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COMMISSION STAFF WORKING DOCUMENT

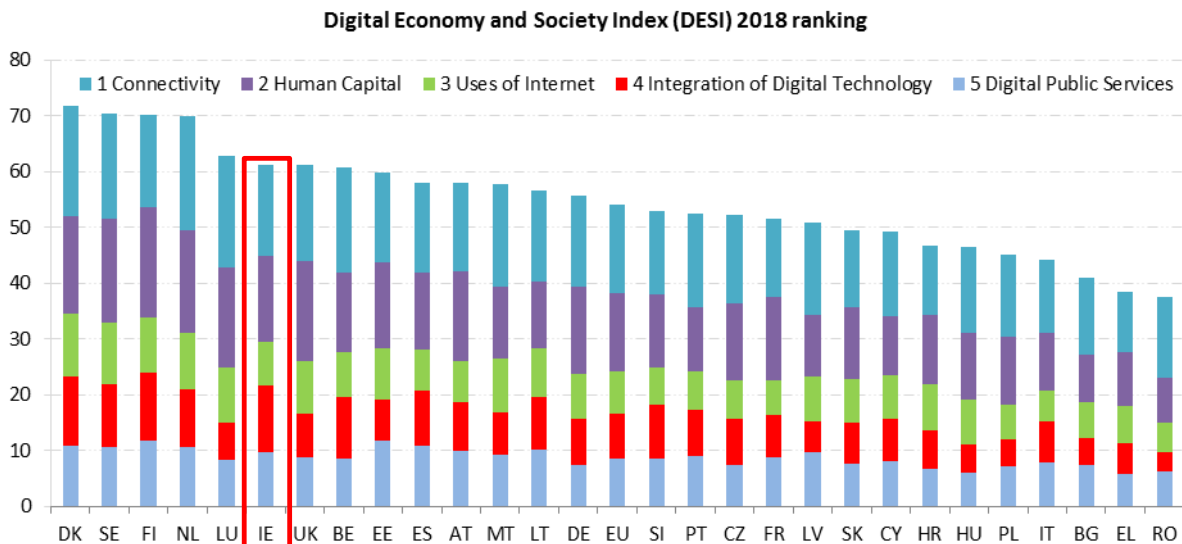**Digital Economy and Society Index (DESI) 2018**

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

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 eCommerce
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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Ireland		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**61.3**	**64.0**	**54.0**
DESI 2017	9	56.3	61.2	50.8

In DESI 2018 Ireland ranks 6th place, up three places from DESI 2017. Whilst outstanding in some areas (with top rankings in Science, Technology, Engineering and Mathematics (STEM) graduates, the use of online trading by SMEs and Open Data), it lags well behind in others. With more than half of the adult population lacking at least basic digital skills, Ireland continues to suffer from ICT skills shortages. Access to fast broadband has improved, but 6 % of rural homes still do not have access to even basic fixed broadband and ultrafast broadband coverage remains below the EU average. In Digital Public Services, Ireland ranks top for Open Data and is in second place for business services. However, it ranks comparatively low when it comes to the user-friendliness of services and the use of eHealth services. Addressing the gaps in Human Capital and Connectivity would help improve Ireland's positioning in the remaining dimensions. These two aspects are also critical for individuals, enterprises and public bodies to make the best use of digital technology.

Ireland belongs to the high-performing cluster of countries.[2]

Over the past year, the new government has continued to implement earlier enterprise and skills strategies, including specific digital strategies. In addition, it unveiled its long-term policy on STEM education3 and a new eGovernment strategy.[4] It has also published a comprehensive plan for public investments (National Development Plan 2018-20275), which reflects the challenges and opportunities of digital transformation.
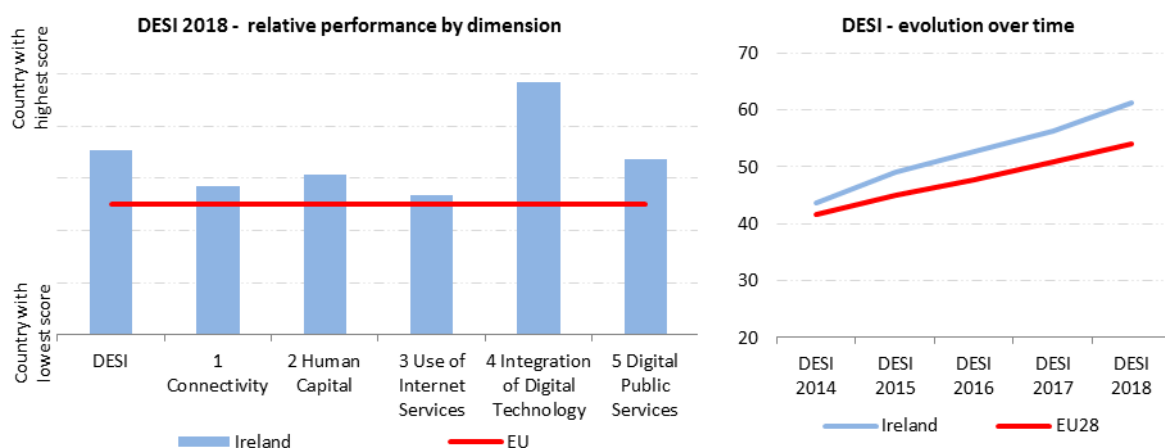
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[2] High-performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.

[3] https://www.education.ie/en/The-Education-System/STEM-Education-Policy/

[4] http://egovstrategy.gov.ie/

[5] http://www.per.gov.ie/en/national-development-plan-2018-2027/

1 Connectivity

1 Connectivity	Ireland		Cluster	EU
	rank	score	score	score
DESI 2018	**11**	**65.1**	**71.9**	**62.6**
DESI 2017	15	59.7	67.9	58.5

	Ireland				EU
	DESI 2018		DESI 2017		DESI 2018
	Value	rank	value	rank	value
1a1 Fixed Broadband Coverage	97% ↑	19	96%	19	97%
% households	2017		2016		2017
1a2 Fixed Broadband Take-up	74% ↑	13	69%	18	75%
% households	2017		2016		2017
1b1 4G Coverage	92% →	17	92%	13	91%
% households (average of operators)	2017		2016		2017
1b2 Mobile Broadband Take-up	104 ↑	7	96	7	90
Subscriptions per 100 people	2017		2016		2017
1c1 Fast Broadband (NGA) Coverage	89% ↑	10	82%	12	80%
% households covered by VDSL, FTTP or Docsis 3.0	2017		2016		2017
1c2 Fast Broadband Take-up	51% ↑	8	41%	9	33%
% homes subscribing to >= 30Mbps	2017		2016		2017
1d1 Ultrafast Broadband Coverage	53%	22	NA		58%
% households covered by FTTP or Docsis 3.0	2017				2017
1d2 Ultrafast Broadband Take-up	17.6% ↑	12	14.2%	11	15.4%
% homes subscribing to >= 100Mbps	2017		2016		2017
1e1 Broadband Price Index	77 ↑	21	72	22	87
Score (0 to 100)	2017		2016		2017

Ireland has considerably improved its performance in the Connectivity dimension, now ranking 11th among EU countries (compared to 15th in 2017, measured in line with the revised 2018 methodology). By contrast, 6 % of rural homes still have no access to any fixed broadband connection and at 74 % of households, take-up of fixed broadband is below the EU average, and fixed broadband is relatively expensive compared with most other EU countries. 4G coverage is slightly above the EU average, at 92 %, while take-up of mobile broadband is 104 %, well above the EU average of 90 %. Coverage of fast broadband (NGA) has increased to 89 %, well above the EU average (80 %), as has take-up (51 %, above the EU average of 33 %). At the same time, a key challenge remains to cover the more remote, sparsely populated areas, where the 'digital divide' remains significant.

The 2015 National Broadband Plan (NBP) Intervention Strategy provides for a minimum download of 30 Mbps and a minimum upload of 6 Mbps to be delivered to all premises with a mix of private and public intervention. Public intervention is eligible for EUR 75 million under the European Regional Development Fund (ERDF) programme for 2016-2020. A gap-funding investment model has been chosen, whereby the winning bidder will provide a wholesale service. The contract aims to build a wholesale open access network for fixed locations as swiftly as possible, to be operated over a 25-year term. Where feasible, re-use

of existing infrastructure is encouraged. New infrastructure built by the winning bidder shall be owned by that bidder from the outset.

National Broadband Plan (NBP) procurement encountered a number of difficulties during the reporting period with regard to the remaining intervention area. In April 2017, the intervention area was reduced by removing about 300 000 households that were to be supplied by Eir on market terms. In September 2017, SIRO announced its withdrawal from the National Broadband Plan tender process. In January 2018, Eir announced its withdrawal from the National Broadband Plan, but remained committed to the deployment of high speed broadband to the 300 000 premises in question. The procurement continued in 2018, with the remaining bidding consortium comprising Enet, SSE, Granahan McCourt and John Laing plc. About 540 000 premises are to be covered by this public intervention.

In 2016, the Irish Government established a Mobile Phone and Broadband Taskforce to coordinate activities across government departments to promote the roll-out of fixed and mobile networks. In 2017, it designated individual Broadband Officers in each of the local government areas, to be a single point of contact within the local authorities and to help prepare for the roll-out of the National Broadband Plan. However, Ireland did not amend its building construction rules to transpose the in-house wiring requirements of the Cost Reduction Directive. This may make it difficult to establish connections, even if the network is rolled out to the premises.

Since the National Broadband Plan encountered significant difficulties during the reporting period, the window is narrowing to adjust the scheme to achieve the objectives of the Plan on schedule. Given the 30 Mbit target of the Plan, and the fact that ultrafast coverage was at 53 %, below the EU average of 58 %, ensuring future-proof ultrafast coverage remains a key challenge.

Moreover, finalising the significantly delayed analysis of the relevant wholesale broadband access markets, and addressing shortcomings in the institutional setup preventing the national regulator ComReg from directly imposing fines on operators for violations of national telecommunications law would improve overall regulatory governance.

2 Human Capital

2 Human Capital	Ireland		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**61.7**	**70.7**	**56.5**
DESI 2017	12	56.0	69.4	54.6

	Ireland					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
2a1 Internet Users	79%	→	17	79%	12	81%
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	48%	↑	23	44%	24	57%
% individuals	2017			2016		2017
2b1 ICT Specialists	3.9%	↑	10	3.7%	10	3.7%
% individuals	2016			2015		2016
2b2 STEM Graduates[6]	31.5	↑	1	24.7	1	19.1
Per 1000 individuals (aged 20-29)	2015 or 2016			2014		2015

Ireland further strengthened its leading position in relation to the proportion of STEM (Science, Technology, Engineering and Mathematics) graduates. This pulls Ireland to the top 10 for the human capital dimension. However, only 48 % of individuals have at least basic digital skills. Despite a 4 percentage point improvement over the last year, this is still one of the lowest levels in the entire EU. Ireland also fell significantly behind other EU countries with regard to the number of people actively using the internet. This is the same as last year (79 %). However, because of progress made in other EU countries, it puts Ireland in 17th place in the rankings.

Ireland continues to suffer from significant skills shortages. Since 2012 the proportion of enterprises who tried to recruit ICT specialists, but experienced difficulties, has consistently remained above 50 %. ICT skills shortages are also confirmed by a recent analysis of vacancies by the competent national authority.[7] The proportion of ICT specialists in the overall workforce is slightly above the EU average, but far below the leading EU country (Finland, with 6.6 %).

To achieve its ambition of becoming the global leader in ICT skills, the new government continues to give high priority to the promotion of STEM education in general and ICT in particular. In November 2017, it unveiled the STEM Education Policy Statement and Implementation Plan for Schools. This is a comprehensive policy, which aims to strengthen the teaching of STEM (including computer science and coding) in all schools and universities and to encourage the uptake of these subjects among young people. This overall goal is also

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[6] 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.

[7] http://www.skillsireland.ie/Publications/2017/Vacancy%20Overview%202016.pdf

reflected in recent horizontal Action Plans for Education.[8] The introduction of Computer Science as a secondary school Leaving Certificate subject is planned for 2018.

Besides aiming to increase the number of highly qualified ICT and STEM graduates, education policy initiatives also aim to ensure that all students acquire sufficient digital skills to equip them for an increasingly digital world. Concrete actions are identified, such as including coding in the mathematics and general school curriculum. In addition, students are to be helped from an early age to hone key general skills, like problem-solving, creativity or communication, to help them successfully navigate technological changes irrespective of their future career. There are also ongoing efforts to integrate digital technology into everyday teaching. The Digital Framework announced in September 2017 will give teachers practical support with this, and funds are being made available to schools for the purchase of digital equipment.

