious plan – "Plan 300x100"- to reinforce its support for the deployment of very high-speed broadband networks for the period 2018-2021. The aim is to reach 95% coverage of the population through the extension of 300 Mbit/s access to 100% of the population centres (Plan 300x100). Population centres include a set of at least 10 buildings or more and, as an exception, less than 10 buildings as long as there are more than 50 inhabitants

109 The process has already started with the public consultation for the proposal of the spectrum caps for the auction.

110 These have been already approved in 2018.

2 Human Capital

2 Human Capital	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**14**	**54.6**	**58.6**	**56.5**
DESI 2017	16	50.2	56.5	54.6

	Spain					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**80%**	↑	**13**	**76%**	**17**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**55%**	↑	**17**	**53%**	**15**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**3.0%**	↑	**18**	**2.4%**	**21**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[111]	**21.6**	↑	**7**	**21.0**	**7**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

Spain ranks 14th among EU countries and below the EU average. Despite an increasing number of Spaniards going online, basic and advanced digital skills levels remain below the EU average. Only 55 % of individuals between 16 and 74 years have basic digital skills (57 % in the EU). Despite the increase in the share of ICT specialists from last year, they represent a lower share of the workforce compared to the EU (3 % compared to 3.7 % in the EU). Spain is performing well above the EU average as regards graduates holding a STEM (Science, Technology and Mathematics) degree with 21.6 graduates per 1000 individuals.

The public consultation for the development of the new national digital strategy ("*Estrategia para una Espana inteligente*")[112], is structured under five pillars. One of them (Citizenship and Digital Employment - "*Ciudadanía y Empleo Digital*") has already identified the need for the improvement of digital skills, competences and ICT training of citizens and the workforce. Additionally, Spain acknowledges as a challenge the need to increase the number of ICT specialists, as well as promoting the role of the education system in the advancement of digital skills. From the analysis of the public consultation, several elements have been identified as key challenges, such as: digital inclusion, re-training of the workforce towards a digital environment, digital skills training and digital entrepreneurship. Given their relevance, digital education and digital transformation of employment might be specially considered in a joint "Citizenship, Education and Digital Employment" pillar in the new digital strategy.

In October 2017, the government adopted the latest Spanish Digital Competence Framework for Teachers to improve teaching skills in ICT. Based on that Framework, a new Digital Competence Portfolio for Teachers has been designed, to acknowledge and improve their

[111] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

[112] http://www.minetad.gob.es/telecomunicaciones/es-ES/Participacion/Paginas/Cerradas/consulta-estrategia-digital.aspx

digital competence through continuous self-assessment and the up-to-date recording of teaching, learning and training experiences.

The Spanish National Digital Jobs Coalition finally became operational in July 2017. This coalition is coordinated by ICT industry association AMETIC through the Information Technology Foundation.

A high degree of skills mismatches in companies' workforces limit their capacity to innovate and capitalise from innovation. Increasing the number of Spanish ICT specialists but also re-skilling the labour force is of the utmost importance to tap the full potential of the Digital Economy.

Highlight 2018: Young Professionals' grant Program *("Profesionales Digitales")*

The Government (through the public entity RED.ES) has launched a grant program to promote training and employment of young people in the Digital Economy called "*Profesionales digitales"* (Ministry of Energy, Tourism and Digital Agenda, 2017).

The programme offers on the one hand training that meets the requirements of the digital industry and new business models (with a minimum of 150 hours of training), and on the other hand facilitates young people's access to jobs in this sector. The grants are intended for training projects with commitment to recruitment in the field of ICT and Digital Economy, aimed at young people enrolled in the National Youth Guarantee System. The recruitment commitment is that at least 30 % of those who complete the training will be employed for at least 6 months, in positions related to ICT and Digital Economy.

At the end of 2017, EUR 19.75 million (about 98 % of the total budget) has already been allocated to projects in 15 autonomous regions (out of a total of 17 and 2 autonomous cities) in a total of 77 projects. It is co-financed by the European Social Fund (ESF), in the 2014-2020 programming period.

3 Use of Internet Services

3 Use of Internet Services	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**18**	**49.4**	**48.3**	**50.5**
DESI 2017	17	47.5	45.0	47.5

	Spain					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**77%** 2017	↓	**17**	**78%** 2016	**16**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**83%** 2016		**11**	**83%** 2016	**11**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**27%** 2016		**7**	**27%** 2016	**7**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**35%** 2017	↑	**27**	**31%** 2016	**28**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**68%** 2017	↑	**21**	**67%** 2016	**18**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**55%** 2017	↑	**18**	**54%** 2016	**18**	**61%** 2017
3c2 Shopping % individuals who used Internet in the last 12 months	**59%** 2017	↑	**16**	**54%** 2016	**18**	**68%** 2017

Overall, the use of internet services in Spain is broadly comparable with the EU average. Spanish citizens are keen to engage in a variety of online activities in line with the rest of European citizens, the most popular online activity being downloading/streaming music, videos and games with 83 % of individuals engaged. 77 % of Spanish Internet users read news online (72 % in the EU). The Spanish used social networks (68 %), above the EU average, but the use of online banking and online shopping (55 % and 59 %, respectively) is below EU average. Furthermore, use of VoD (Video on Demand) is more widespread than in other EU countries. At the same time, the use of video calls is increasing with more than one third of internet users in Spain now using these services.

4 Integration of Digital Technology

4 Integration of Digital Technology	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**49.8**	**42.1**	**40.1**
DESI 2017	10	41.7	38.5	36.7

	Spain					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**46%** 2017	↑	**4**	**35%** 2015	**15**	**34%** 2017
4a2 RFID % enterprises	**7.8%** 2017	↑	**2**	**6.5%** 2014	**3**	**4.2%** 2017
4a3 Social Media % enterprises	**28%** 2017	↑	**7**	**24%** 2016	**8**	**21%** 2017
4a4 eInvoices % enterprises	**31.7%** 2017	↑	**6**	**25.0%** 2016	**6**	**NA** 2017
4a5 Cloud % enterprises	**17.8%** 2017	↑	**11**	**13.0%** 2016	**12**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**19.6%** 2017	↑	**9**	**18.7%** 2016	**8**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**10.1%** 2017	↑	**13**	**9.4%** 2016	**13**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**7.1%** 2017	↑	**20**	**5.9%** 2015	**20**	**8.4%** 2017

On the Integration of Digital Technology by businesses, Spain ranks 7th, well above the EU average, and it managed to improve and advance three ranks compared to last year. Spain made good progress on all indicators. Spanish enterprises are increasingly taking advantage of the possibilities offered by online commerce: 20 % of SMEs sell online (above the 17 % of the EU average), 7 % of total SMEs are selling cross-border and an average of 10 % of their turnover comes from the online segment. Furthermore, almost one third of SMEs use eInvoicing (one fourth in 2016). 28 % of enterprises use social media (up from 24 % in 2016) and 18 % use cloud services (13 % in 2016).

The Ministry of Economic affairs is preparing a common plan and establishing a single point of contact for all start-up and industry 4.0. initiatives at national level (several strategies in different ministries, secretaries of State) to boost innovation. ICO (*instituto de credito oficial*) through FUND ICO global and CDTI (centre for the development of industrial technology) are supporting with improving private equity and innovation.

The public entity RED.ES[113], presented their Strategic Plan 2017-2020 which is structured around four axis[114]. The Digital Ecosystem axis, which includes a National SME Digital Transformation plan aims to digitised enterprises, especially SMEs. In that line, two programs have been recently launched: Digital transformation offices ("Oficinas de

[113] http://www.red.es/redes/es/quienes-somos/plan-estrat%C3%A9gico?qt-view__pagina_corporativa__block_3=4#qt-view__pagina_corporativa__block_3

[114] Namely Digital ecosystem, Digital government, Digital hub and Digital organisation.

transformacion digital") and Digital Advisers ("Asesores Digitales"). Both projects support the integration of digital technologies in SMEs for the period 2017-2020.

One the five pillars in the public consultation for the new digital strategy is Ecosystems 4.0., where main barriers to digitisation of SMEs will be adressed. When proposing digitisation incentives, it is of the utmost importance to take into account the high concentration of small and medium-sized firms in the Spanish industrial structure, mostly operating in low-tech traditional sectors.

In order to boost the digital transformation of the Spanish economy, it is important to raise awareness of the relevance of digitisation of SMEs and their needs. That way the full range of benefits from the adoption of digital technologies by SMEs can be captured.

5 Digital Public Services

5 Digital Public Services	Spain		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**72.4**	**58.5**	**57.5**
DESI 2017	4	68.5	54.9	53.7

	Spain				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[115] % internet users needing to submit forms	**67%** ↑ 2017	**11**	**66%** 2016	**11**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**72** ↑ 2017	**9**	**67** 2016	**10**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**94** ↑ 2017	**6**	**89** 2016	**11**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**95** ↑ 2017	**3**	**88** 2016	**11**	**83** 2017
5a5 Open Data % of maximum score	**94%** ↑ 2017	**2**	**91%** 2016	**1**	**73%** 2017
5b1 eHealth Services % individuals	**29%** 2017	**5**	**NA**		**18%**

In Spain, Digital Public Services remains the dimension where Spain is performing best. It ranks 6th among EU countries, with a better score over last year's. Spain performs very well in Open Data and there is a high level of online interaction between public authorities and citizens. 67 % of Spanish online users actively engage with eGovernment services. In 2017, Spain performs better than the previous year in the indicators concerning pre-filled (72 out of 100) and completion of eGovernment information (94 out of 100). Furthermore, availability of eGovernment services for business shows an uplifting result for Spain, scoring 95 out of 100, the third best performer in the EU. Regarding eHealth services, it ranks fifth country in the Union with 29 % of Spaniards having used health and care services provided online.

The adopted ICT Strategic plan for 2015-2020[116] (Plan de Transformación digital de la Administración General del Estado y sus Organismos Públicos) is already delivering digital by default results in central administration and public agencies. The next Digital Transformation Action Plan (DTAP) lead by the Ministry of Finance and Public Administration (MINHAFP) constitutes a structural reform aimed at implementing the last phase of the development of e-Government in the MINHAFP environment. The full implementation encompasses two key elements; firstly, sectoral action plans for the digital transformation developed by each Ministry[117]; secondly, a consolidated catalogue of eGovernment services to be provided by the Ministry of Finance and Public Administration to all public authorities (at national, regional and local) to implement at their respective level.

[115] The definition of this indicator has been changed. Th new indicator measures eGovernment users as a percentage of thos internet users needing to submit forms to the public administration.

[116] Plan de Transformación digital de la Administración General del Estado y sus Organismos Públicos.