Finally, the National Development Plan 2018-2027 envisages making significant investments in technological universities.

Evidence-based policy-making continues to be at the heart of educational initiatives relevant for digital skills. The Expert Group for Future Skills Needs is doing a comprehensive study to assess the impact of digitisation on job roles and sectors across the economy. It is also reviewing the ICT Skills Action Plan 2014-2018, a key initiative to address ICT skills shortages through education, and forecasting demand for ICT skills in the coming years. This work will serve as a basis for a new action plan. Following a closer analysis of the demand for such skills, new types of ICT apprenticeships are also being developed in the framework of the publicly supported comprehensive apprenticeship scheme.

Policy initiatives focusing on educational activities are likely to lead to progress over time. However, such initiatives do not cover adults who have left the educational system, but nevertheless need at least basic digital skills to keep up with the technological changes which increasingly permeate their work and lives. In particular, the flagship reskilling programme (Springboard+) focuses only on advanced ICT skills. At the other end of the spectrum, funding is made available for only introductory digital literacy courses across Ireland, targeting people who have never used the internet (including the elderly). Overall, the courses have received positive feedback from participants.[9]

Despite the clear commitment from successive Irish governments to digital skills, it remains a challenge to ensure that a significant proportion of the adult population is not left behind in a fast-moving digital economy and society because they lack adequate digital skills. This is of course a general challenge not only affecting Ireland. However, the overall low level of digital skills suggests that the challenge may be relatively more difficult to overcome in Ireland.

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[8] Action Plan for Education 2017 (https://www.education.ie/en/Publications/Corporate-Reports/Strategy-Statement/Action-Plan-for-Education-2017.pdf) and 2018 (https://www.education.ie/en/Publications/Corporate-Reports/Strategy-Statement/action-plan-for-education-2018.pdf).

[9] *'Getting Citizens Online'* programme: https://www.dccae.gov.ie/en-ie/communications/topics/Digital-Strategy/getting-citizens-online/Pages/Citizens-and-Training.aspx

3 Use of Internet Services

3 Use of Internet Services	Ireland		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**52.3**	**63.4**	**50.5**
DESI 2017	16	47.8	60.5	47.5

	Ireland				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
3a1 News	**65%** ↑	**25**	**49%**	**28**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**73%**	**22**	**73%**	**22**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**24%**	**10**	**24%**	**10**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**48%** ↑	**16**	**42%**	**17**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**72%** ↑	**12**	**70%**	**13**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**71%** ↑	**12**	**64%**	**12**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**64%** ↓	**14**	**71%**	**9**	**68%**
% internet users (last year)	2017		2016		2017

The use of online services in Ireland has remained broadly comparable to the EU average. Despite a significant increase in the proportion of internet users who read news online, it still remains one of the lowest in Europe. Internet users are making increased use of video calls, social media and online banking, but the appetite for online shopping seems to have decreased over the past year.

4 Integration of Digital Technology

4 Integration of Digital Technology	Ireland		Cluster	EU
	Rank	score	score	score
DESI 2018	**3**	**60.0**	**47.0**	**40.1**
DESI 2017	2	55.7	44.0	36.7

	Ireland					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**28%**	↑	19	**25%**	21	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**4.7%**	↑	14	**4.0%**	13	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**36%**	→	4	**36%**	3	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**15%**	15	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**NA**			**24.2%**	5	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**30%**	→	1	**30%**	1	**17%**
% SMEs	2017			2016		2017
4b2 eCommerce Turnover	**23%**	↑	1	**22%**	1	**10%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**17%**	↑	1	**16%**	1	**8%**
% SMEs	2017			2015		2017

In Integration of Digital Technology Ireland is still in the top three countries thanks to its top ranking for all three indicators measuring the use of online commerce by SMEs. Social media also continues to be more widely used by companies than in most other EU countries.

In line with the long-term vision set out in the *Enterprise 2025* strategy in 2015, the National Development Plan 2018-2027 confirms the government`s continued focus on innovation and the knowledge-based economy, with the tech sector featuring prominently.

In the same spirit, the government continued its comprehensive support programme for start-ups, investing EUR 30 million during 2017. ICT start-ups continue to be promising targets for the programme and Deep Tech was singled out as one of the two priority areas for investments in 2018. According to research by Startup Europe Partnership, in 2017 Ireland ranked 8th among the top 20 European ICT scale-up ecosystems overall, based on the number of scale-ups and capital raised.[10] It is within the top 5 if the size of the economy and population is taken into account.

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[10] Start-up Europe Partnership, SEP Monitor, June 2017.

According to the IDA, the agency promoting FDI in the country, Ireland is home to 16 of the world's top 20 software companies.[11] Nevertheless, public intervention is needed to help indigenous firms, in particular SMEs, to make the most of technology.

To this end, Technology and Research Centres are being set up across the country. Technology Centres focus on close-to-market activities. Whilst benefiting from public and private funding, they are established and run by industry. They offer access to research, know-how and technology which their client firms could not obtain themselves. Around half of these centres focus directly on digital technology. In 2017, a new centre was established specialising in advanced manufacturing technologies, including Industry 4.0, Collaborative Robotics, Industrial IoT, Data Analytics and Cybersecurity. Research Centres, overseen by Science Foundation Ireland, focus on collaboration between higher education institutions and industry. They complement the work carried out in Technology Centres. For example, several institutions participate in a Research Centre dedicated to advanced smart manufacturing.

The government also announced, as part of the National Development Plan 2018-2027, the establishment of a EUR 500 million Disruptive Technologies Innovation Fund. Besides offering direct support to enterprises and start-ups in the coming years, the fund will also be used to drive further cooperation between research institutions and industry. As also announced in the Plan, Ireland is planning to join the European High-Performance Computing (HPC) initiative and it is also planning to invest in national HPC facilities.

Ireland recognises the need to facilitate the uptake of digital technology by indigenous enterprises, especially SMEs. Efforts are being made to incentivise and facilitate both the supply and adoption of digital technology. Some of these are relatively recent and still being developed. It is therefore too early to gauge their full impact, in particular on the diffusion of technology among indigenous companies and any resulting gains in competitiveness and productivity. It is also important to note that connectivity and human capital is crucial for the effective utilisation of digital technology, so any efforts to improve on these two dimensions are bound to have positive spillover effects on the integration of digital technology by enterprises.

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[11] https://www.idaireland.com/invest-in-ireland

5 Digital Public Services

5 Digital Public Services	Ireland		Cluster	EU
	rank	score	score	score
DESI 2018	**10**	**64.7**	**63.0**	**57.5**
DESI 2017	9	60.6	60.2	53.7

	Ireland				EU
	DESI 2018		DESI 2017		DESI 2018
	Value	rank	value	rank	value
5a1 eGovernment Users[12] % internet users needing to submit forms	**77%** ↑ 2017	9	71% 2016	9	58% 2017
5a2 Pre-filled Forms Score (0 to 100)	**39** ↑ 2017	18	35 2016	18	53 2017
5a3 Online Service Completion Score (0 to 100)	**88** ↓ 2017	12	89 2016	10	84 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**99** ↑ 2017	2	97 2016	3	83 2017
5a5 Open Data % of maximum score	**96%** ↑ 2017	1	80% 2016	3	73% 2017
5b1 eHealth Services % individuals	**11%** 2017	21	NA		18%

Ireland ranks 10th in Digital Public Services, with no significant change in its rankings. It ranks top in Open Data and has an almost perfect result in digital public services for businesses. When it comes to services aimed at and used by citizens, the results are less impressive. Ireland ranks particularly low in the use of eHealth services for example.

In July 2017, a new eGovernment strategy was unveiled covering the period until 2020. The strategy recognises the need to ensure that people have the skills to make the most of digital public services. This is important in view of the low levels of basic digital skills among the wider population. In the meantime, whilst embracing the *'digital by default'* principle, services will also be available in other ways and assistance to use digital services will be provided if needed. There are plans to improve the services provided to private citizens by offering a one-stop shop login for all services (the *'Digital Service Gateway'*). Also, users would not have to provide the same information several times: information should be reusable for different purposes within the limits of data protection rules. Since Ireland ranks quite low for the DESI indicator most relevant in this context (pre-filled forms), this would be a positive development.

The government also appointed a Minister of State for eGovernment, which should help to drive implementation and the eGovernment agenda in general.

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[12] 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.

Ireland has had a comprehensive eHealth strategy in place since 2013 and eHealth was confirmed as an investment priority in the National Development Plan 2018-2027.

The weak points of the supply and use of digital public services seem to be well recognised and action is planned to tackle these. Central to the effective use of digital public services are the digital skills of the population and connectivity. Any effective measures to improve on these dimensions in general would be beneficial for the use of digital public services.

Highlight 2018: Open Data Portal[13]

Despite commencing its Open Data Initiative as recently as 2014, Ireland is now best in the class in Europe. This is confirmed by its top DESI ranking, based on a comprehensive set of indicators. The portal contains over 6 000 datasets organised into 14 categories covering a wide range of topics. It is user-friendly and has a showcase page which demonstrates how Open Data can be used, as well as visualisations of data.
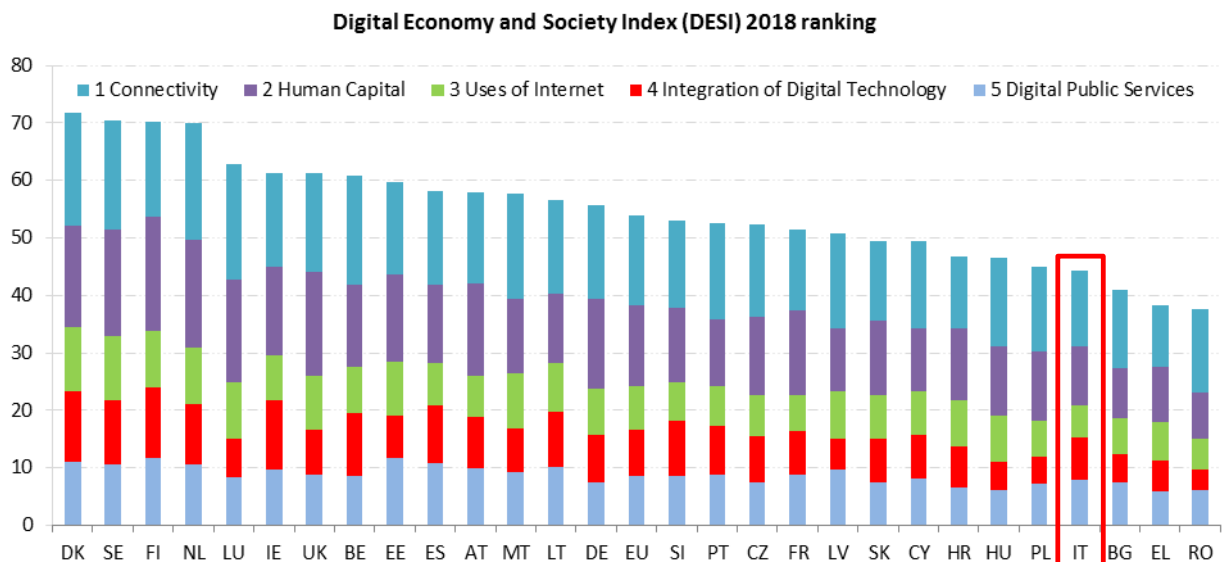
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[13] https://data.gov.ie/

Digital Economy and Society Index (DESI)[14] 2018 Country Report Italy

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Italy		**Cluster**	**EU**
	rank	score	score	score
DESI 2018	**25**	**44.3**	**43.5**	**54.0**
DESI 2017	25	41.4	40.4	50.8

Italy ranks 25th out of the 28 Member States. It made progress in general over the last year, and its DESI ranking remained unchanged. Integration of Digital Techologies and Digital Public Services are the main drivers of digital progress in Italy. Another positive aspect is its performance on next generation access (NGA) coverage, which is much improved (from 23rd in 2016 to 13th in 2017). As in previous years, the main challenge is still the low level of digital skills, for which the Italian government has taken some (but not enough) steps. This has a negative impact on the performance of DESI indicators across all five dimensions: take-up of broadband, internet users, take-up of online services, SMEs selling online and eGovernment users.

Italy belongs to the **Low-performing** cluster of countries[15].

Italy adopted the national Digital Agenda Strategy 2014-2020[16] and the National Ultrabroadband Strategy[17] in March 2015
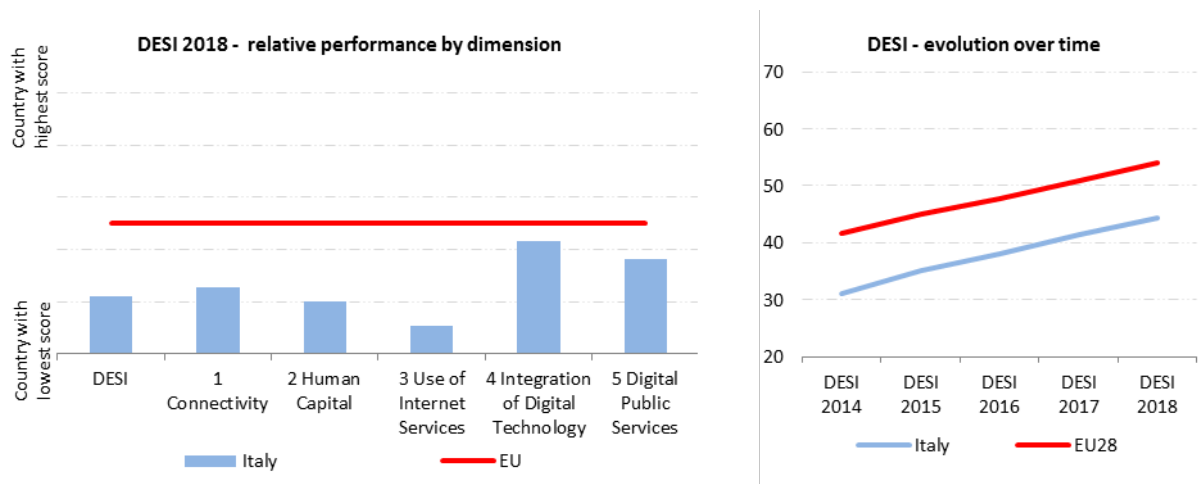
DESI 2018 - relative performance by dimension

DESI - evolution over time

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

[16] Strategia per la crescita digitale 2014-2020. http://www.agid.gov.it/notizie/2015/03/24/approvati-i-piani-nazionali-la-banda-ultralarga-crescita-digitale

[17] Strategia Nazionale per la Banda Ultralarga http://www.infratelitalia.it/wp-content/uploads/2015/03/Strategy.pdf

1 Connectivity

1 Connectivity	Italy		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**52.8**	**55.0**	**62.6**
DESI 2017	25	49.8	50.1	58.5

	Italy				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage % households	99% → 2017	10	99% 2016	11	97% 2017
1a2 Fixed Broadband Take-up % households	57% ↑ 2017	28	55% 2016	28	75% 2017
1b1 4G Coverage % households (average of operators)	89% ↑ 2017	20	86% 2016	19	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	86 ↑ 2017	17	85 2016	11	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	87% ↑ 2017	13	72% 2016	23	80% 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30 Mbps	12% ↑ 2017	26	7% 2016	26	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	22% 2017	27	NA		58% 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100 Mbps	4.8% ↑ 2017	25	1.1% 2016	25	15.4% 2017
1e1 Broadband Price Index Score (0 to 100)	87 ↓ 2017	15	90 2016	7	87 2017

With an overall connectivity score of 52.8, Italy ranks 26th among EU countries, dropping one place compared with 2017. While fixed coverage remained stable with a value of 99 % — slightly above the EU average (97 %) — Italy continued to significantly increase its fast broadband (NGA) coverage (from 72 % to 87 %), outstripping the EU average (80 %). On ultrafast (100 Mbps and above) broadband, Italy still lags behind (only 22 % compared to a EU average of 58 %) and ranks near the bottom (27th). On take-up, mobile broadband take-up (86 subscriptions per 100 people) is slightly below the EU average (90). While fixed broadband take-up increased slightly, Italy still lags behind here and ranks 28th among EU countries. Moreover, whereas NGA networks are comparatively new in much of the country and the rate of fast broadband subscriptions showed a marked increase last year (up from 7 % in 2016 to 12 % in 2017), take-up of fast internet remains low in absolute and comparative terms, with Italy still ranked 26th in the EU.

In 2017, the National Ultra Broadband Strategy entered the implementation phase[18]. The first two tenders were awarded to Open Fiber (first contract signed in June 2017, second contract in November 2017)[19] and the first building sites were opened in December 2017. Preparatory activities for the launch of the third and final tender for the regions of Sardinia, Apulia and Calabria were carried out at the end of 2017: in particular, a new public consultation on the investment plans for deploying ultrafast broadband in white areas in these three regions was launched in October 2017 to assess the areas where public intervention is still necessary. The third tender should be launched in the first few months of 2018. In August 2017, the Interministerial Economic Planning Committee (CIPE) completed the allocation of resources for the Ultrafast Broadband Plan, devoting an additional EUR 1.3 billion from the Fund for Development and Cohesion ('Fondo Sviluppo e Coesione'). The total amount of resources allocated adds up to EUR 3.6 billion, which will be used to implement phase two of the Ultrafast Broadband Plan. This phase provides for infrastructure intervention in grey areas and vouchers to stimulate demand.

Thanks to an increasing level of infrastructure-based competition and a combination of private and public investments, Italy is greatly improving the level of fibre-based NGA roll-out in line with the goals of the Commission's Digital Agenda. This has also generated a positive effect on the demand side; it is increasing in parallel, albeit at a slower pace. On Multi Operator Vectoring (MOV), a technical committee of operators backed by the regulator AGCOM drew up the guidelines for technical MOV characteristics in June 2015. Telecom Italia and operators wishing to adopt vectoring transmission systems must comply with these, as established in a regulatory measure of 2015[20]. While trials continued on the basis of the 2015 measure, no MOV business model has been launched yet.

On the other hand, the national antitrust authority suspects that several factors — including delaying tactics by the incumbent operator — have produced a negative impact on the process of implementing the National Ultrafast Broadband Strategy.

On implementation of the Broadband Cost Reduction Directive, Italy was the first Member State to fully transpose the legislation. However, the single information point was not yet fully operational in 2017[21]. The ongoing issues related to the delays in local authorisation/permit granting are expected to be resolved by means of preliminary community agreements.

Italy is a pioneer in 5G mobile technology thanks to the 5G testing initiatives launched by both the government and the operators privately in a number of cities. In particular, the

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[18] See last year's telecoms country chapter for a more detailed description of the Italian Ultrafast Broadband plan and strategy: https://ec.europa.eu/digital-single-market/en/news/europes-digital-progress-report-2017-country-profiles-telecom-country-reports.

[19] The infrastructure interventions envisaged in the first and second contracts involve the regions of Veneto, Tuscany, Molise, Emilia Romagna, Abruzzo and Valle d'Aosta, Umbria, Sicily, Autonomous Province of Trento, Piedmont, Marche, Liguria, Lazio, Friuli Venezia Giulia, Campania and Basilicata for a total of 6 743 municipalities and more than 13 million nationals.

[20] AGCOM Decision No. 623/15/CONS Article 20.

[21] According to the information provided by the Italian authorities, the single information point is currently undergoing a field trial test with 10 operators and is expected to be fully operational by the end of the first quarter of 2018.

government's '5G in 5 Cities' plan assigned 100 MHz in the 3.6-3.8 GHz spectrum band in September 2017[22].

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[22] The winning bidders will start to test infrastructure and services in the metropolitan cities of Milan, Prato, L'Aquila, Bari and Matera in 2018. See http://bandaultralarga.italia.it/en/5g-5-italian-cities-approved-the-best-projects/.

2 Human Capital

2 Human Capital	Italy		Cluster	EU
	rank	score	score	score
DESI 2018	**25**	**40.8**	**42.2**	**56.5**
DESI 2017	24	39.7	40.6	54.6

	Italy DESI 2018			Italy DESI 2017		EU DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**69 %**	↑	**25**	**67 %**	**25**	**81 %**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**NA**			**44 %**	**25**	**57 %**
% individuals	2017			2016		2017
2b1 ICT Specialists	**2.6 %**	↑	**22**	**2.5 %**	**20**	**3.7 %**
% individuals	2016			2015		2016
2b2 STEM Graduates[23]	**13.5**	↓	**22**	**13.9**	**24**	**19.1**
Per 1 000 individuals (aged 20-29)	2015			2014		2015

On the Human Capital dimension, Italy dropped one place, further slipping towards the bottom of the ranking. The percentage of internet users has remained stable both in absolute terms (with a small increase) and in terms of ranking. The number of ICT specialists slightly increased from 2.5 % to 2.6 % while the share of graduates in Science, Technology, Engineering and Mathematics (STEM) decreased to 1.3 % in the 20-29 year-old age group(1.4 % the previous year).

In 2018, a new provision in the Budget Law will introduce tax credits for incremental expenditure on training for topics related to Industry 4.0 ('Lavoro 4.0'), which may help address existing gaps in the digital skills of the labour force. The 'Crescere in digitale' programme completed its cycle in 2017. The programme addressed young people not in education, employment or training (NEETs) and was also financed in part by private partners and the European Social Fund. It provided an initial course in digital skills followed by a paid traineeship in an enterprise to help it digitalise its operations (e.g. by creating a website). In its 2 years of existence, the programme helped train 105 000 young people in more than 6 500 enterprises. More recently, as part of the Digital School National Plan ('Piano Nazionale Scuola Digitale'), the Ministry of Education has forged partnerships with many industrial partners to offer traineeships on Industry 4.0 topics for young people in high school in order to combine school and work experience ('Piano Alternanza Scuola-Lavoro'). As part of of the Digital School National Plan, initiatives launched in previous years have reached a significant size: for example, 1.3 million students and 50 000 teachers have participated in coding lessons.

At the end of 2017, the Prime Minister's Office — Department of Public Administration launched a project to strengthen the basic digital skills of civil servants and disseminate a common vision on the issues of digital citizenship ('Competenze digitali per la PA'). By using

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[23] 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.

a dedicated online assessment platform, the competence gap of civil servants in the digital domain will be identified so that it can be addressed through individual elearning courses.

Italy still does not have a comprehensive digital skills strategy. This has a negative impact on parts of the population such as the elderly and inactive people, who are not targeted by other existing digital skills policies.

3 Use of Internet Services

3 Use of Internet Services	Italy		Cluster	EU
	rank	**score**	**score**	**score**
DESI 2018	**27**	**37.4**	**41.0**	**50.5**
DESI 2017	27	36.1	38.7	47.5

	Italy				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	**rank**	**value**	**rank**	**value**
3a1 News	**56 %** ↓	**28**	**60 %**	**26**	**72 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**79 %**	**14**	**79 %**	**14**	**78 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**15 %**	**14**	**15 %**	**14**	**21 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**39 %** ↑	**25**	**34 %**	**23**	**46 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**61 %** ↑	**23**	**60 %**	**22**	**65 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**43 %** ↑	**23**	**42 %**	**23**	**61 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**44 %** ↑	**25**	**41 %**	**25**	**68 %**
% individuals who used Internet in the last 12 months	2017		2016		2017

Italy has failed to make progress on internet use and remains second to last. Use of online services like eShopping, eBanking and social networks has slightly increased. Italians read less news online than the EU average, probably as a result of the increasing use of paid services by news publishers. The use of telephone or video calls has increased, although slower than the EU average.

4 Integration of Digital Technology

4 Integration of Digital Technology	Italy		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**36.8**	**29.2**	**40.1**
DESI 2017	19	33.0	26.7	36.7

	Italy				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	37 % ↑ 2017	13	36 % 2015	14	34 % 2017
4a2 RFID % enterprises	5.2 % ↑ 2017	11	4.6 % 2014	12	4.2 % 2017
4a3 Social Media % enterprises	17 % ↑ 2017	16	16 % 2016	18	21 % 2017
4a4 eInvoices % enterprises	NA → 2017		30.3 % 2016	5	NA 2017
4a5 Cloud % enterprises	NA → 2017		11.5 % 2016	17	NA 2017
4b1 SMEs Selling Online % SMEs	7.9 % ↑ 2017	25	7.4 % 2016	26	17.2 % 2017
4b2 E-commerce Turnover % SME turnover	5.8 % ↓ 2017	24	6.4 % 2016	21	10.3 % 2017
4b3 Selling Online Cross-border % SMEs	6.2 % ↑ 2017	22	5.2 % 2015	22	8.4 % 2017

Over the last year, Italy made some progress on the Integration of Digital Technology dimension, but fell from 19th to 20th as other countries made faster progress. Italian enterprises are above-average users (and are making progress in terms of ranking) of eBusiness solutions like Electronic Information Sharing and radio-frequency identification (RFID). However, the picture is mixed on e-commerce. While there has been an increase in the percentage of SMEs selling online (including cross-border), the revenue from e-commerce sales has dropped.