[117] Two action plans are already available, including MINHAFP and Ministry of Defence.

In order to achieve efficiencies, avoid duplicated expenses and reduce costs in the Administration, all the regions have signed an agreement with the General State Administration which enables them to use the eGovernment services of the State. Additionally, a Regional Liquidity fund has been foreseen, but the release of funds to regions will be made conditional on achieving specified targets for the uptake of eGovernment services[118]. The estimated savings[119] for the use of digital services for the period 2012 - June 2017 surpassed EUR 4 Bn (distributed in 60 % citizens and 40 % public administration).

Full implementation of the Digital Transformation plan, by all public actors involved - central, regional and local government entities - could lead the way to even more significant improvements in the area of Digital Public Administration.

118 For example, all the administrative units must be included in the eInvoicing System, receive all their invoices electronically and all registers must be digital by June 2017.

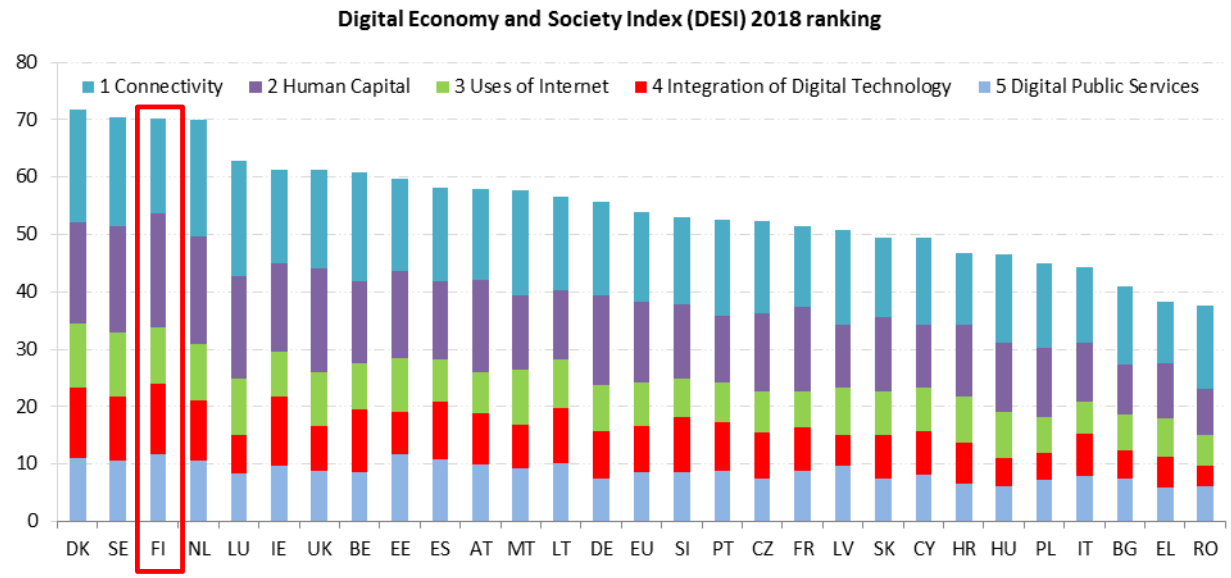
119 Source: Secretaria General de Administración Digital del Ministerio de Hacienda y Función Pública (data as of 30.09.17)

Digital Economy and Society Index (DESI)[120] 2018 Country Report Finland

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



[120] https://ec.europa.eu/digital-single-market/en/desi

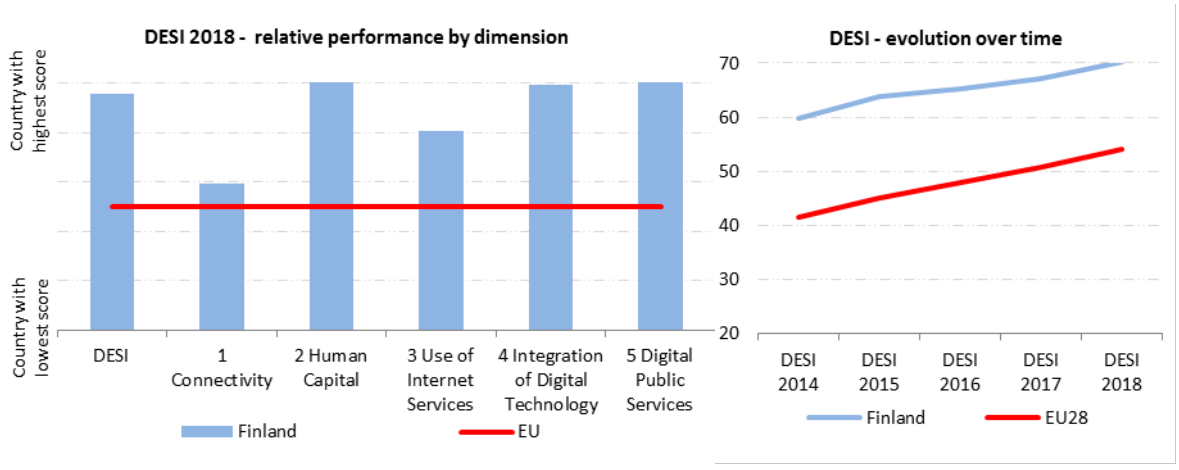
	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**3**	**70.1**	**64.0**	**54.0**
DESI 2017	2	67.2	61.2	50.8

Finland ranks 3rd out of the 28 EU Member States, with a score which is virtually identical to both the 2nd-placed and 4th-placed. Its overall score regularly progresses more or less in line with the EU average, this maintaining its outstanding position.

In addition to its leadership position in digital skills, which Finland has already held for several years, it also turned into the top scorer in digital public services. Moreover, it improved its score regrading the integration of digital technologies, where it is closing in on the frontrunner. While it remained steady in 5th place for the use of Internet services, it lost two places in the connectivity dimension, which is partly due to the introduction of a new indicator on ultra-fast broadband, where Finland does not score very well.

Overall, Finland remains a world leader in digitisation and one of the best EU countries in this domain.

Finland belongs to the High-performing cluster of countries[121].



[121] High performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.

1 Connectivity

1 Connectivity	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**66.1**	**71.9**	**62.6**
DESI 2017	7	65.0	67.9	58.5

	Finland					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**97%** 2017	→	**18**	**97%** 2016	**17**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**57%** 2017	↓	**27**	**61%** 2016	**25**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**98%** 2017	↑	**7**	**97%** 2016	**4**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**146** 2017	↓	**1**	**147** 2016	**1**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**75%** 2017	→	**22**	**75%** 2016	**21**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**23%** 2017	↑	**22**	**22%** 2016	**21**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**59%** 2017		**21**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**16.9%** 2017	↑	**13**	**16.1%** 2016	**8**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**94** 2017	→	**1**	**94** 2016	**2**	**87** 2017

With an overall Connectivity score of 66,1 Finland ranks 9th among the EU Member States. Fixed broadband is available to 97 % of households, despite the specific geographical characteristics of the country. Fixed broadband take-up at 57 % is significantly behind the EU average of 75 %. Besides, only 23 % of households with fixed broadband chose to have subscription to fast broadband (at 30 Mbps or above), thus much below the EU average of 33 %. One of the reasons for the relatively low usage of fixed broadband connectivity can be seen in Finland's excellent performance in mobile broadband. Indeed, Finland leads the ranks in mobile broadband take-up and is not far away from twice the EU average: its mobile broadband take up was 146 in June 2017 (subscriptions per 100 subscribers) against 90 for the EU over the same period.

On 15 July 2017, national legislation was renewed to extend Finland's national broadband plan, the "fast broadband project" until the end of 2019. The project aims at providing an optical fibre or cable network enabling connections of 100 Mbps within two kilometres of 99% of all permanent residences and offices in Finland. State aid is available under the Fast Broadband project to finance high-speed broadband networks.

In practice, network building companies have had difficulties to find financing for their part of the costs. Therefore they have not been able to run the project in time as planned in the initial phase of the "fast broadband project". On 15 July 2017, amended State Aid rules applicable to broadband funding came into force. The amended rules aim at incentivising market players to apply for State Aid and ultimately generate more broadband offers on the market.For instance, the aid intensity could be raised up to 90% for ongoing projects.

While Finland has good fixed broadband and 4G coverage overall, coverage in rural areas could be further improved. Market players have not invested enough in the sparsely populated rural areas of the country. In this context, it remains to be seen whether the amendments to the State aid rules of 15 July 2017 will generate the expected results in practice both as far as ongoing and future broadband roll-out projects are concerned.

In the meantime, FICORA has granted Telia Company a licence for the purposes of testing 5G base stations in Helsinki, Espoo and Vantaa.

2 Human Capital

2 Human Capital	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**1**	**79.2**	**70.7**	**56.5**
DESI 2017	1	76.7	69.4	54.6

	Finland					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**92%**	↑	**6**	**91%**	**5**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**76%**	↑	**4**	**73%**	**4**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**6.6%**	↑	**1**	**6.5%**	**1**	**3.7%**
% individuals	2016			2015		2016
2b2 STEM Graduates[122]	**24.3**	↑	**2**	**22.3**	**4**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

Digital skills remain the strongest competitive advantage of the Finnish economy. The share of ICT specialists in its work force increased further, with an additional 4 500 jobs. Overall, Finland managed to increase its score in this dimension faster than the EU average, reversing the catch-up process which had happened during the two previous years. Concerning the reduction of the share of citizens without at least basic digital skills, progress is regular and the current score leaves space for further improvement.

Digital skills and education remain a priority for the authorities, with the continuing implementation of strategic policies. Under the new Finnish national qualifications framework (NQF), which entered into force in 2017, digital learning environments and new approaches to pedagogy (e.g. modern simulators) will have a larger role[123]. Under the Digabi project, the first tests for Matriculation Examination were arranged electronically in autumn 2016, while, all tests will be arranged electronically in spring 2019. Under the national tutor teacher programme a tutor teacher will be provided for each basic school in Finland. The tutor teacher's task is to support and train their colleagues locally, for example how to use ICT pedagogically. The organizers of basic education have been granted state subsidies for tutors' training and tutors' work. In 2017 the total sum of grants was about 10 million euros[124].

[122] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.
[123] https://ec.europa.eu/education/sites/education/files/monitor2017-fi_en.pdf
[124] http://www.eun.org/documents/411753/839549/Country+Report_Finland_2017.pdf/f106f29c-7092-44e3-9ecf-5ae24b521cab

Highlight 2018: support guarantee e-inclusion of people under 30[125]

Tampere University of Applied Sicences is running a three-year project to create new innovative guidance methods and pedagogical solutions to support under 30 year-old students' education and workshops after basic education. These students are often in need of special support in their studies and in life.