Italy has launched a comprehensive Industry 4.0 strategy. This is now called 'Piano Impresa 4.0' to better reflect the scope of the initiative, which is not limited to manufacturing. The tax deductions for Industry 4.0-related investments in instrumental goods, software, machinery and industrial equipment have been extended until the end of 2018. 18 Digital Innovation Hubs have been created so far, mostly in collaboration with Confindustria, the Italian employers' association. These hubs constitute the main access point for companies to the world of Industry 4.0 by providing them with services to introduce advanced digital technologies and access the innovation ecosystem at regional, national and European level. They are mostly situated in northern Italy, although there is a digital innovation hub in most Italian regions. The Italian government adopted a new law in June 2017 to define the fiscal obligations for intermediaries, including digital platforms. The law requires intermediaries (even foreign ones) to withhold the tax on rental income (together with any applicable local tourist taxes). It will help to reduce the administrative burden on law-abiding landlords related to tax obligations, therefore increasing the supply of sharing economy services.

There is still one key element missing from the Italian Industry 4.0 strategy — 'Competence Centres', which will be launched during the course of 2018. These centres are supposed to be innovation poles that are built around public private partnerships made up of universities, research centres and companies. Their objective is to provide tech transfer and training services to SMEs in particular, encourage experimentation of new technologies and testbeds for industrial research projects and increase the competences of the workforce. Once all elements of the Industry 4.0 strategy are up and running, it is likely that the digitisation process of Italian SMEs will speed up.

5 Digital Public Services

5 Digital Public Services	Italy		Cluster	EU
	rank	score	score	score
DESI 2018	**19**	**52.5**	**48.0**	**57.5**
DESI 2017	19	47.0	44.2	53.7

	Italy				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
5a1 eGovernment Users[24] % internet users needing to submit forms	**30 %** 2017	**28**	**NA** 2016		**58 %** 2017
5a2 Pre-filled Forms Score (0 to 100)	**33** → 2017	**21**	**33** 2016	**19**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**87** ↑ 2017	**14**	**84** 2016	**16**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**81** → 2017	**19**	**81** 2016	**15**	**83** 2017
5a5 Open Data % of maximum score	**81 %** ↑ 2017	**8**	**52 %** 2016	**19**	**73 %** 2017
5b1 eHealth Services % individuals	**24 %** 2017	**8**	**NA**		**18 %**

On eGovernment, Italy is making slow progress and still occupies 19th place. In terms of open data, Italy has made remarkable progress. The country jumped 11 places, propelling it above the EU average. Availability of eGovernment services (i.e. Onlne Service Completion) is above average, although the services for businesses are slightly less developed than average. Italy performed worst in the category of eGovernment users, ranking last in this among EU countries. This is even lower than the ranking registered for the use of other online services, which could signal issues of usability of public services. On the use of eHealth Services, Italy is performing well and ranks 8th among EU countries.

In May 2017, the Italian government published the new triennial strategy for information technology in public administration. This strategy aims to accelerate the implementation of main eGovernment initiatives that are overdue, in particular the local population registries ('Anagrafe Nazionale Popolazione Residente') and the eIdentity system in compliance with the EiDAS Regulation ('Sistema Pubblico di Identità Digitale'). The latter will certainly benefit from the planned adoption by private service providers (e.g. banks), which will accelerate take-up by the public (there are currently only 2.2 million eIDs[25], well below the target of 10 million users by the end of 2017). The certification of attribute providers, i.e. institutions that can add qualifications (e.g. professional register) to the citizen's eID, initially planned for 2017 will probably start during the course of 2018. 16 Italian regions (out of 21) have

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[24] 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.

[25] Data from Italian Digital Agenda Dashboard, retrieved 02/03/2018, https://avanzamentodigitale.italia.it/it.

currently adopted the electronic health record (although only a minority of them for all health services) and 11 are ready for interoperability.

The Digital Transformation Team, appointed by the previous government to coordinate the digitisation efforts of public administration, has introduced modern and lean management methods. These have helped speed up the implementation of major projects. Now that the mandate of the team is coming to an end, the challenge for the Italian government is to apply and scale up lessons learned with this experience.

Highlight 2018: Designers Italia and Developers Italia

Designers Italia and Developers Italia are two projects — launched in June 2017 by the Agency for Digital Italy and the Digital Transformation Team — that form part of the same strategy to strengthen the role of the general public in developing public services.

Designers Italia calls upon service designers, both inside and outside public administration, to strengthen the role of design thinking when planning digital public services. The aim is to design services driven by users' needs.

Developers Italia is a community dedicated to developing open source software for Italian digital public services. Designers Italia seeks to collaborate with service designers to: (1) include people's points of view when designing and choosing technologies for public digital services; (2) understand users' needs across a range of situations and moods in which they live while interacting with public administration; (3) help people understand the new digital tools; and (4) give them ways to help them familiarise themselves with the changes. The Developers Italia community is helping create the new digital infrastructure. Both projects aim to make technology simpler and design services focused on people's needs.
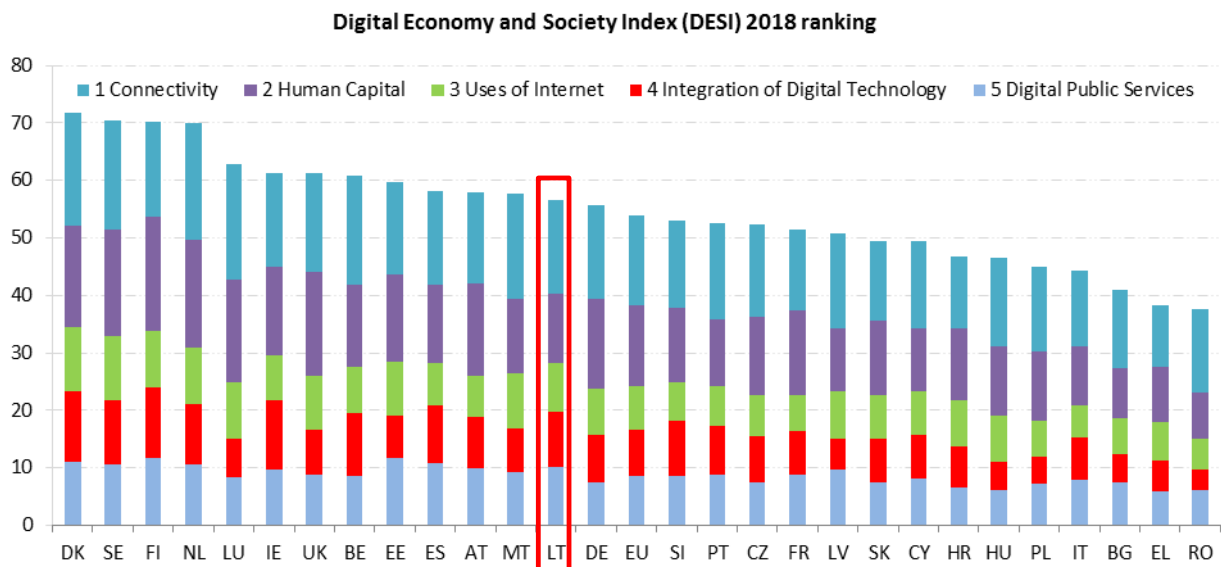
Digital Economy and Society Index (DESI)[26] 2018 Country Report Lithuania

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.

Digital Economy and Society Index (DESI) 2018 ranking

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

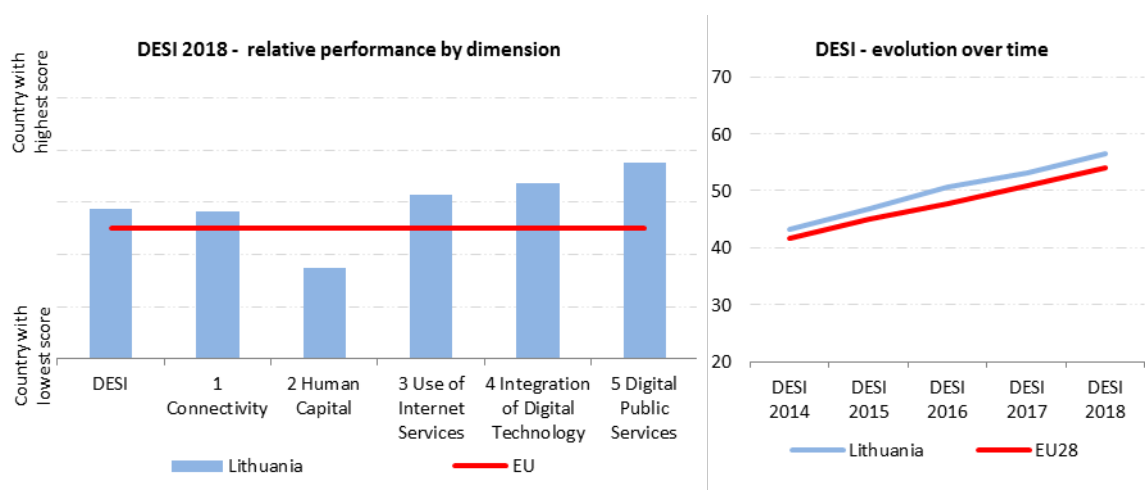| | Lithuania | | Cluster | EU |
	rank	score	score	score
DESI 2018	**13**	**56.6**	**54.7**	**54.0**
DESI 2017	13	53.2	51.5	50.8

Lithuania ranks 13th out of the 28 EU Member States in the Digital and Society Index (DESI) 2018. Lithuania's DESI score is above the EU average and the country has progressed at the same pace as the EU over the last year. Lithuania performs particularly well in terms of Connectivity and the Integration of Digital Technology, where it has gone up one and three places, respectively, in the ranking. Lithuania has improved in Human Capital as well, but it is still below the EU average. This is largely due to the constant drop in the proportion of STEM graduates and the persisting low proportion of ICT specialists as a fraction of employed individuals, although a positive trend in the latter has been seen in the last couple of years.

Lithuanian internet users are very active online in using new services over mobile, e.g. payment instruments, mobile e-signature, car parking, banking services, etc.

As concerns Digital Public Services, Lithuania is slightly below the EU average but has significantly improved compared to last year, and is making continuous progress towards increasing its uptake of eGovernment services.

Lithuania belongs to the Medium performing cluster of countries.[27]

The Information Society Development Programme 2014–2020 Digital Agenda strategy for Lithuania, which replaced the former Lithuanian Information Society Development Programme 2011–2019, was adopted in March 2014 and amended in September 2017.[28]

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[27] The Medium performing countries are: Latvia, Czech Republic, Slovenia, France, Portugal, Spain, Lithuania, Malta, Germany and Austria.
[28] https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/a66c0760b04011e3bf53dc70cf7669d9/lfFeuvqYOP P.

1 Connectivity

1 Connectivity	Lithuania		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**64.8**	**62.4**	**62.6**
DESI 2017	13	61.4	58.8	58.5

	Lithuania					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	**96 %**	→	**20**	**96 %**	**20**	**97 %**
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	**65 %**	↑	**23**	**63 %**	**22**	**75 %**
% households	2017			2016		2017
1b1 4G Coverage	**98 %**	↑	**8**	**96 %**	**5**	**91 %**
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	**78**	↑	**23**	**75**	**19**	**90**
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	**82 %**	↑	**18**	**81 %**	**14**	**80 %**
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast broadband take-up	**45 %**	↑	**11**	**39 %**	**11**	**33 %**
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultrafast Broadband Coverage	**82 %**		**10**	**NA**		**58 %**
% households covered by FTTP or Docsis 3.0	2017					2017
1d2 Ultrafast Broadband take-up	**27.1 %**	↑	**8**	**11.8 %**	**13**	**15.4 %**
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband price index	**94**	↑	**3**	**92**	**5**	**87**
Score (0 to 100)	2017			2016		2017

Lithuania made good progress over the past year and performs relatively well in terms of fast broadband (NGA) coverage, though a significant digital divide with rural areas remains. Ultrafast broadband coverage is significantly higher in Lithuania than in the EU as a whole. Moreover, Lithuania has improved its performance in terms of pricing competitiveness compared to last year, and the value of its broadband price index is getting close to 100. Although the country is still performing below the EU average in the take-up of fixed broadband, subscriptions to fast broadband are increasing. Demand for these services is almost double the EU average and demonstrates year-on-year growth.

Lithuania has one of the highest levels of 4G coverage, and performs well above the EU average. Even though mobile broadband take-up has slightly improved, Lithuania still lags behind the EU average.

The national broadband plan was implemented in 2017 with the preparation of an investment project for the deployment of NGA networks in "white" areas. The NGA network deployment project in rural areas (PRIP-2) was also implemented in 2017. The network equipment has been installed, and the fibre-optic infrastructure has been designed and is currently under construction. Public consultations with all stakeholders, including network operators, regarding the planned project development of Next Generation Access Infrastructure took

place during the preparation of the investment project. Public consultations included questions on the areas in which infrastructure was planned to be built, technological solutions and service tariffs.

Moreover, it was agreed that 5G technologies will be taken into consideration during the process of detecting non-covered areas and choosing the most appropriate technologies. As a result, sustainable investments in NGA infrastructure are ongoing, with an estimated cost of around EUR 43 million.

In light of the above, Lithuania's efforts to increase public investment in fibre networks in addition to private investment in order to develop the next generation of access infrastructure in white areas are expected to further materialise. Moreover, demand-side measures might be necessary to support fixed and mobile broadband take-up and use of the internet.

Concerns about the national regulator (RRT) having insufficient administrative capacity, expressed by Lithuanian market players, remained. Moreover, according to some market players, Lithuania's legislation might not fully ensure the independence of the national regulatory body. The Commission is looking into the matter.

Lithuania has not yet developed a strategy on the usage of the 700 MHz band and sub-700 MHz band, which is key for future 5G rollout, due to restrictions stemming from cross-border coordination issues with non-EU countries.

2 Human Capital

2 Human Capital	Lithuania		Cluster	EU
	rank	score	score	score
DESI 2018	**19**	**48.5**	**58.6**	**56.5**
DESI 2017	20	45.7	56.5	54.6

	Lithuania					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**75 %**	↑	21	72 %	21	81 %
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**55 %**	↑	16	52 %	17	57 %
% individuals	2017			2016		2017
2b1 ICT Specialists	**2.5 %**	↑	23	2.1 %	26	3.7 %
% individuals	2016			2015		2016
2b2 STEM Graduates[29]	**18.0**	↓	13	19.3	11	19.1
Per 1000 individuals (aged 20-29)	2015 or 2016			2014		2015

In the area of Human Capital, Lithuania is below the EU average but has made good progress over the last year and has moved up one position; it now ranks 19th in the EU. Lithuania has improved at a slightly faster rate that the EU average. The proportion of regular internet users is below the EU average but has seen a significant increase compared to last year. Barely half of Lithuanians have at least basic digital skills, which is close to the EU average. On the positive side, the number of Lithuanians who have never used the internet has decreased from 21.8 % to 19.3 %. Although this level is still significantly worse than the EU average, Lithuania is on the right track thanks to initiatives like 'discover yourself' implemented by the Lithuanian Labour Exchange, which aims to teach more than 35 000 unemployed young people who are not currently studying basic computer skills. To decrease the digital divide, there are currently 1200 public internet access points in public libraries, providing free training and consultations to local community members on digital skills. The proportion of ICT specialists as a percentage of employed individuals is still among the lowest in the EU but has shown a significant increase compared to last year. There are also numerous initiatives by private businesses providing free 'fast track to it' training;[30] they are also helping address the lack of ICT professionals. However, even though Lithuania has a relatively high proportion of STEM graduates, the number has been steadily decreasing since 2013.

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[29] The most recent data has bee n 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.
[30] e.g. 'Infobalt Tech City Academy', Telia IT Academy, Barclays Academy of Technologies.

The Digital Agenda Strategy for Lithuania acknowledges the high number of skilled citizens leaving the country to be employed abroad and sets out a number of measures that support digital transformation by increasing investment in human capital, particularly improving the quality of teaching, the labour market relevance of education, and the employability of low-skilled people, and promoting adult and work-based learning. One of its main objectives is to encourage more young people to choose ICT and other sciences to study and as a profession.

To bring the value of international education to the Lithuanian labour market, programmes such as 'Talents for Lithuania' try to encourage top Lithuanian graduates of foreign universities to come to Lithuania for paid professional internships at leading companies operating in the country.[31]

The timely implementation of the Digital Agenda strategy will help increase the digital skills of the general population and close the competencies gap in the Lithuanian labour market.

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[31] http://lithuanianleaders.org/projects/talents-for-lithuania/.

3 Use of Internet Services

3 Use of Internet	Lithuania		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**56.8**	**48.3**	**50.5**
DESI 2017	9	55.6	45.0	47.5

	Lithuania				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**93 %** →	**1**	**93 %**	**1**	**72 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**77 %**	**18**	**77 %**	**18**	**78 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**11 %**	**21**	**11 %**	**21**	**21 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**71 %** ↑	**2**	**69 %**	**3**	**46 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**69 %** ↑	**19**	**68 %**	**16**	**65 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**72 %** ↓	**9**	**73 %**	**8**	**61 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**49 %** ↑	**21**	**44 %**	**23**	**68 %**
% internet users (last year)	2017		2016		2017

In terms of the propensity of individuals to use internet services, Lithuania has made progress and continues to be above the EU average. Lithuanian internet users are once again the leading consumers of online news content in the EU and in 2nd place for interaction via Video Calls made over the internet. They are comparable with or above the EU average in terms of use of most other internet services, such as social networks, music, videos and games. Although the number of internet users who buy online is still well below the EU average, there has been a 5 % increase and Lithuania jumped two places forward in the ranking compared to the previous year. There has been no progress in terms of use of Video-on-Demand and, although use of online banking is still above the EU average, it has been falling in recent years.

4 Integration of Digital Technology

4 Integration of Digital Technology	Lithuania		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**47.5**	**42.1**	**40.1**
DESI 2017	8	44.1	38.5	36.7

	Lithuania					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**47 %**	↑	**3**	**40 %**	**8**	**34 %**
% enterprises	2017			2015		2017
4a2 RFID	**4.3 %**	↓	**18**	**6.4 %**	**4**	**4.2 %**
% enterprises	2017			2014		2017
4a3 Social Media	**20 %**	↑	**14**	**19 %**	**13**	**21 %**
% enterprises	2017			2016		2017
4a4 eInvoices	**23.6 %**	↓	**8**	**24.4 %**	**8**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**16.6 %**	↑	**12**	**12.6 %**	**13**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**21.9 %**	↑	**7**	**18.4 %**	**9**	**17.2 %**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**11.8 %**	↓	**8**	**12.2 %**	**6**	**10.3 %**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**12.4 %**	↑	**3**	**9.7 %**	**9**	**8.4 %**
% SMEs	2017			2015		2017

Even though Lithuania has moved down one position in the ranking in this area, it continues to perform well above the EU average in Integration of Digital Technology by businesses, is slowly progressing and showing a steady continuous increase. Lithuanian enterprises keep taking advantage of the opportunities offered by various digital technologies. While a couple of indicators have suffered a slight decline, there has been significant increase in others. This improvement is most evident in the number of companies sharing electronic information, which has gone up 7 %, jumping from the 8th to the 3rd positon in the ranking, and the number of enterprises selling online across borders, for which Lithuania has moved from the 9th positon last year to the top three in the EU this year.

In May 2017, the Lithuanian government approved the establishment of a national Industrial Competitiveness Commission to manage the National Industry Digitisation Platform 'Pramonė 4.0' ('Industry 4.0') and to develop a national digitalisation initiative. Lithuania conducts scientific research under several National Research Programmes (NRP) organised by its Research Council. The research funding focuses on strategically important problems and is awarded in compliance with public tendering rules. Examples include the 'Towards future technologies (2016–2021)' programme and the EU project on Digital Innovation Networks ('DIGINNO').

'Intellect' ('Intelektas. Bendri mokslo–verslo projektai'), Lithuania's largest national R&D programme, aims to encourage companies to invest in R&D activities for the development of new products, services or processes, as well as to invest in R&D infrastructure and certify newly created products. It mainly offers R&D investors a favourable tax package that includes, for example, a higher deduction rate for capital assets and special reductions in taxable profit.

The Digital Agenda has set ambitious targets to increase online sales and encourage businesses to adopt digital technologies in general. Another important objective of the strategy is to promote the application of ICT in the development of e-business. The strategy aims to increase the proportion of companies selling online from a current 22 % to 45 % by 2020, and SME turnover to 20 %, even though for the first time since 2014 SME revenue has dropped compared to the previous year. On the demand side, the number of citizens purchasing goods online has been steadily increasing, from 5 % in 2009 to 35 % in 2017. Nevertheless, there is still a long way to go to reach the target set in the strategy in just a couple of years.

Successful implementation of the strategy will contribute to improving the digital transformation of the economy by for example, giving SMEs and citizens access to a much larger market. Further improving citizens' and employees' digital skills is necessary for Lithuania to benefit from an inclusive labour market as well as for further improving the productivity of businesses by helping them adopt digital technologies.

Highlight 2018: Strategic roadmap of the industry digitisation initiative in Lithuania

In order to improve the competitiveness and productivity of Lithuania's industry, in 2017 the European Commission, through the Structural Reform Support Service (SRSS), agreed to finance a project to support national authorities in their efforts to develop, coherently with Industry 4.0 (Pramoné 4.0), a strategic roadmap for the digitisation of Lithuania's manufacturing industry and services sector.
The project includes the delivery of technical advisory services by entities with substantial experience in setting up industry platforms, with the aim of benchmarking against best practices in other EU Member States and identifying challenges and opportunities for Lithuania.
The support from the SRSS has helped the Ministry of Economy to secure funding from the EU's structural and investment funds to implement the strategic roadmap. Additional funding from Lithuania's private sector has been mobilised.

5 Digital Public Services

5 Digital Public Services	Lithuania		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**68.2**	**58.5**	**57.5**
DESI 2017	8	61.6	54.9	53.7

	Lithuania				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
5a1 eGovernment Users[32]	**81 %** ↑	6	**78 %**	7	**58 %**
% internet users needing to submit forms	2017		2016		2017
5a2 Pre-filled Forms	**85** ↑	4	**69**	9	**53**
Score (0 to 100)	2017		2016		2017
5a3 Online Service Completion	**94** ↑	5	**92**	7	**84**
Score (0 to 100)	2017		2016		2017
5a4 Digital Public Services for Businesses	**93** ↑	7	**91**	9	**83**
Score (0 to 100) — including domestic and cross-border	2017		2016		2017
5a5 Open Data	**56 %** ↑	25	**40 %**	26	**73 %**
% of maximum score	2017		2016		2017
5b1 eHealth Services	**19 %**	12	**NA**		**18 %**
% individuals	2017				

Lithuania keeps making good progress on its online public services, with an increase of almost 7 % compared to last year. Increases were seen in all areas, with a particularly high rise in the number of pre-filled forms, where the score went from 69 to 85 (out of 100). The proportion of businesses and citizens that use e-government services remains solidly above the EU average. The measures put in place to ensure that an even larger part of the population, in particular of those who are less digitally literate, is able to take advantage of digital public services include: EU and national ICT skills awareness raising campaigns; promotion of success stories to increase interest in public service usage for better life quality; librarians' readiness to meet local community needs; and ICT knowledge certification following training courses. Lithuania has once again shown a significant increase in promoting open data, but, although it is closing the gap with the EU average, it is still lagging considerably behind.

Lithuania is implementing the Programme for the Improvement of Public Administration 2012-2020 with the objective of increasing the availability of e-services provided to the public

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

and improving their quality.[33] The programme has a specific goal to develop online public and administrative series relevant to the population and businesses, and to encourage service recipients to take full advantage of them. Thanks to the creation and development of health-related e-services and ICT products, it is expected that the programme will result in widespread digitisation of administrative services and more active participation. In order to promote open data, the programme will also soon include a specific goal to open up public sector data to society and businesses and to encourage them to use the data for the development of innovations and e-services. As from 2018, every public sector institution must evaluate all open data they possess, to prepare plans and necessary measures to make the data readily available. Progress will have to be communicated on from 2019 onwards. In addition, an official centralised open data portal in currently under development and will be ready in 2019.

Lithuania has effective tools for digital service transformation, but it is still missing a more strategic vision of how these different and often uncoordinated elements can work together to build a modern, open, responsive and data-driven public sector. There is therefore a need for public sector institutions to coordinate better with each other in order to improve their performance and develop more advanced and fully interactive services.