This project focuses on the development of developing digital learning environments and on the better inclusion of students needing special support in e-society in a way that every individual would have better possibilities to study, work and be an active citizen in a more and more digitalized society. The inclusion in e-society project aims to develop participation in e-society, inclusion and equality. It aims to strengthen the readiness of teachers and guidance personnel to meet with and to guide students in need of special support to operate in digital learning and operational environments.

As a consequence the project increases the competence of young students, matching better today's labour market demands; ensures smooth transfers from basic education to vocational education and trainings; and prevents drop-outs in education.

[125] http://www.tamk.fi/web/tamken/projects?RepoProject=E3110-16013

3 Use of Internet Services

3 Use of Internet Services	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**5**	**65.4**	**63.4**	**50.5**
DESI 2017	5	61.8	60.5	47.5

	Finland				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**90%** ↑ 2017	**4**	**85%** 2016	**8**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**91%** 2016	**2**	**91%** 2016	**2**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**37%** 2016	**4**	**37%** 2016	**4**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**37%** ↑ 2017	**26**	**34%** 2016	**24**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**70%** ↑ 2017	**15**	**66%** 2016	**21**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**93%** ↑ 2017	**1**	**92%** 2016	**1**	**61%** 2017
3c2 Shopping % individuals who used Internet in the last 12 months	**75%** ↑ 2017	**8**	**72%** 2016	**8**	**68%** 2017

The use of Internet services is significantly more widespread in Finland than in the EU average, but not outstandingly so. While online consumption of news, music, video and games as well as online banking have all been virtually universal for a couple of years, online shopping and video calls saw growth in line wth the overall EU growth. In the use of social networks, where Finland was lagging behind, it has improved its position, now situating tiself above the EU average. Thanks to this improvement, its overall score for this category increased faster the than the EU average and faster than the score of the other advanced countries.

4 Integration of Digital Technology

4 Integration of Digital Technology	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**60.9**	**47.0**	**40.1**
DESI 2017	3	55.7	44.0	36.7

	Finland					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**39%**	↑	**9**	**37%**	**12**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**6.8%**	↑	**3**	**5.8%**	**6**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**29%**	↑	**6**	**26%**	**7**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**71.8%**	**1**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**48.4%**	↑	**1**	**40.4%**	**1**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**19.6%**	↑	**8**	**17.3%**	**13**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**NA**			**NA**		**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**5.9%**	↑	**23**	**5.8%**	**21**	**8.4%**
% SMEs	2017			2015		2017

Finnish enterprises continue to be among the most advanced business in Europe concerning the integration of digital technologies, and indeed moved one place up, within reach of the frontrunner. In particular the use of cloud computing is very widespread, with every second Finnish company now making use of it; here Finland scores three times the average of those countries for which data is available.

The policy initiatives launched in 2016[126] to further increase the use of digital technologies by businesses continued their course in 2017 and are mostly coming to an end in 2018. In the meantime, in December 2017 Finland launched a national AI strategy[127] with the objective of turning Finland into a leading country in the application of artificial intelligence. It is based on the assumption that Finland has excellent opportunities to be among the winners in AI transformation, since Finland was ranked second among 11 developed countries in a recent report[128], which was partly due to Finland's business structure and investment product-driven industry, partly due to the public sector's degree of digitalisation, and partly due to Finland's high level of education.

[126] http://valtioneuvosto.fi/documents/10616/1986338/Action+plan+for+the+implementation+Strategic+Government+Programme+EN.pdf/12f723ba-6f6b-4e6c-a636-4ad4175d7c4e

[127] https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/160391/TEMrap_47_2017_verkkojulkaisu.pdf?sequence=1&isAllowed=y

[128] Accenture and Frontier Economics, "Why Artificial Intelligence is the Future of Growth", 2017.

The strategy argues that, in order to to take full advantage of the possibilities created by artificial intelligence, it is necessary that actions on several fronts are needed: investment in the development and application of technology; an improvement in its ability to adapt; strong scientific support; putting possibilities created by artificial intelligence into practice in both the private and public sectors; and. legislation supporting the transformation.

Currently, and despite the overall strong position and the policy support for digitisation, there remain significant disparities among businesses. According to the Finnish Innovation Survey, the importance of digitalisation for enterprises' business activity is much more strongly acknowledged in services than in manufacturing firms: 41% of services firms consider one form or another of digitalisation key to firm operations, compared to 25.4% of manufacturing firms[129].

[129] OECD Reviews of Innovation Policy, Finland, 2017

5 Digital Public Services

5 Digital Public Services	Finland		Cluster	EU
	rank	score	score	score
DESI 2018	**1**	**78.6**	**63.0**	**57.5**
DESI 2017	2	75.8	60.2	53.7

	Finland				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[130] % internet users needing to submit forms	**91%** → 2017	**2**	**91%** 2016	**2**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**86** ↑ 2017	**3**	**82** 2016	**3**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**93** → 2017	**8**	**93** 2016	**6**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**80** → 2017	**21**	**80** 2016	**16**	**83** 2017
5a5 Open Data % of maximum score	**90%** ↑ 2017	**5**	**76%** 2016	**7**	**73%** 2017
5b1 eHealth Services % individuals	**49%** 2017	**1**	**NA**		**18%**

The government is continuing to drive the digitisation of public services also in local government. In the legislative reform package for the social and healthcare services which the parliament plans to adopt this spring, increased use of digital and electronic services is expected to increase productivity and improve cost efficiency. Already now the Finnish Electronic Patient Record system (KanTa) allows every citizen to access his or her medical records, as well as prescription services. Physicians also utilize this database not only to view patient records, but also to gain access to the Picture Archiving and Communications System (PACS), from which they can see and send relevant information to other entities within the healthcare system.

In July 2017, the eGovernment portal Suomi.fi was revamped, merging the former Suomi.fi portal for citizens and Suomi.fi Workspace pages for authorities' services, whilst the activities of EnterpriseFinland.fi were added by the end of 2017. It now provides a possibility for citizens to get to know their own information in the authorities' registers; a single sign-on for different organisations' e-services is scheduled for 2018. It plans also to enable an e-Authorizations service which offers the possibility of verifying the legal right of a person to act on behalf of another person or a company. Another new service will enable citizens to receive mail sent by various authorities electronically, such as decisions, instructions and notifications, for example. Contents for different life events are published in three languages, i.e. Finnish, English and Swedish.

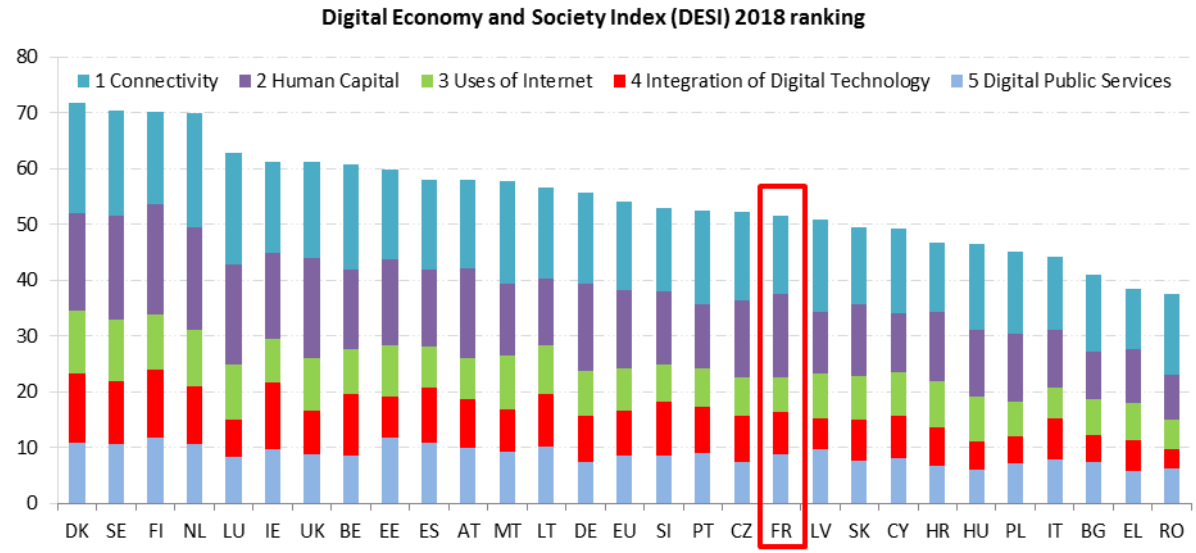
[130] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration

Digital Economy and Society Index (DESI)[131] 2018 Country Report France

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband, broadband speed and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



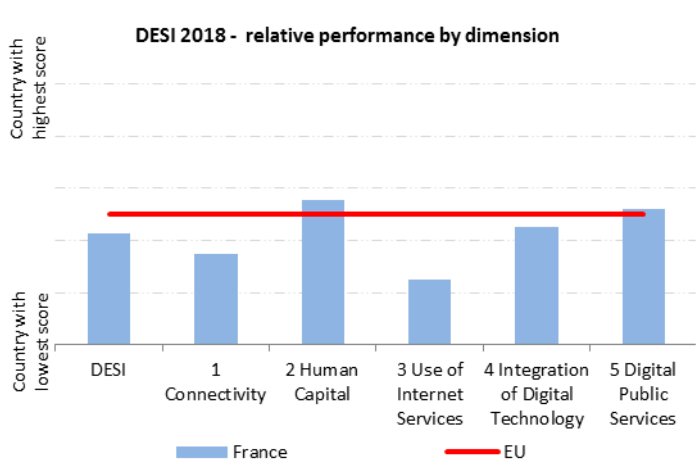
[131] https://ec.europa.eu/digital-single-market/en/desi

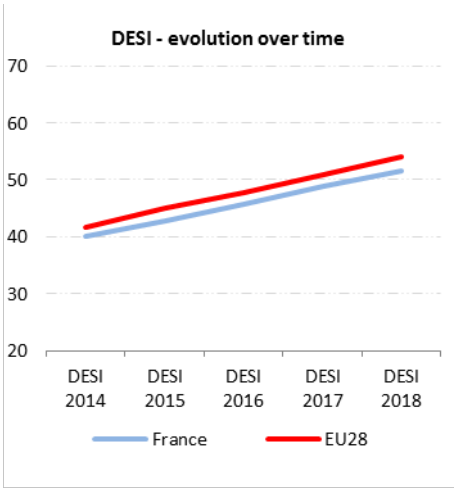
	France		Cluster	EU
	rank	score	score	score
DESI 2018	**18**	**51.5**	**54.7**	**54.0**
DESI 2017	18	48.8	51.5	50.8

France ranks 18th out of the 28 EU Member States. Overall, it retains its ranking with some slight improvements to its score, making overall some progress. France has achieved good results in digital skills, both basic and advanced, in particular because of a high proportion of scientific and technical graduates (9th rank). France occupies an average position in terms of e-government (use and services offered online) and performs well in open data. However, France has a level of connectivity that is below the European average, in particular because of a low degree of coverage for the 4G mobile band and for fast and ultra-fast broadband. Furthermore, companies in France have a below average degree of integration of digital technologies. In terms of e-commerce, France occupies an average position. Finally, France is lagging behind in the use of the Internet, both in terms of content (news, music and video) and communication (social networks); even if online transactions (banking, shopping) are widely practised.