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[33] Support for developing better country knowledge on public administration and institutional capacity building, 2016.
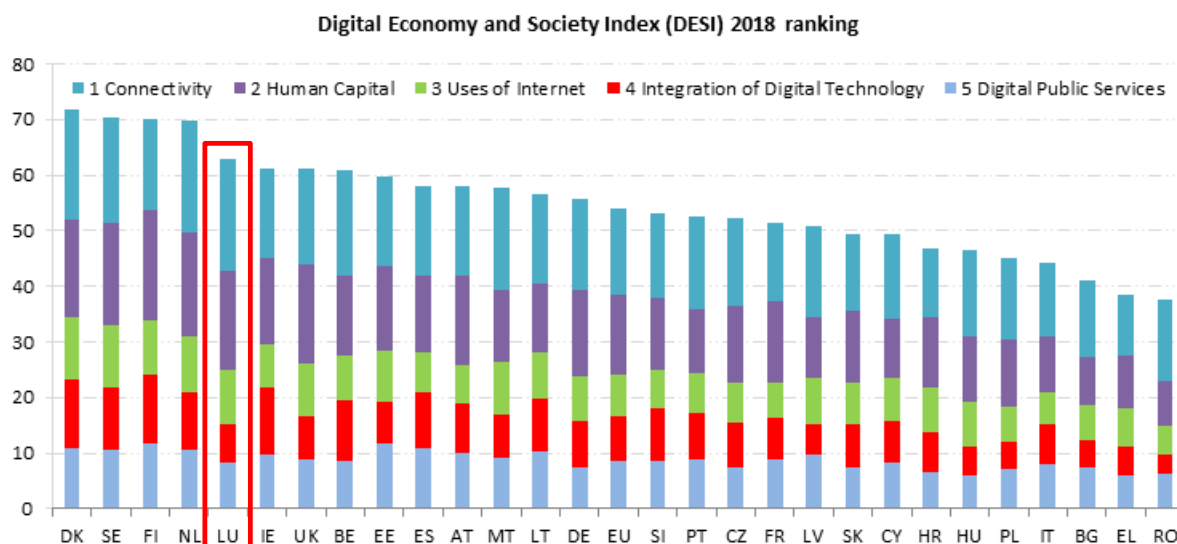
Digital Economy and Society Index (DESI)[34] 2018 Country Report Luxembourg

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.


Digital Economy and Society Index (DESI) 2018 ranking

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[34] https://ec.europa.eu/digital-single-market/en/desi
Digital Economy and Society Index 2018, Country Report Luxembourg

	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**5**	**62.8**	**64.0**	**54.0**
DESI 2017	5	60.4	61.2	50.8

Luxembourg ranks 5th out of the 28 EU Member States. Overall it has maintained its rank and improved its score slightly since last year. Luxembourg performs well in connectivity (2nd rank in DESI 2018), both for coverage and subscription (take-up). It records very good results (5th rank in DESI 2018) in terms of human capital, especially in use or in digital skills where it is a top performer. It achieves very good results for the use of Internet (4th rank in DESI 2018). On the other hand, it is lagging behind in the integration of digital technologies by companies (22nd rank in DESI 2018), for e-business and even more for e-commerce. Similarly, it is lagging behind in digital public services (17th rank in DESI 2018).

Luxembourg belongs to the high performing cluster of countries[35]. However, this good overall performance masks more diverse performance levels across the five dimensions.

Luxembourg has undertaken an ambitious economic diversification strategy in respect of the digital sector. This strategy is multidimensional and collaborative, embracing skills, infrastructure, the digital ecosystem and public services, and grouped under an umbrella initiative called *Digital Luxembourg.*[36]
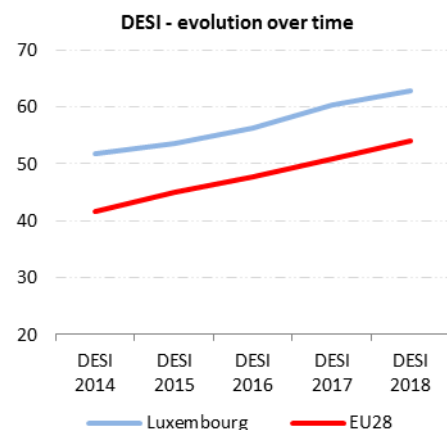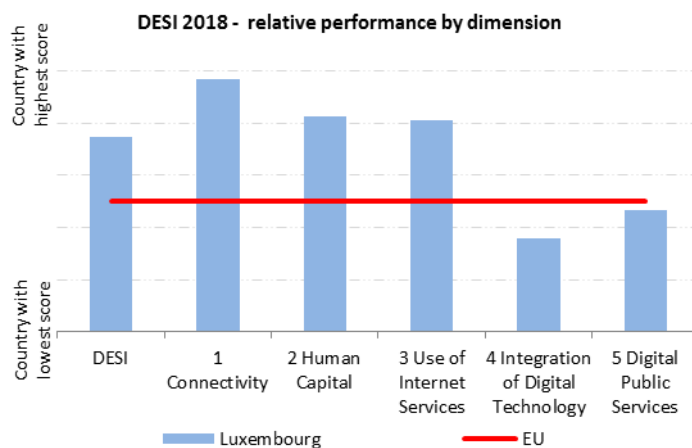
DESI 2018 - relative performance by dimension

DESI - evolution over time

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[35] High performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.
[36] http://www.digital-luxembourg.lu

1 Connectivity

1 Connectivity	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**80.1**	**71.9**	**62.6**
DESI 2017	1	77.9	67.9	58.5

	Luxembourg				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage % households	>99.5% → 2017	5	100% 2016	4	97% 2017
1a2 Fixed Broadband Take-up % households	94% ↓ 2017	2	96% 2016	1	75% 2017
1b1 4G Coverage % households (average of operators)	98% ↑ 2017	6	95% 2016	6	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	126 ↑ 2017	4	116 2016	5	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	95% ↑ 2017	6	94% 2016	5	80% 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	52% ↑ 2017	6	47% 2016	4	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	87% 2017	6	NA		58% 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	22.5% ↑ 2017	9	14.7% 2016	10	15.4% 2017
1e1 Broadband Price Index Score (0 to 100)	88 ↓ 2017	9	89 2016	8	87 2017

Luxembourg performs very well in comparison with other Member States and is making significant progress in the Connectivity dimension. It is particularly strong in fixed and mobile broadband take-up.

Luxembourg is fully covered by broadband services, including fixed, mobile and satellite networks. NGA coverage is at 95%. Luxembourg performs very well in the uptake of mobile broadband services (126 subscripstions per 100 people uptake of mobile broadband services) compared with the EU average of 90. To a limited extent this growth in mobile broadband take-up (10 percentage points in 2017) comes at the expense of fixed broadband take-up. Fixed broadband take-up is significantly above EU-average but has shrunken by 2 percentage points in 2017. Demand for fast and ultrafast broadband services is also increasing; 52 % of subscriptions are for fast broadband and 22,5 % for ultrafast broadband versus 47 % and 14.7 % respectively one year ago. As regards spectrum, Luxembourg has made only very limited progress and has assigned now 50.46 % of the overall harmonised spectrum for broadband (50 % in 2016), due to lack of demand from operators. This has not prevented Luxembourg from achieving a 4G coverage that is better than the EU average (98 % versus 91 %). As fibre roll-out continues, above 60 % FTTP (fibre-to-the premises) coverage has been achieved.

Luxembourg is sticking to its national broadband policy aim of having everyone connected by the end of 2020 with coverage of 1Gbit/sec. The country relies mainly on market-driven

broadband roll-out based on competition among operators. Accordingly, there are no plans to use public financing. Operators and also the national regulatory authority and the ministry are aware of the significant challenges as regards investment in 5G network infrastructure. A recent study concludes that operators might call for extending the possibilities for spectrum sharing for 5G provided by the current legislative framework.

While Luxembourg is well on track to achieve the broadband targets at EU-level, it may not meet the more ambitious targets defined by national policy by 2020.. While continuing the current market-driven approach it could nevertheless be considered how future policy could encourage more predictability of further FTTH rollout which would be relevant both for fixed ultrafast broadband coverage and for 5G.

2 Human Capital

2 Human Capital	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**5**	**71.3**	**70.7**	**56.5**
DESI 2017	2	73.2	69.4	54.6

	Luxembourg				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
2a1 Internet Users	**96%** ↓	**1**	**97%**	**1**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**85%** ↓	**1**	**86%**	**1**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**4.1%** ↓	**9**	**4.6%**	**5**	**3.7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[37]	**NA**		**NA**		**19.1**
Per 1000 individuals (aged 20-29)	2015		2014		2015

In terms of human capital, Luxembourg maintains a very good position (5th rank in DESI 2018). It takes the first rank in terms of proportion of individuals who are regular internet users (96 % in 2017, EU average: 81 %) and proportion of individuals who have at least basic digital skills (85 % in 2017, EU average: 57 %). It has an above average record in terms of the proportion of ICT specialists (4.1 % in 2016) even if it has a high proportion of companies reporting hard-to-fill vacancies for ICT specialists (65 % of enterprises which recruited/tried to recruit reporting hard-to-fill vacancies for jobs requiring ICT specialist skills in 2017, EU average: 48 %).

In the field of STEM (Science, Technologies, Engineering and Mathematics) as in other subjects, about 70 % of Luxembourg students (residents) study abroad and not in Luxembourg (for instance at the University of Luxembourg).

Addressing the shortage of ICT specialists remains crucial to support digital transformation. This objective is pursued through different actions.

- National coalition for digital skills and jobs

In line with the Digital Luxembourg initiative, the national coalition for digital skills and jobs was launched on 29th May 2017. The Luxembourg coalition brings together various actors from the public and private sectors involved in promoting digital skills, including the government, the education and training sector, professional chambers and federations, ICT companies and non-governmental organisations. The objective is to effectively address the shortage of ICT specialists to support the digital transformation of the country.

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37 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.

- Digital(4)Education[38]

The Digital(4)Education action was launched by the Luxembourg government in 2015 for young people in primary and secondary education. It comprises two components: digital education and digital for education.

A label for high-schools innovating in ICT, called "Future Hub", was initiated in 2017 (the first 3 high-schools have already received the Future Hub label, an objective of 9 awarded labels has been set for 2018). These schools commit to developing their infrastructure as well as their learning activities, so as to enable students to pursue their passions while acquiring the hard science competencies necessary for them to achieve their own goals. These schools offer innovative courses that specialise in ICT (Cloud Computing, Game Development, Informatics and Communication) as well as informal opportunities for students and regional participants to discover scientific activities such as Robotics Labs, Coding Clubs and traditional science facilities.

Designed as places of discovery, the network of makerspaces throughout Luxembourg are creative and multidisciplinary spaces open to young people and anyone interested in using the new media creatively to realize their own digital projects. The activities offered stimulate talent, encourage young people to take an interest in technological tools and motivate them to invest themselves in this field. Unlike a classic classroom, where knowledge transfer is at the forefront, makerspaces are placed entirely under the sign of creativity, experimentation, craftsmanship, experience, learning by and the concrete realization of his ideas. The makerspaces are equipped with machines that can be used by young people and by trainers: hand tools, computers, soldering irons, robots, 3-D printers as well as more complex parts such as cutting laser and much more.

In the context of the "one2one" project, the ministry of Education introduced a programme to equip 50% of all high school students with tablets in the next four years, providing logistical and technical support as well as teacher training opportunities to take full advantage of this creative tool. In concert with this deployment, the ministry is currently also updating the infrastructure of all high schools to provide high speed internet through fibre.

In parallel, the Luxembourg Tech School provides an extra-curricular activity for high-school pupils wanting to implement their digital knowledge in a real-life business project.

- Cybersecurity Competence Center (C3)

The Cybersecurity Competence Center (C3) was opened in October 2017, to further strengthen the Luxembourg economy in the field of cybersecurity by focusing on 3 competence: areas: observation, training and testing. In the field of training, C3 offers different training packages, including cyberattack simulation tools (e.g. Room 42 – do[n't] panic). The Securitymadein.lu GIE (Economic Interest Grouping) which brings together the Luxembourg government as well as various local and private partners was at the origin of this initiative.

- Digital Skills Bridge

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[38] www.portal.education.lu/digital4education/

The Digital Skills Bridge project was announced in October 2017 by the Minister of Labour, Employment and the Social and Solidarity Economy. The aim of this project is to help companies and their workers to anticipate and to adapt to disruptive changes in the content of their jobs due to digital technological adaptations (e.g. banking and insurance as well as industrial and logistic sectors). To this end, the government will support re- and up-skilling efforts of the companies through different means (financial support, working time adaptations, etc.). A pilot project is set to start in May 2018, targeting 300 people in the financial sector and 300 people in the industrial and logistics sectors.

3 Use of Internet Services

3 Use of Internet Services	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**65.9**	**63.4**	**50.5**
DESI 2017	3	63.9	60.5	47.5

	Luxembourg				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**88%** ↓	**7**	**89%**	**4**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**89%**	**5**	**89%**	**5**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**29%**	**6**	**29%**	**6**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**57%** ↑	**8**	**54%**	**6**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**70%** ↑	**17**	**69%**	**15**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**78%** ↑	**6**	**73%**	**9**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**82%** ↑	**5**	**80%**	**4**	**68%**
% internet users (last year)	2017		2016		2017

In Luxembourg, Internet use by individuals is clearly above average in all dimensions (4th rank in DESI 2018) and is progressing slightly in score (65.9 in DESI 2018 vs. 63.9 in DESI 2017). Among individuals who used Internet in the last 3 months, 88 % read online news (EU average: 72 % in 2017), 89 % play games or download music / videos (EU average: 78 % in 2016), 29 % subscribe to video on demand (EU average: 21 % in 2016), 57 % make a telephone or video call (EU average: 46 % in 2017). In terms of participation in social networks, individuals in Luxembourg exceed average practice (70 % compared with 65 % on average in the EU). Finally, individuals in Luxembourg often carry out online transactions: 79 % use online banking (average EU: 61 % in 2017) and 82 % shop online (average EU: 68 % in 2017).

4 Integration of Digital Technology

4 Integration of Digital Technology	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**33.2**	**47.0**	**40.1**
DESI 2017	22	29.9	44.0	36.7

	Luxembourg				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
4a1 Electronic Information Sharing	**41%** ↑	**5**	**39%**	**10**	**34%**
% enterprises	2017		2015		2017
4a2 RFID	**6.1%** ↑	**6**	**4.9%**	**10**	**4.2%**
% enterprises	2017		2014		2017
4a3 Social Media	**20%** ↑	**13**	**19%**	**12**	**21%**
% enterprises	2017		2016		2017
4a4 eInvoices	**NA**		**10.9%**	**20**	**NA**
% enterprises	2017		2016		2017
4a5 Cloud	**NA**		**12.2%**	**14**	**NA**
% enterprises	2017		2016		2017
4b1 SMEs Selling Online	**7.8%** ↓	**26**	**9.1%**	**24**	**17.2%**
% SMEs	2017		2016		2017
4b2 E-commerce Turnover	**NA**		**NA**		**10.3%**
% SME turnover	2017		2016		2017
4b3 Selling Online Cross-border	**7.7%** ↑	**17**	**6.3%**	**18**	**8.4%**
% SMEs	2017		2015		2017

Regarding the integration of digital technologies by companies, Luxembourg is well below the European average (22nd rank in DESI 2018) and stagnates in position. In terms of business digitisation, companies in Luxembourg are in a good position for electronic information sharing (41 % in 2017, EU average: 34 %), radio frequency identification (6.1 % in 2017, EU average 4.2 %), and in an average position for the use of social networks (20 % in 2017, EU average 21 %). In the same way, Luxembourg recorded below-average results in terms of e-commerce for small and medium-sized enterprises (10-249 persons employed, excluding financial sector): only 7.8 % of SMEs sell online (EU average: 17.2 %) and 7.7 % of SMEs sell online cross-border (EU average: 8.4 %).

In order to reduce the dependence of Luxembourg on the financial sector, the government has embarked on an economic "multi-specialisation" strategy and identified five priority sectors, one of which is the Information and Communication Technologies (ICT) sector.

Luxinnovation, the Luxembourg agency for innovation and research, promotes business development linked to innovation, including in the ICT sector.

The Luxembourg Cluster Initiative, managed through Luxinnovation, supports at present ten cluster organisations, among one dedicated at the ICT cluster. It brings together various industry and research stakeholders with the aim of encouraging business development in relation to ICT technologies.

The Fit4Start action supports start-up companies with financing and training. It was started in October 2015 and implemented by Luxinnovation. At the end of 2017, 18 start-up companies had followed this program.

The platform 'Digital4Industry' has been launched in June 2016 by FEDIL, Luxinnovation and the ministry of the Economy. The initiative is funded by the ministry of Economy via investment aid (10% for medium enterprises; 20% for small enterprises) for tangible and intangible investments depreciated over 3 years or more and grants for R&D and innovation according the bottom-up principle with different funding rates depending on firm-size.

Building on Luxembourg's experience in the financial sector, several actions have been launched in the field of financial technologies with the ambition to make Luxembourg the European hub of FinTech.

The InfraChain initiative was incorporated in May 2017. It is a public-private partnership (founded by the state of Luxembourg plus 11 private actors) that aims to develop a European infrastructure for blockchain operations. It strives to develop a stable governance framework in the spirit of the GDPR, as well as a technical framework able to support operators using blockchain technology (not only FinTech but also healthcare, public services, etc.) in an operational manner. It also regroups a large majority of Luxembourg's blockchain ecosystem and fosters the community through events and knowledge sharing.

At the end of 2017, an e-commerce platform called "*LetzShop.lu*" was launched by the government in collaboration with the Chamber of commerce, the Luxembourg confederation of commerce (clc) and the main towns of the country. This online site is a digital showcase for shops in Luxembourg to allow traders to gain visibility and enhance their image through a developed network of shops. The aim is to increase their traffic and their sales, erase barriers between physical and digital stores and increase customer service by offering customers a path to purchase online.

Highlight 2018: The Luxembourg House of FinTech (LHoFT)[39]

The LHoFT opened its gates in April 2017 as the entrepreneurial hub of the Grand Duchy in the field of Financial Technologies (FinTech). This initiative brings together public partners (led by the Ministry of Finance) and private partners (13 companies in the financial sector) which finance it equally.

It carries out 3 missions:
1°) a business incubator: the LHoFT is dedicated to start-up companies using ICT technologies that aim to bring innovation to the financial sector
2°) a place of installation of companies: it offers coworking spaces; it is also a place to organize events. Finally it is a soft landing platform for companies from outside the EU.
3°) a training center: the LHoFT offers training courses as well as advice from its professional partners in the financial sector

The LHoFT hosts on a regular basis between 5 and 10 startups in several fields: online payment (e.g. BITPESA: foreign currencies exchange platform for frontier markets), money transfer (e.g. UniSkip), Know-Your-Customer applications and software, cryptocurrencies and blockchain …

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[39] https://www.lhoft.com/

5 Digital Public Services

5 Digital Public Services	Luxembourg		Cluster	EU
	rank	score	score	score
DESI 2018	**17**	**56.2**	**63.0**	**57.5**
DESI 2017	20	47.0	60.2	53.7

	Luxembourg					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
5a1 eGovernment Users[40]	**49%** ↑		**20**	**45%**	**22**	**58%**
% internet users needing to submit forms	2017			2016		2017
5a2 Pre-filled Forms	**50** ↑		**15**	**30**	**20**	**53**
Score (0 to 100)	2017			2016		2017
5a3 Online Service Completion	**80** ↑		**19**	**77**	**19**	**84**
Score (0 to 100)	2017			2016		2017
5a4 Digital Public Services for Businesses	**82** ↑		**16**	**80**	**17**	**83**
Score (0 to 100) - including domestic and cross-border	2017			2016		2017
5a5 Open Data	**85%** ↑		**6**	**57%**	**14**	**73%**
% of maximum score	2017			2016		2017
5b1 eHealth Services	**19%**		**12**	**NA**		**18%**
% individuals	2017					

In the digital public services dimension, Luxembourg ranks below the European average, 17th rank in DESI 2018, having progressed slightly from the 20th rank, its DESI 2017 placing. 49 % of Internet users needed to submit online forms to public authorities (well below the EU average of 58 %) in 2017. According to the e-government benchmark, Luxembourg has a score of 50 for pre-filled data in online forms (EU average: 53) and a score of 80 for life events that can be completed online (EU average: 84). The substantial progression of Luxembourg in open data should be noted: according to the measure of the European Open Data Portal, there was a significant jump from 57 % in 2016 to 85 % in 2017, causing a speedy ascent up the ranking, from 14th to 6th rank.

The Digital Public Services government policy is based on three principles: digital by default, once only, and transparency. These three principles have been implemented to achieve three goals of public management.

1°) Simplification: the simple Luxembourg (Einfach Lëtzebuerg) policy aims at simplifying a set of administrative procedures (88 procedures were identified, 36 were completed, 22 were in progress and 22 were reviewed at the end of 2017).

2°) Efficiency: through the website myguichet.lu citizens and companies are able to complete an increasing number of administrative procedures (78 new procedures since 2016).

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[40] 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.

3°) Tranparency: beyond the mere transposition of the 2013/37/EU PSI 2 directive in 2016, the Luxembourg government has embarked on an open data strategy. At the legal level, new texts must be in a format that is machine readable; in addition, all texts will be linked to metadata.

The Data Embassy project resulted from an agreement between the governments of Luxembourg and Estonia signed in June 2017. In its terms, a data center in Luxembourg keeps a copy of the critical data of Estonia with extraterritorial privileges. It is a world first.

In the field of e-health, the Clinnova project was launched in September 2017 by the Minister of Health. The Clinnova project aims to establish a research center for digital health and personalized medicine. This project will bring together both Luxembourg (the Luxembourg Institute of Health, the NORLUX laboratory) and foreign partners (the University of Southern Denmark, the German Cancer Research Center). This project was presented as an opportunity for both health and digital technologies. It will bring advances in medical research but also patient knowledge through personalized data.
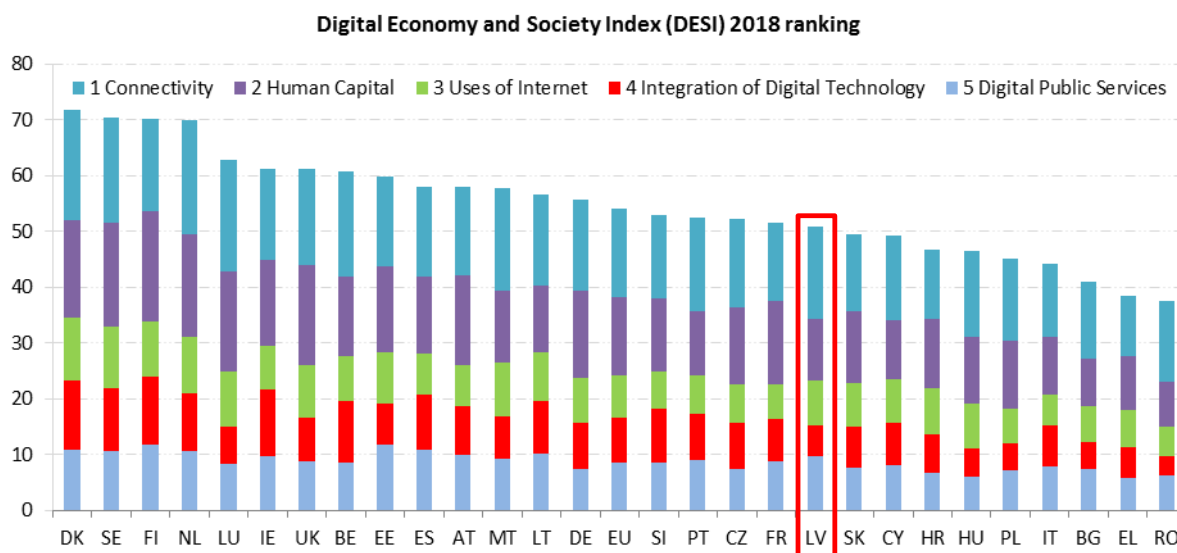
Digital Economy and Society Index (DESI)[41] 2018 Country Report Latvia

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

| | Latvia | | Cluster | EU |
	rank	score	score	score
DESI 2018	**19**	**50.8**	**54.7**	**54.0**
DESI 2017	19	47.2	51.5	50.8

Latvia ranks 19th in the DESI 2018, its position has remained unchanged over the last two years. The country has progressed in line with the EU average. Progress has been driven by improvements in connectivity — both coverage and take-up of ultrafast broadband are relatively high — and in digital public services — due to the launch of the national data portal as well as the life events approach being adopted in the provision of public services. More and more Latvians are using internet banking and eGovernment services, but half of the population has no or low digital skills. Improving citizens' digital skills is necessary for Latvia to benefit from an inclusive labour market, as well as for improving the productivity of businesses, which make only limited use of digital.