France belongs to the Medium performing cluster of countries.[132]

Following the 2017 elections, the new Government presented The '**Grand Plan d'Investissement 2018-2022**' in September 2017, which has the ambition to accompany the transition of the economy to a new growth model, including an ecological and digital transition, with a **mix of institutional reforms and targeted investments**. The Plan will mobilise over 5 years EUR 57 billion on a broad spectrum of actions under 4 action lines for the transformation: ecological transition; vocational training; innovation; digital transformation of the public services. The last action line, digital administration, will receive an endowment of EUR 9.3 billion.





[132] Medium performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia.

1 Connectivity

1 Connectivity	France		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**56.4**	**62.4**	**62.6**
DESI 2017	21	52.7	58.8	58.5

	France					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**>99.5%** 2017	→	**3**	**100%** 2016	**6**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**71%** 2017	↓	**17**	**72%** 2016	**10**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**89%** 2017	↑	**21**	**78%** 2016	**23**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**87** 2017	↑	**15**	**81** 2016	**14**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**52%** 2017	↑	**27**	**47%** 2016	**27**	**80%** 2017
1c2 Fast broadband take-up % homes subscribing to >= 30Mbps	**16%** 2017	↑	**24**	**13%** 2016	**24**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**42%** 2017		**25**	**NA**		**58%** 2017
1d2 Ultrafast Broadband take-up % homes subscribing to >= 100Mbps	**10.4%** 2017	↑	**20**	**8.0%** 2016	**19**	**15.4%** 2017
1e1 Broadband price index Score (0 to 100)	**94** 2017	→	**1**	**94** 2016	**4**	**87** 2017

With an overall connectivity score of 56.4, France ranks 23rd among the EU Member States. French households are fully covered (>99,5 % coverage) by fixed broadband and 71 % of them subscribe to fixed broadband, slightly below the EU average of 75 %. The situation as regards higher performance networks is more complex: only 52 % of French households have NGA coverage (Next Generation Access or fast broadband networks providing at least 30 Mbps); and only 16 % of French households actually availed of fast broadband. These figures are lower than the EU averages of 80 % for NGA coverage and 33 % for subscription to fast broadband respectively, which may be partly explicable by low population density outside urban areas. Take-up of mobile broadband has improved from 81 to 87 subscriptions per 100 subscribers within a year (June 2016-June 2017), although it is still slightly below the EU average of 90.

According to the French National Broadband Plan 'Plan France Très Haut Débit' (Plan for Ultra-Fast Broadband in France), all French territories should be covered by broadband speeds of 30 Mbps and above by 2022. Additionally, in July 2017, French President Macron declared that he wished to offer "good high speed" Internet (at or above 8Mbit/s) to all by 2020. It has been confirmed that a total of 3.3 billion euros is allocated by the government to support the deployment of NGA networks in areas where private initiative is lacking.

In order to further improve its high speed connectivity coverage throughout the country, France aims to speed up the roll-out of fibre network and considers alternative means to fibre in remote areas, e.g. fixed 4G as a transitory complement.

French authorities are also looking at ways of making deployment commitments more effective and avoid overbuild of new networks in less dense areas.

Finally, French Authorities are steering new investment into mobile networks with the view to reducing zones without coverage and improve quality of services, including indoor coverage. In exchange for investing more than EUR 3 billion in improving network coverage, the French mobile operators would not have to face new spectrum auctions in the years to come as current spectrum licences expire. Instead, reinforced requirements would be introduced in their licence obligations.

Both strategies are expected to contribute to better high speed connectivity results throughout the country by 2020 already.

2 Human Capital

2 Human Capital	France		Cluster	EU
	rank	score	score	score
DESI 2018	**11**	**59.1**	**58.6**	**56.5**
DESI 2017	10	57.4	56.5	54.6

	France					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**83%**	↑	**11**	**82%**	**10**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**57%**	↑	**13**	**56%**	**11**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**3.8%**	↑	**11**	**3.6%**	**13**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[133]	**21.4**		**9**	**NA**		**19.1**
Per 1000 individuals (aged 20-29)	2015			2014		2015

In the Human Capital dimension, France is performing well (11th rank in DESI 2018). French people are regular Internet users (83 % of individuals aged 16-74 consult the Internet at least once a week) and they have good digital skills (57 % of individuals aged 16-74 have at least basic digital skills). The good proportion of graduates in science and technology (21.4 graduates per 1000 inhabitants aged 20-29 years, EU average 19.1 per 1000 in 2015) might contribute to the generally high level of digital skills and the high use of the Internet. However, French companies face difficulties in recruiting ICT specialists (42 % of companies with more than 10 employees outside the financial sector which have tried to recruit ICT specialists reported difficulties in filling job vacancies in 2017). Nevertheless, France is below the EU average (48 % reported the same problems in 2017).

The second part of the social reforms initiated by the new government will be launched in early 2018 (projects to be presented in the spring and to be adopted this summer). It will include the reform of vocational training and apprenticeship.

The new approach to vocational training and apprenticeship will be organized according to the skills and practical needs of businesses rather than trades; it will take greater account of transversal skills, including digital skills.

The "Grande Ecole du Numérique" (GEN) is a network of public and private training centres offering short-term (6 months) to long-term (2 years) digital training courses without any prerequisite qualification. Now in its 2nd year, about 420 certified training courses and 10 000 apprentices were trained at the end of 2017 (respectively 171 and 4 000 at the end of 2016). GEN will benefit from additional credits. GEN is part of the French coalition for digital skills and jobs.

The "French coalition for digital skills and jobs" was signed in September 2017 in order to tackle the lack of digital skills in France. It is managed by the MEDEF (the "Movement of the

[133] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

Enterprises of France", the largest employer federation in France). It has 4 components: 1) active persons 2) education 3) professionals 4) skills. GEN is pilot on components 2 and 3.

The "Investment plan for skills", the second axis of the Great Investment Plan ("Grand Plan d'Investissement") 2018-2022 launched by the Government in September 2017, will have a significant digital dimension. It will be awarded a credit of EUR 15 billion out of a total of EUR 57 billion (although it is difficult to calculate the exact proportion that will be devoted to digital training). Its goal is to train 1 million job seekers with low skills and 1 million young dropouts. These courses will be certifying; they will have a strong numerical dimension both in their methods and in their content.

All these training measures help to adapt the digital knowledge of the population to the demand of businesses and to the needs of everyday life.

3 Use of Internet Services

3 Use of Internet Services	France		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**42.2**	**48.3**	**50.5**
DESI 2017	25	40.3	45.0	47.5

	France					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**61%** ↑ 2017		**27**	**56%** 2016	**27**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**75%** 2016		**21**	**75%** 2016	**21**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**12%** 2016		**18**	**12%** 2016	**18**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**33%** ↓ 2017		**28**	**34%** 2016	**25**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**49%** ↑ 2017		**28**	**47%** 2016	**28**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**72%** ↑ 2017		**11**	**69%** 2016	**10**	**61%** 2017
3c2 Shopping % internet users (last year)	**76%** ↑ 2017		**7**	**75%** 2016	**7**	**68%** 2017

Internet usage is the dimension in which France has the lowest ranking (24th rank in DESI 2018) even if it has slightly improved. In terms of content, among internet users in the last three months, only 61 % (EU average: 79 % in 2017) read an online newspaper or magazine; 75 % (EU average: 78 % in 2016) play or download a game, movie, or music; and 12 % (EU average: 21 % in 2016) watch a video on demand. Moreover, in terms of communication, among internet users in the last three months, 33 % (EU average: 46 % in 2017) made a phone or video (via webcam) call over the Internet; 49 % (EU average: 65 % in 2017) participate in a social network. However, in terms of online transactions, France is above average: 72 % (EU average: 61 % in 2017) of Internet users in the last three months used online banking, and 76 % (EU average: 68 % in 2017) of Internet users in the past year ordered goods or services online.

4 Integration of Digital Technology

4 Integration of Digital Technology	France		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**37.8**	**42.1**	**40.1**
DESI 2017	16	34.7	38.5	36.7

	France					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**38%** 2017	↓	**10**	**39%** 2015	**9**	**34%** 2017
4a2 RFID % enterprises	**4.6%** 2017	↑	**15**	**2.7%** 2014	**24**	**4.2%** 2017
4a3 Social Media % enterprises	**16%** 2017	↑	**21**	**14%** 2016	**20**	**21%** 2017
4a4 eInvoices % enterprises	**NA** 2017			**14.9%** 2016	**16**	**NA** 2017
4a5 Cloud % enterprises	**NA** 2017			**11.8%** 2016	**16**	**NA** 2017
4b1 SMEs Selling Online % SMEs	**15.8%** 2017	↓	**16**	**15.9%** 2016	**15**	**17.2%** 2017
4b2 E-commerce Turnover % SME turnover	**11.1%** 2017	↑	**12**	**10.3%** 2016	**10**	**10.3%** 2017
4b3 Selling Online Cross-border % SMEs	**7.4%** 2017	↓	**19**	**7.9%** 2015	**15**	**8.4%** 2017

In terms of the integration of digital technologies by companies, France is below average in rank (16th rank in DESI 2018), but it is slightly progressing in score (37.8 in DESI 2018 vs. 34.7 in DESI 2017). In terms of business online, 38 % of companies with more than 10 employees outside the financial sector share information internally using Enterprise Resource Planning (ERP) software, which places France above the European average (34 % in 2017). However, companies use little social media (16 %, EU average: 21 % in 2017), electronic invoicing (15 % in 2016) and cloud computing (12 % in 2016). In addition, France has an average position in terms of e-commerce. Among SMEs outside the financial sector, 16 % sell online (EU average: 17 % in 2017) and 7.4 % sell online cross-border (EU average: 8.4 % 2017).

'Industrie du Futur' (IdF) is a cross-cutting programme with the aim of modernising France's industrial fabric via focusing on 5 axes: technology, transformation, training, cooperation and promotion.

Another important channel for funding innovation contributing to the IdF agenda are the regional clusters, combining R&D, industry and education 'Projets structurants des pôles de compétitivité' (PSPC). In its third phase (2013-2018) the government has focussed the objectives of this programme more strongly on economic impact and accompaniment of SMEs.

As part of the overall industrial policies in favour of the adoption and diffusion of industry 4.0 technologies and platforms, 'Factory Lab' was started in 2016. It is a multi-sector

collaborative platform for integration of technologies provided by technology suppliers in industrial environments for providing short demos of common interest, and for training of SMEs.

Another feature of the broader programme Nouvelle France Industrielle is the focus on key technologies for France. The “Key Technologies 2020” is a list of 47 key technologies in which French companies need to be present within 5 to 10 years in order to maintain a competitive advantage and uphold the appeal of France in growth markets.

For 2017 IdF programme priorities included a new phase of SMEs support; testbeds development for testing and experimenting with new and innovative products and technologies; as well as start-ups integration within the programme.

A step which will be taken in 2018 to support digital transformation of SMEs is the modernisation of ‘Transition Numérique’ programs by setting up a platform that provides resources to support the network of consultants as well as the companies themselves. Furthermore, new local actors and pilot actions will be integrated in close cooperation with the regions, in particular to generalise the use of digital vouchers.

The legislative framework has been adapted to the specificities of the collaborative economy in different sectors. The "ALUR" and "Digital Republic" laws in the housing sector, as well as the Thévenoud and Grandguillaume laws in transports have regulated the operation of service platforms.

Highlight 2017: Station F

Station F is the largest business incubator in the world. Station F was founded by Xavier NIEL in June 2017.

Station F is both an incubator and an accelerator. Startups rent paid workstations: EUR 195 per post and per month. Beyond the premises, a set of services are available to them: events, meeting rooms, a Tech Shop, public services. 1000 startups are installed representing 3000 entrepreneurs (between 2 and 5 people per company). There are 30 support programs run by partners, either companies or schools (e.g. HEC, EDHEC, and INSEAD).

The "Founders" program: Station F serves as an incubator (startup phase) for startups. The products must have a technological dimension. The ambition must be international. 2300 applications were received; 184 were selected, representing 650 people. 20 to 25% of startups come from abroad. Applications were received from 50 different countries.

The "Fighters" program: for entrepreneurs from disadvantaged backgrounds. The service is free. 50 people are welcomed for a period of 1 year.

The "Fellowship" program: provincial or foreign companies can take a campus "subscription" for EUR 900 per month.

The team consists of 18 people, all entrepreneurs or former entrepreneurs. The average age is 26 and ½. 9 nationalities are represented.

5 Digital Public Services

5 Digital Public Services	France		Cluster	EU
	rank	score	score	score
DESI 2018	**13**	**58.4**	**58.5**	**57.5**
DESI 2017	13	55.6	54.9	53.7

	France				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[134] % internet users needing to submit forms	**67%** ↑ 2017	**12**	**62%** 2016	**14**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**32** ↑ 2017	**22**	**27** 2016	**22**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**87** ↑ 2017	**13**	**86** 2016	**13**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**85** ↑ 2017	**13**	**84** 2016	**13**	**83** 2017
5a5 Open Data % of maximum score	**91%** ↑ 2017	**4**	**86%** 2016	**2**	**73%** 2017
5b1 eHealth Services % individuals	**12%** 2017	**20**	**NA**		**18%**

In terms of digital public services, France is in the average (13th rank in DESI 2018, unchanged since last year). More than half (67 % in 2017) of internet users need to submit forms via the Internet to public authorities (EU average: 58 % in 2017). In addition, according to the Euro Data Portal composite indicator, France ranks 4th in Europe for open data, 91 % of the maximum score, thanks to good performance both in terms of readiness, usability and impact. On the other hand, according to the results of the e-government benchmark, France has an average position in terms of completion of online services (score of 87, EU average: 84 in 2017) and a laggard position (score of 32, EU average: 53 in 2017) in terms of the amount of pre-filled data in the online forms.

The Public Action Program 2022, launched in October 2017 by the Prime Minister, gives priority to the digital transformation of administrations, with the objective of 100 % of dematerialized public services by 2022. A fund for the transformation of public action was installed at the end of 2017 and endowed with EUR 700 mio over the next five years, including EUR 200 mio for 2018. For implementation, the first interdepartmental committee of public transformation was held on 1st February; five major transformation projects have been launched, including one in the field of digital transformation (FranceConnect, see below).

The FranceConnect project has launched 4 actions: a dashboard of online public services (by the end of March 2018), FranceConnect Identity (Single-Sign-On system) for the unique identification of users (by 31 December 2020 at the latest), FranceConnect Platform: secure data exchange, a kit of development of online services.

[134] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

The Digital Society mission of the Digital Agency represents the citizenship component and, at the local level, the support of the territories ("digital appropriation by all"). It intervenes according to 3 axes:

1) Toolkit: e.g. the "Resources Platforms" provide information sites in physical centers; the "Laboratory" provides data (indicators, surveys ...) and services.

2) Structuring and animation: e.g. The MedNum (Digital Mediation): in the form of a cooperative, it brings together the State, communities and companies in the same legal framework (in France, there would exist between 5,000 and 10,000 Digital Public Spaces); Article 69 of the Digital Republic Act (the agency aggregates responses from local authorities that implement Master Plans for Digital Development of the Territory).

3) Speed up: e.g. the Digital Culture voucher. First launched in the Aquitaine region, it offers partial or total funding for digital support services offered to citizens. An experiment was launched with the Directorate General of Public Finances (pilot who trained 300 people): in the Tax Centers, help those who do not have digital skills, or even access to a computer / internet (right to training workshops).

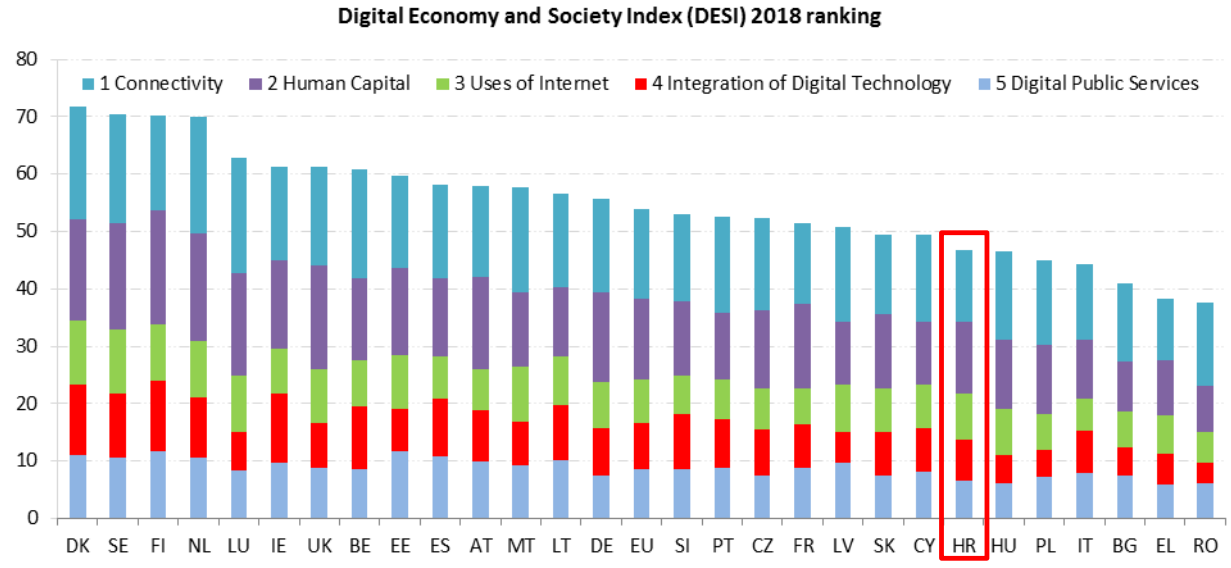
Actions in favor of digital administration are part of the policy of modernizing public services and of adapting them to the demands of their users.

Digital Economy and Society Index (DESI)[135] 2018 Country Report Croatia

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



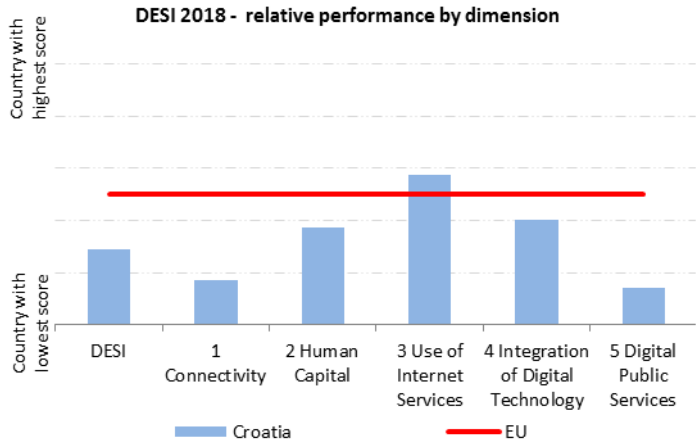
[135] https://ec.europa.eu/digital-single-market/en/desi

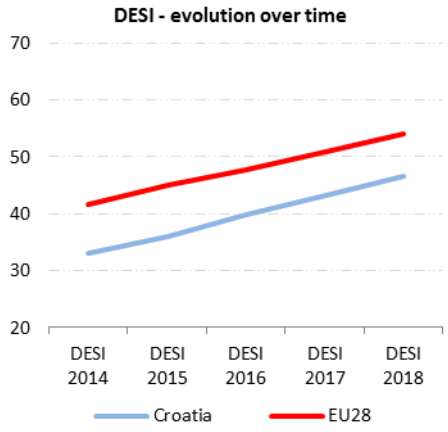
	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**46.7**	**43.5**	**54.0**
DESI 2017	23	43.2	40.4	50.8

Croatia ranks 22nd out of the 28 EU Member States. Overall, it made good progress over the last year. Croatian citizens are above average Internet users and also enterprises are keen to employ digital technologies. Croatia's greatest challenge in digital remains its low performance in connectivity (Rank 27). Rural broadband connectivity and fast broadband coverage are limited. Furthermore, prices for fixed broadband remain the highest in Europe. The incumbent (together with its subsidiaries) has a very high market share. In terms of eGovernment, Croatia is progressing slowly and remains on rank 25. The number of eGovernment users is above EU average but there has been no progress with the delivery of eGovernment services. Croatia performs well on Open Data eHealth Services. In order to reap the full benefits of the digital transformation, Croatia needs to improve its broadband infrastructure.

Croatia belongs to the Low-performing cluster of countries[136].

Following the September 2016 elections, the new Government was setting-up a Central Office for the Development of the Digital Society. Its mission comprises the support of the Croatian Government with regard to the development of ICT infrastructure and digital public services, and to popularise the development of the digital society to citizens, the economy and the public sector. Digital Strategies are currently being updated and to be released before the end of the year.





[136] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

1 Connectivity

1 Connectivity	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**27**	**49.4**	**55.0**	**62.6**
DESI 2017	27	44.2	50.1	58.5

	Croatia				EU
	DESI 2018			DESI 2017	DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**99%** 2017	↑	**12**	**97%** 2016	**18**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**70%** 2017	→	**19**	**70%** 2016	**17**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**73%** 2017	↑	**26**	**67%** 2016	**25**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**81** 2017	↑	**20**	**78** 2016	**15**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**67%** 2017	↑	**25**	**60%** 2016	**26**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**14%** 2017	↑	**25**	**7%** 2016	**25**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**34%** 2017		**26**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**1.4%** 2017	↑	**26**	**0.4%** 2016	**26**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**63** 2017	↑	**28**	**56** 2016	**28**	**87** 2017

Compared to 2017 Croatia didn't make significant progress in this area, while it improved its overall score. Regarding fixed broadband coverage of households (99 %), Croatia performs above the EU average (97 %) which is the category where the highest improvement over the last year was achieved. However, fast and ultrafast broadband coverage remain very weak. Broadband services are available throughout the country but the take-up of fast broadband is low (14 %) despite fairly wide availability (67 %). Different aspects can be seen as factors which contribute to the low take-up, including low internet use, and relatively high prices for (fast) broadband (Broadband Price Index of 63, EU average 87). In the past year, Croatia has retained or lost its rank in most of the connectivity subcategories with the exception of the fixed broadband and fast broadband coverage. The coverage of ultra-fast broadband of 100 Mbps and above is also low (34.1 %), and the take-up extremely low (1.4 %).

The Croatian market keeps its strong market presence of the incumbent, which controls more than 71% of the fixed market. The Croatian Competition Protection Agency has granted extension of the incumbent's control of Optima Telekom by 2021 and this decision will not help to improve the competitiveness of the sector.

National investment in broadband is improving but more focused regulation could be beneficial to increase the investments of alternative operators. Moreover, regulation could focus on alleviation of market imbalances to improve Croatia's position, having the worst

score in the Broadband price index. This may provide at least part of the explanation for low take-up rates across all technologies and speeds. It is noticeable that investments in ultrafast broadband infrastructure are much higher in 2017 comparing with the last 5 years with more than 70 announcements of new fibre access networks where most were made by the biggest alternative operator and the incumbent.

Croatia could focus more on its low connectivity in order to be able to achieve the Digital Agenda for Europe goals and in particular to reach fast broadband coverage of the entire population by broadband speeds of at least 30 Mbps. It would be beneficial to speed up the rollout of the approved EU-funded access and backhaul networks. In particular the latter seems to be blocked at the governmental level and Croatia is risking losing EU funds. In this context, alternative operators would benefit the most from the backhaul deployment. In general, Croatia could be more vigilant to ensure competition in the market. This would benefit the consumers and would stimulate investments in fast internet infrastructure and take-up of related retail products. If no action is taken, Croatia risks falling even more behind in the creation of a digital economy and society.

2 Human Capital

2 Human Capital	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**18**	**49.8**	**42.2**	**56.5**
DESI 2017	19	45.9	40.6	54.6

	Croatia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**NA**			**71%**	**22**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**NA**			**55%**	**13**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**3.3%**	↑	**17**	**2.7%**	**18**	**3.7%**
% individuals	2016			2015		2016
2b2 STEM Graduates[137]	**17.1**	↑	**16**	**15.7**	**20**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

In the Human Capital dimension, Croatia is making good progress. The number of ICT specialists increased from 2.7% to 3.3% and the share of graduates in Science, Technology and Mathematics (STEM) 1.7% of the 20-29 years old cohort went up as well.

A number of reforms have been prepared in the context of the Strategy for Education, Science and Technology and the associated curricular reform. However, progress in 2017 has been limited. The introduction of obligatory ICT classes in 5th and 6th grade in primary schools is now planned for 2018. Also in 2018, the Ministry of Science and Education plans to announce a call for schools which want to participate in the experimental stage of the curricular reform. Currently, 10 % of Croatian schools are taking part in the ESI Funds-supported e-Schools project designed to prepare strategic documents, plans and policies to systematically integrate ICT into activities of all primary and secondary schools by 2022. Schools participating in the project are being equipped with at least one ICT classroom and receive equipment including laptops, tablets, presentation equipment, and wired and wireless local area networks. In parallel, learning scenarios for ensuring creative ICT use and digital educational content are being developed. There is increasing demand for employees with ICT skills. The interest in STEM studies is slowly improving. It is planned to attract more students to STEM studies by increasing the number of scholarships.

Croatia is currently developing a strategy to address its digital skills challenges and is planning to set up a national coalition of relevant stakeholders, bridging the industry, education and employment worlds to further improve digital skills.

[137] The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.

3 Use of Internet Services

3 Use of Internet Services	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**11**	**54.1**	**41.0**	**50.5**
DESI 2017	14	50.2	38.7	47.5

	Croatia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News	**91%** →	**2**	**91%**	**2**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**85%**	**8**	**85%**	**8**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**17%**	**13**	**17%**	**13**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**63%** ↑	**4**	**45%**	**14**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**70%** ↑	**16**	**69%**	**14**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**50%** ↓	**20**	**53%**	**20**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**NA**		**45%**	**21**	**68%**
% individuals who used Internet in the last 12 months	2017		2016		2017

In terms of the propensity of individuals to use Internet services, Croatia continued to make good progress over the last year, and improved from rank 14 to rank 11. This continues to be the dimension where Croatia scores best and well above the EU average. Croatian Internet users read news online (91%, 2nd in Europe), listen to music, watch videos and play games online, watch films and make video calls over the Internet. They use social networks and online banking and use Internet for online shopping.

4 Integration of Digital Technology

4 Integration of Digital Technology	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**21**	**35.4**	**29.2**	**40.1**
DESI 2017	17	34.6	26.7	36.7

	Croatia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**26%**	↓	**23**	**29%**	**20**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**4.5%**	↓	**16**	**4.7%**	**11**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**16%**	↑	**18**	**15%**	**19**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**11.2%**	↑	**22**	**9.9%**	**22**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**21.7%**	↑	**8**	**15.7%**	**9**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**17.1%**	↓	**13**	**18.0%**	**11**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**8.7%**	↑	**18**	**8.3%**	**16**	**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**8.3%**	↓	**14**	**8.9%**	**13**	**8.4%**
% SMEs	2017			2015		2017

Over the last year, Croatia made slow progress in the dimension concerning the Integration of Digital Technology by businesses, but fell back from rank 17 to rank 21 because other countries were progressing faster. Croatian enterprises are above-average users of cloud technologies and they take advantage of the possibilities offered by online commerce: 17.1% of SMEs sell online (similar to the 17.2% EU average). eInvoices are slowly gaining popularity and there are 17% of enterprises with high levels of Digital Intensity (compared to 21.5% EU average, see Digital Scoreboard).

Croatia is preparing a comprehensive Strategy for the Digitisation of the Economy. This initiative is being prepared in joint collaboration between all relevant stakeholders, including universities and the academic community, the business sector, industry sector and the relevant central government bodies.

Three Croatian Digital Innovation Hubs have been selected to participate in a project to support the development of new Hubs in the 13 new EU Member States.

The Croatian Chamber of Commerce (HGK) project "HGK Digital Croatia Hub - DigiCro" is a consortium consisting of the HGK, technical universities and coworking organisations and it will provide expert support and specialised infrastructure to companies going through the process of digitisation. It will be the central point for the digitisation of SMEs and startups, experimenting with digital innovations including robotics, photonics, high-performance computing, cyber-physical systems, data analysis and data protection.

As digital technologies offer new ways to connect, collaborate and conduct business, they touch the core of all business functions and are challenging existing business models. In spite of the relative absence of national digitisation policies, Croatian companies are keen to employ digital technomogies. It would therefore be even more beneficial for the Croatian economy if Croatia's businesses could benefit from a targeted digitisation strategy.

Highlight 2018: High performance computing

Croatia signed the European declaration on high-performance computing on the 20th of November 2017. The Bura supercomputer at the University of Rijeka is the most powerful supercomputer in the Adriatic region. Named after the Croatian North Wind, it is used in biotechnological and biomedical research and is also available to institutions and companies from abroad. Bura was installed by Bull Atos and is a “green” computer according to testing performed by Green 500, placing it at the 175th position worldwide with 234 teraflops. As one of the leading players in the world of high-performance electric cars, Croatia based Rimac signed an agreement with the University of Rijeka at the beginning of December 2017 on using the super computer for finishing the development of the latest Concept Two electric car with 1384 HP and a top speed of around 400 km/h.

5 Digital Public Services

5 Digital Public Services	Croatia		Cluster	EU
	rank	score	score	score
DESI 2018	**25**	**44.4**	**48.0**	**57.5**
DESI 2017	25	41.4	44.2	53.7

	Croatia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[138] % internet users needing to submit forms	**66%** → 2017	**13**	**66%** 2016	**12**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**20** → 2017	**25**	**20** 2016	**24**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**62** ↑ 2017	**27**	**61** 2016	**27**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**61** → 2017	**26**	**61** 2016	**25**	**83** 2017
5a5 Open Data % of maximum score	**76%** ↑ 2017	**13**	**60%** 2016	**13**	**73%** 2017
5b1 eHealth Services % individuals	**22%** 2017	**10**	**NA**		**18%**

In terms of eGovernment, Croatia is progressing and it remains on rank 25 in DESI 2018. The number of eGovernment users is with 66% of internet users needing to submit forms above EU average. However, there has been no progress with the delivery of services and services for businesses. In terms of Open Data, Croatia continued to make considerable progress over the last year and it still scores slightly above European average. As to eHealth Services, Croatia is performing well and ranks 10th amongst EU Member States when it comes to people who used health and care services provided online without having to go to the hospital or doctors surgery (for example, by getting a prescription or a consultation online).

The platform eCitizen, launched in 2014, offered 43 different eServices in 2017 and continues to develop and integrate new features. More than 1.5 million citizens have an electronic IDcard with an identification and signature certificate. Since October 2017 Croatia implements the "Once only principle". The Strategy for eCroatia 2020 and its Action Plan, as well as the eGovernment and government digitisation plan (May 2017) are aimed at supporting positive developments in this policy area, including interoperable government systems and services to reduce bureaucracy. An important feature is the establishment of a *Shared Service Centre in the Cloud* which would coordinate and manage all ICT applications by various governmental institutions (2300 targeted public bodies to be included in the project). Croatia plans to develop further e-applications for citizens. The eBusiness tool for companies is not yet being implemented. From 28 February 2016 onwards, the reception and processing of electronic invoices (eInvoices) for all central contracting authorities and

[138] The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

entities was mandatory. New legislation on eInvoicing in public procurement has been prepared and is in legislative procedure.

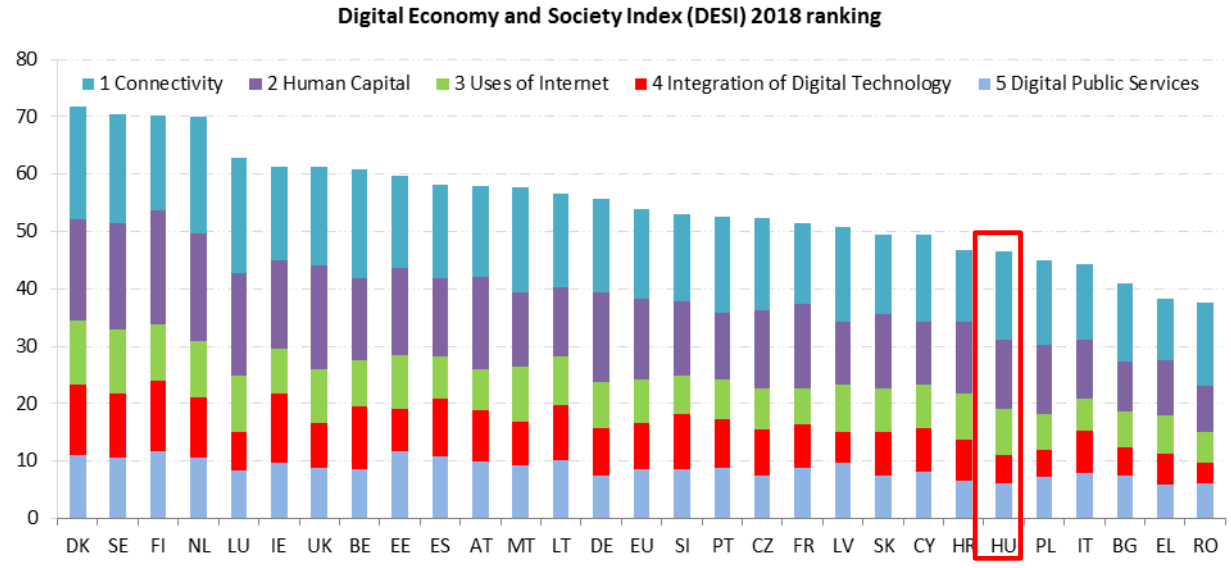
Croatia is performing well when it comes to eHealth services. The Central Health Care Information System in Croatia (CEZIH) with more than 17,000 users and a large number of information systems makes a good basis for informatisation of the entire health care system in Croatia. All general practice/family medicine offices, paediatric offices, gynaecological offices, dentist offices, pharmacies, primary health care laboratories, school medicine offices (153), out-of-hospital specialist-consiliary health care (approx. 800) and information systems of the Croatian Institute for Health Insurance are connected to CEZIH. All of the listed participants in the system send data into the central database in real time, and receive advanced reports on operation of the health care system from that database. Croatia introduced ePrescription in January 2011. E-referral and telemedicine services, i.e. medical services provided from a distance through information and communication technologies, are currently provided at several levels of the healthcare system.

Digital Economy and Society Index (DESI)[139] 2018 Country Report Hungary

The DESI report tracks the progress made by Member States in terms of their digitisation. It is structured around five chapters:

1 Connectivity	Fixed broadband, mobile broadband and prices
2 Human Capital	Internet use, basic and advanced digital skills
3 Use of Internet Services	Citizens' use of content, communication and online transactions
4 Integration of Digital Technology	Business digitisation and e-commerce
5 Digital Public Services	eGovernment and eHealth

The DESI was re-calculated for the previous years for all countries to reflect slight changes in the choice of indicators and corrections to the underlying indicator data. As a result, country scores and rankings may have changed from the previous publication. For further information please consult the DESI methodological note at https://ec.europa.eu/digital-single-market/en/desi.



[139] https://ec.europa.eu/digital-single-market/en/desi

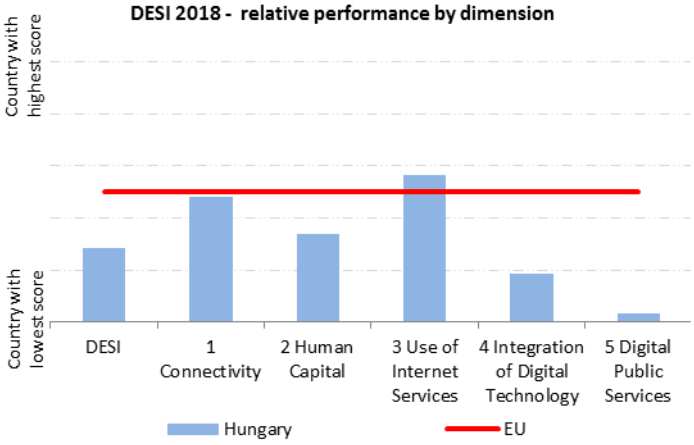
	Hungary		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**46.5**	**43.5**	**54.0**
DESI 2017	22	44.2	40.4	50.8

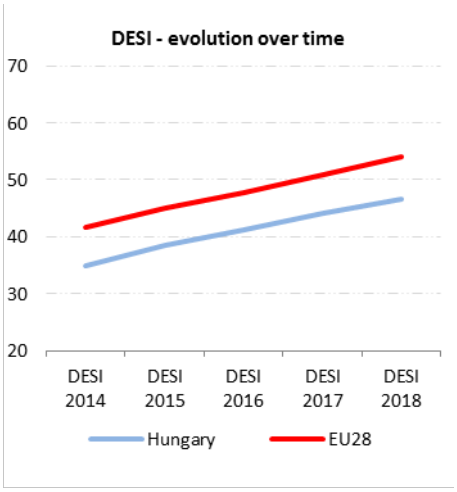
Hungary ranks 23rd out of the 28 EU Member States. Overall, it progressed at an average pace over the last few years.

Hungary performs well on Connectivity, thanks to the wide availability and the high take-up of fast and ultrafast broadband. Hungary scores below the average on human capital, since half of the population does not have basic digital skills, and there is a low number of STEM (science, technology and mathematics) graduates. Although the use of ICTs by businesses and e-commerce has improved, Hungarian companies are still far from fully exploiting the opportunities offered by digital technology. The improvement of digital skills is also vital to enhance the integration of digital technologies within enterprises. As for Digital Public Services including eHealth, the situation has somewhat improved, but Hungary still ranks 27th, scoring below the EU average in all aspects.

Hungary belongs to the Low performing cluster of countries.[140]

In 2014, Hungary adopted its National Info-communication Strategy 2014-2020[141]. The implementation of the strategy started in 2014, and it was confirmed with the adoption of the Digital Success Programme (DJP) at the end of 2015, and the DJP 2.0 in 2016, which defines several strategies and a large number of actions in all the key areas of ICT.





[140] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

[141] http://www.kormany.hu/hu/nemzeti-fejlesztesi-miniszterium/infokommunikacioert-felelos-allamtitkarsag/hirek/infokommunikacios-akciotervet-fogadott-el-a-kormanyf

1 Connectivity

1 Connectivity	Hungary		Cluster	EU
	rank	score	score	score
DESI 2018	**18**	**61.7**	**55.0**	**62.6**
DESI 2017	18	57.7	50.1	58.5

	Hungary					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**95%** 2017	→	**22**	**95%** 2016	**22**	**97%** 2017
1a2 Fixed Broadband Take-up % households	**78%** 2017	↑	**10**	**72%** 2016	**11**	**75%** 2017
1b1 4G Coverage % households (average of operators)	**91%** 2017	↓	**18**	**92%** 2016	**12**	**91%** 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**49** 2017	↑	**28**	**43** 2016	**28**	**90** 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**82%** 2017	↑	**17**	**81%** 2016	**16**	**80%** 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**49%** 2017	↑	**10**	**40%** 2016	**10**	**33%** 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**74%** 2017		**13**	**NA**		**58%** 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**29.8%** 2017	↑	**7**	**21.8%** 2016	**7**	**15.4%** 2017
1e1 Broadband Price Index Score (0 to 100)	**85** 2017	↑	**18**	**82** 2016	**19**	**87** 2017

On Connectivity, Hungary scores slightly below the EU average, and ranks 18th, the same position as last year (as measured in line with DESI 2018 methodology). Although fixed broadband coverage remained at 95 % of homes, fast broadband coverage increased slightly in 2017 to 82 % from 81 % in 2016. In Hungary, there is very strong platform-based competition, which is best illustrated by the fact that two of the three local incumbent telephony operators belong to cable operators. There was significant progress in the take-up of fixed broadband (growth to 78% from 72%), which surpasses the EU average (of 75%). Nearly half (49%) of homes subscribe to at least 30 Mbps, as opposed to the EU average of 33%. In addition, Hungary scores well above the average on ultrafast connectivity mainly as a result of its widespread cable networks: coverage stands at 74 % (58 % in the EU) and take-up at 29.8 % (15.4 % in the EU) In contrast, mobile broadband coverage is not increasing and mobile broadband take-up is the lowest in the EU (49 subscription per 100 people compared with 90 in the EU). This may be due to the fact that prices for mobile phone users are persistently among the highest ones in Europe. At the same time, the fixed broadband price index is close to the EU average.

The development of digital infrastructure is one of the pillars of Hungary's 2014-2020 National Info-communication strategy. This strategy was updated at the end of 2015 with the adoption of the Digital Success Programme and the launch of the Superfast Internet Programme. The Superfast Internet Programme aims to cover the whole country with NGA

networks of at least 30 Mbps by the end of 2018. The programme started in 2016 with a mapping exercise to identify areas in which telecom operators are expected to make the full investment on their own. For areas that are not economically viable, a EUR 250 million State aid scheme has been developed to ensure broadband roll-out. The programme is co-funded by the European Structural Funds and by the Hungarian State, except for Budapest and its suburban area, for which only domestic resources will be used. The vast majority of projects under the Superfast Internet Programme will deploy FTTH technology, enabling speeds in line with the gigabit society targets.

To boost demand, the government has launched two initiatives directly affecting retail prices. First, a preferential VAT rate (18 % as opposed to the general rate of 27 %) has applied to broadband subscriptions since January 2017. Second, a 'digital welfare basic tariff' trademark has been created. This targets non-users by offering them a basic broadband package (fixed or mobile) at a 10-15% price discount.

In June 2017, the 5G Coalition (5GC), initiated by the Digital Success Programme, was formed with the aim of making Hungary a major European centre of 5G developments and taking a leading role in the region in testing 5G-based applications. Hungary intends to be among the first countries in the world introduce 5G. The 5GC consists of domestic and multinational companies, universities and academia, professional organisations, chambers, ministries and government institutions.

While the above initiatives targeting both fixed and mobile markets as well as both demand and supply aim to further increase the coverage and take-up of broadband in Hungary, their effects may be mitigated by the fact that the telecommunication sector in Hungary was subject to extensive taxation and various levies in recent years that may limit the capabilities of telecom operators to invest, and that price competition in mobile broadband appears to be mitigated. Predictability of investment and competitive conditions could have been supported in recent years by a more timely review of wholesale market regulation.

2 Human Capital

2 Human Capital	Hungary rank	Hungary score	Cluster score	EU score
DESI 2018	**21**	**48.0**	**42.2**	**56.5**
DESI 2017	18	49.2	40.6	54.6

	Hungary DESI 2018 value		Hungary DESI 2018 rank	Hungary DESI 2017 value	Hungary DESI 2017 rank	EU DESI 2018 value
2a1 Internet Users	**76%**	↓	**20**	**78%**	**15**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**50%**	↓	**21**	**51%**	**18**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**3.6%**	→	**14**	**3.6%**	**13**	**3.7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[142]	**12.6**	↑	**27**	**12.2**	**27**	**19.1**
Per 1000 individuals (aged 20-29)	2016			2014		2015

On Human Capital, Hungary ranks 21th among EU countries below the EU average and progressed at a relatively slow pace last year. The number of internet users stands at 76 %, compared with 81% in the EU. Only 50% of the population has at least basic digital skills, which is not improving. There is large skills gap: only 21 % people aged 55 and above (34% in the EU) and only 25 % of people with low education (30 % in the EU) has at least basic digital skills. As for advanced skills, on ICT specialists Hungary is just below the EU average, and the number of STEM (Science, technology and Mathematics) remained relatively low despite a slight increase.

The Digital Success Programme 2.0 (DJP 2.0) includes both the already ongoing programme elements of the former strategy and the planned new ones. Its key priorities include the digitisation of education, the development of digital competences among adults above the age of 45, small enterprises and micro businesses as well as public servants. Obtaining digital competences is one of the three pillars of the strategy and ensuring the preparedness of citizens and the workforce to meet the challenges of the digital age remains important. The Digital Success Programme 2.0 – on the basis of a comprehensive view on the issue of lack of digital skills - provides a plethora of solutions and actions that are necessary to bridge the digital gap in Hungary.

Hungary continued the implementation of the "National Infocommunication Strategy", concentrating mainly on the basic digital skills of the working age population[143] and the promotion of the use of e-government services. Based on the experiences gained so far, elderly citizens and citizens with a low level of digital skills have mostly been interested in the trainings. These initiatives to increase general digital literacy are continued to be

[142]The most recent data has been used in DESI 2018. It may refer to 2016 or 2015 depending on the Member State. This is reflected in the 2018 DESI ranking. Historical data has been updated by Eurostat.
[143] See: Decreasing Digital Skills Gap (EDIOP 6.1.2)

underpinned by a growing, country-wide network of Community Internet Access Points with the aim of providing the necessary basic IT infrastructure and professional support.

The shortage of ICT professionals is being addressed by a specific programme that aims at increasing the number of university and college graduates with IT qualifications as well as improving the quality of their skills. The programme also builds on the cooperation between training institutions and ICT companies and is supported by promotional activities. The goal of the initiative is to double the number of IT graduates by 2021.

The National Digital Jobs Coalition also takes part in the implementation of the Digital Labour Force Programme and Hungary also participates in the EU Code Week initiative.

The ambitions of the digital competences related parts of the Digital Success Programme 2.0 remain high. The implementation of the different projects is in progress and there is a clear interest from citizens in taking part in the trainings offered. The government expects further results from the remaining stages of the ongoing programmes as well as from the upcoming new ones. Despite the updated comprehensive strategic policy framework and timely implementation of several programme elements, the tangible increase of the level of digital competences is yet to be achieved.

Highlight 2018: Program Your Future!

This programme aims at increasing the number of graduated students in ICT and improving the cooperation between the educational institutions and the ICT sector. In Hungary, there are 22 000 unfilled vacancies in ICT. The project has a budget of 8.2 billion HUF (EUR 26.4 million), and is co-financed by the EU.

The project is built along the following pillars

- Develop a knowledge base supporting the renewal of IT education
- Develop co-operation between training institutions and ICT businesses (teaching pool, internship program and training packages)
- Increasing the socio-economic recognition and popularity of IT professions (orientation events in secondary schools)
- Implementation of communication activities (national media campaign)
- Create three Demonstration and Experience Centres.

3 Use of Internet Services

3 Use of Internet Services	Hungary		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**53.6**	**41.0**	**50.5**
DESI 2017	12	51.7	38.7	47.5

	Hungary					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
3a1 News % individuals who used Internet in the last 3 months	**85%** ↓ 2017		**10**	**88%** 2016	**6**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**81%** 2016		**12**	**81%** 2016	**12**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**8%** 2016		**24**	**8%** 2016	**24**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**59%** ↑ 2017		**6**	**54%** 2016	**7**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**84%** ↑ 2017		**2**	**83%** 2016	**1**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**49%** ↑ 2017		**22**	**44%** 2016	**22**	**61%** 2017
3c2 Shopping % individuals who used Internet in the last 12 months	**49%** ↑ 2017		**20**	**48%** 2016	**20**	**68%** 2017

In general, Hungarian internet users engage in a broad range of activities online. Hungary scores above the EU average in the Use of Internet Services dimension of the DESI. 84 % use social networks, which is the second highest in the EU, 85 % read news (72 % in the EU), and 59 % make video calls (46 % in the EU). Hungary ranks first on the use of social media.

Nevertheless, the uptake of transactional services online remains low: only 49% use eBanking and e-commerce, as opposed to 61% and 68% respectively in the EU.

4 Integration of Digital Technology

4 Integration of Digital Technology	Hungary		Cluster	EU
	rank	score	score	score
DESI 2018	**25**	**25.1**	**29.2**	**40.1**
DESI 2017	24	23.5	26.7	36.7

	Hungary					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**14%**	↓	**28**	**16%**	**27**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**2.8%**	↓	**23**	**3.9%**	**16**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**15%**	↑	**22**	**13%**	**21**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**8.4%**	↑	**26**	**8.1%**	**25**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**10.7%**	↑	**22**	**8.0%**	**23**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**12.5%**	↑	**20**	**11.7%**	**20**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**10.0%**	↑	**14**	**7.6%**	**18**	**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**5.2%**	↑	**24**	**4.5%**	**23**	**8.4%**
% SMEs	2017			2015		2017

On the Integration of Digital Technology by businesses, Hungary's ranks 25th, well below the EU average. Hungary has an alarmingly low share of enterprises sharing information electronically (14 % compared with 34 % in the EU). Although, the use of social media, eInvoices and cloud services all grew, Hungary did not manage to close the gap with the EU. The same applies to e-commerce, as only 12.5 % of SMEs sell online, which is slightly higher than a year ago, but still below the EU average of 17.2 %.

The Digital Success Programme 2.0 (DJP 2.0) aims at increasing the digital preparedness of micro-enterprises and SMEs as well as defining digital strategies for the different sectors of the economy (such as agriculture and tourism) in 2018. In the Modern Businesses Programme - focusing on awareness-raising activities and helping businesses becoming digital, more than 6.000 company audits were conducted and 128 events organised by November 2017. In addition, in the Support of Business Digital Developments project more than one thousand SMEs received grants and loan financing to carry out investment in ICT developments.

The government is planning to continue and extend its programmes to digitise companies, which is absolutely vital to improve the competitiveness of the Hungarian economy.

5 Digital Public Services

5 Digital Public Services	Hungary		Cluster	EU
	rank	score	score	score
DESI 2018	**27**	**40.4**	**48.0**	**57.5**
DESI 2017	28	33.6	44.2	53.7

	Hungary				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[144] % internet users needing to submit forms	**45%** ↑ 2017	**24**	**38%** 2016	**26**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**28** ↑ 2017	**23**	**23** 2016	**23**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**75** ↑ 2017	**25**	**63** 2016	**25**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**73** ↑ 2017	**24**	**68** 2016	**23**	**83** 2017
5a5 Open Data % of maximum score	**48%** ↑ 2017	**26**	**43%** 2016	**23**	**73%** 2017
5b1 eHealth Services % individuals	**7%** 2017	**26**	**NA**		**18%**

In Hungary, Digital Public Services remain one of the most challenging areas of the digital economy and society. Hungary ranks 23rd on the re-use of information across administrations to make life easier for citizens (Pre-filled Forms) and 25th on the sophistication of services (Online Service Completion). eGovernment users stood at 45 % in 2017 (EU average: 58 %). As for open data, Hungary went up by 5 percentage points, but did not manage to close the gap with the EU. At the same time, the use of electronic health services was low as of March 2017.

In 2017, the Central Governmental Service Bus (KKSzB) was launched. It aims to ensure a service-oriented and standardised connection between the base registries and the different specific public administration information systems, which can contribute to increasing the pre-filling of forms. In January 2018, the Municipality ASP system at the local government level was extended to cover 93 % of the Hungarian municipalities. As for the user side, the former Java based forms (ÁNYK) are gradually being replaced by the application of user-friendly online forms. In addition, the new customisable electronic administration user interface (SZÜF) was launched in January 2018, which will be the new single point of contact portal. According to the E-Administration act, all public administration bodies providing eGovernment services are obliged to publish their services on the SZÜF portal. Also in January 2018, a new digital post service for businesses (Cégkapu) was launched.

The impact of all these developments and the forthcoming user-facing improvements are to be evaluated during the next eGovernment benchmarking process.

144 The definition of this indicator has been changed. The new indicator measures eGovernment users as a percentage of those internet users needing to submit forms to the public administration.

As for eHealth, a new nationwide eHealth platform (EESZT) was launched in November 2017. All pharmacies, general practitioners and public inpatient and outpatient health care providers are now obliged to use the platform. This platform manages also ePrescriptions.