Latvia belongs to the Medium performing cluster of countries.[42]

In 2013, the Latvian government approved Information Society Development Guidelines for 2014-2020; this is Latvia's current national strategy for digitisation.[43] The Guidelines are built on seven pillars — ICT education and skills; widely available access to the internet; modern and efficient public administration; e-services and digital content for society; cross-border cooperation for the digital single market; ICT research and innovation; trust and security.

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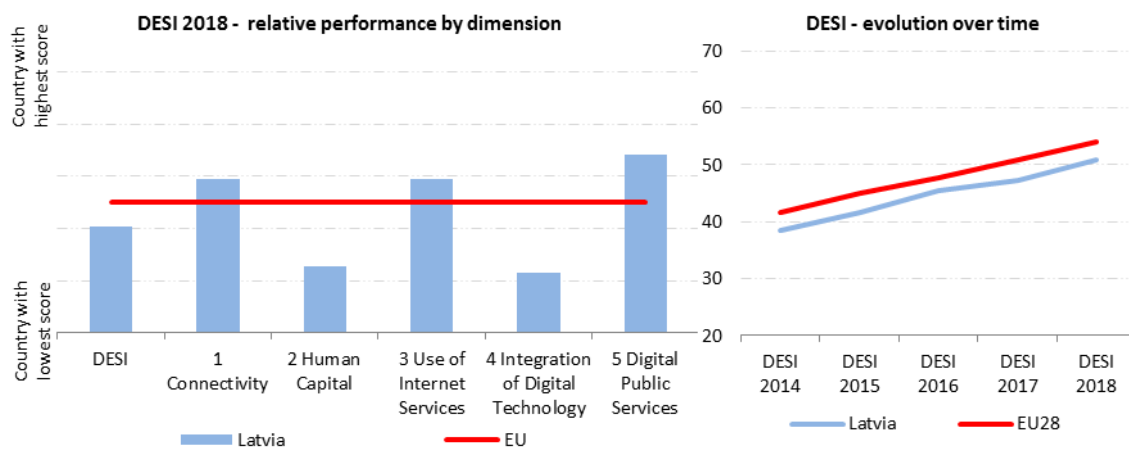
[42] The Medium performing countries are: Latvia, Czech Republic, Slovenia, France, Portugal, Spain, Lithuania, Malta, Germany and Austria.

[43] http://www.varam.gov.lv/eng/darbibas_veidi/e_gov/?doc=13317.

1 Connectivity

1 Connectivity	Latvia		Cluster	EU
	rank	score	score	score
DESI 2018	**10**	**65.9**	**62.4**	**62.6**
DESI 2017	12	61.7	58.8	58.5

	Latvia					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	93 %	→	24	93 %	24	97 %
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	64 %	↑	24	61 %	24	75 %
% households	2017			2016		2017
1b1 4G Coverage	98 %	↑	8	91 %	15	91 %
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	91	↑	12	78	16	90
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	91 %	→	8	91 %	8	80 %
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast Broadband Take-up	42 %	↑	14	38 %	12	33 %
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultrafast Broadband Coverage	88 %		5	NA		58 %
% households covered by FTTP or Docsis 3.0	2017					2017
1d2 Ultrafast Broadband Take-up	35.0 %	↑	5	29.5 %	5	15.4 %
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband Price Index	87	↑	14	86	14	87
Score (0 to 100)	2017			2016		2017

In 2017, Latvia made good progress in the connectivity dimension at a pace similar to the EU average. The country is stagnating as regards fixed broadband coverage of households, still lagging behind the EU average (ranked 24th, with 93 % household coverage). Remarkably, almost all coverage is NGA (91 % of households covered), and a large part is even ultrafast broadband (88 % of households covered), where Latvia stands among the leading Member States, far above the EU average. 4G coverage in Latvia is also very high (98 % of households). Take-up of fast and ultrafast broadband are also well above the EU average: 42 % and 35 % of homes subscribe to fast and ultrafast broadband respectively, as opposed to 33 % and 15.4 % on average in the EU. However, overall fixed broadband take-up in Latvia remains below the EU average, despite a small increase in 2017. This is to some extent compensated by a much more rapid increase in mobile broadband, thanks to data bundles being widely available at affordable prices.

The 'middle mile project',[44] launched in 2012 and co-financed by EU structural funds to connect rural areas to the national backbone infrastructure, has entered its second phase. The actual construction work of the second phase is planned to start in spring 2018. It will focus on the remaining 221 white areas identified in 2014-2015. It is envisaged that, by 2020, 2 800 km of optical cable and 220 optical network access points will be built. Telecoms operators will then have the opportunity to create a local loop with a data transmission speed of at least 30 Mbits/sec (the 'last mile'), using the new network to offer retail services to end users. However, it seems that there is no private investment in the last mile in some places. Further efforts are necessary to assess the situation and propose solutions to close the last mile gap where needed, including further state aid schemes and regulatory measures. Mobile operators' delivery of fixed services to homes using mobile technology contributes to closing the gap in some rural areas where there is no fixed investment in the last mile.

Latvia has been among the EU front-runners in terms of fibre and 4G deployment. However, bridging the digital divide remains a real challenge for the country; the recent rules transposing the Broadband Cost Reduction Directive may help the situation. In addition, in order to keep up with the fast pace of connectivity developments, market players need appropriate spectrum to be available to them for early 5G trials and deployment.

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[44] Project *'State aid SA.33324 — Latvia Next generation network for rural areas' (C (2011)7699),* also known as the SAP project. During the first phase of this project (2012-2015), 1418 km of cable ducts and 1813 km of optical cable were laid and 177 access points were built in white areas.

2 Human Capital

2 Human Capital	Latvia		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**43.8**	**58.6**	**56.5**
DESI 2017	22	44.1	56.5	54.6

	Latvia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
2a1 Internet Users % individuals	**78 %** ↑ 2017	**18**	**77 %** 2016	**16**	**81 %** 2017
2a2 At Least Basic Digital Skills % individuals	**48 %** ↓ 2017	**22**	**50 %** 2016	**19**	**57 %** 2017
2b1 ICT Specialists % individuals	**2.2 %** → 2016	**25**	**2.2 %** 2015	**24**	**3.7 %** 2016
2b2 STEM Graduates[45] Per 1000 individuals (aged 20-29)	**12.7** ↓ 2016	**26**	**13.1** 2014	**26**	**19.1** 2015

In the Human Capital area, Latvia performs below the EU average, having made no progress in the last year. Although the percentage of internet users in the population is almost in line with the EU average, 52 % of Latvian citizens do not have the basic digital skills needed to function effectively online, with 19 % having no digital skills at all (2 points higher than the EU average).

In Latvia, women's digital skills are slightly higher than those of men. While 50 % of women have at least basic digital skills, for men this figure is only 46 %. Differences in digital skills also exist between employed and unemployed people. While 57 % of employed people have basic digital skills or more, for the unemployed this figure is only 33 %. The education level is also an important determining factor for digital skills. While 76 % of highly educated people have at least basic digital skills (against 84 % at EU level), for those with only low or medium levels of education this figure is only 35 %. If for low educated people the figure is 5 % above the EU average, for medium educated people it implies a distance of 20 points from the EU average. The number of ICT specialists is stable but well below the EU average. The proportion of STEM graduations has been decreasing in recent years (from 14.1 per 1000 in 2013 to 12.7 in 2016).

The Education Development Guidelines for 2014-2020 include actions that address the use of ICT for learning and developing digital skills. The 'ICT Education and E-skills' pillar of the Information Society Development Guidelines for 2014-2020 envisages education actions on: public awareness and readiness to use e-opportunities; development of inhabitant and entrepreneur e-skills; increasing ICT competences in public administration; preparing ICT practitioners and professionals based on labour market requirements; increasing the

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[45] The most recent data was 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.

proportion of algorithmic thinking and information literacy in educational programmes. These actions would be supported by state funding, as well as EU financial support.

Moreover, Latvia has a National Coalition' for digital skills and jobs that involves several ministries, ICT industry associations and companies, as well as the Chamber of Commerce and Industry of Latvia. The coalition is coordinated by the Latvian Information and Communications Technology Association (LIKTA). Its work is based on the priorities defined in the documents mentioned above, and aims to provide ICT training tailored to labour market needs, involve more youth in ICT, develop modern and interactive learning processes, and raise awareness of the importance of digital literacy and ICT skills.

A number of steps have been taken towards implementing these strategies over the past year. They include the 'SMEs trainings for digital technologies and innovations in Latvia' and 'ICT professional trainings for ICT industry development and innovations' projects. These projects aim to support young peoples' employability and personal development by equipping them with the right ICT skills for future digital jobs. The goal is to provide high quality digital skills courses to 7 000 SME employees and 1 500 ICT professionals over the 2017-2020 period. At the end of October 2017, over 400 companies were already involved in the first project and more than 900 training courses had been provided (out of the 7000 envisioned). By this time, 55 ICT companies had joined the second project and 780 ICT professionals had updated their skills and qualifications thanks to 196 high-level specialised ICT training courses.

Although promising measures have been undertaken in this area, their effects may take some time to materialise. Latvia still has some way to go in order to improve the digital skills of its citizens and labour force in preparation for the digital transformation of its economy and population.

3 Use of Internet Services

3 Use of Internet Services	Latvia		Cluster	EU
	rank	score	score	score
DESI 2018	**10**	**54.8**	**48.3**	**50.5**
DESI 2017	10	54.5	45.0	47.5

	Latvia				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**84 %** →	**11**	**84 %**	**10**	**72 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**77 %**	**19**	**77 %**	**19**	**78 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**15 %**	**15**	**15 %**	**15**	**21 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**51 %** →	**14**	**51 %**	**9**	**46 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**74 %** ↑	**10**	**71 %**	**11**	**65 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**75 %** ↓	**8**	**78 %**	**6**	**61 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**55 %** →	**19**	**55 %**	**17**	**68 %**
% individuals who used Internet in the last 12 months	2017		2016		2017

Latvians' use of internet services continues to be above the EU average. Latvians are in particular above-average users of internet banking (75 %, ranking 8th in the EU). However, other internet services are also popular, including reading the news (84 %), watching or listening to music, watching videos and playing games (77 %) and using social networks (74 %). Online shopping, on the other hand, is less popular: only slightly more than half (55 %) of people who used the internet in the last year declared that they had shopped online in 2017 (against 68 % at EU level).

4 Integration of Digital Technology

4 Integration of Digital Technology	Latvia		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**27.0**	**42.1**	**40.1**
DESI 2017	25	22.7	38.5	36.7

	Latvia				EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**25 %** ↑		24	16 %	28	**34 %**
% enterprises	2017			2015		2017
4a2 RFID	**2.8 %** →		22	2.8 %	21	**4.2 %**
% enterprises	2017			2014		2017
4a3 Social Media	**13 %** ↑		25	11 %	25	**21 %**
% enterprises	2017			2016		2017
4a4 eInvoices	**17.0 %** ↓		18	18.9 %	10	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**9.4 %** ↑		24	5.8 %	24	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**10.6 %** ↑		23	8.1 %	25	**17.2 %**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**8.6 %** ↑		19	8.2 %	17	**10.3 %**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**4.7 %** ↑		25	3.9 %	24	**8.4 %**
% SMEs	2017			2015		2017

In the last year, Latvia has made good progress on Integration of Digital Technology by businesses, improving its rank from 25th in 2017 to 23rd. However, it still lags behind most of the EU in this area. Improvements have been driven by the proportion of enterprises purchasing cloud computing services, which has almost doubled in the last year (now at 9.4 %), and by the percentage of enterprises adopting electronic information sharing. The percentage of SMEs that make use of electronic sales channels has also increased by 2.5 percentage points to 10.6 %, reducing the gap with the EU average (17 %). The percentage of SME turnover coming from e-commerce has also increased somewhat (up 0.5 pp. to 8.6 %). Nevertheless, there is still room for further improvements as there are relatively few enterprises selling online across borders (4.7 %). High delivery costs are a major barrier encountered by firms wanting to sell online to customers in other EU countries.

Latvia does not have an overarching strategy in place for the digitisation of businesses. Nevertheless, there are several initiatives that address the development of Industry 4.0, including: a pilot project in the engineering sector promoting awareness of Industry 4.0; participation in the Interreg DIGINNO project about speeding up industry digitisation in the Baltic Sea region; participation in the Interreg SKILLS+ project that aims to advance public policies promoting ICT skills among SMEs in rural areas.

Support for innovation vouchers is also envisaged, within the framework of the Technology Transfer Programme. Innovation vouchers would support SMEs' innovation activities by providing support for outsourcing R&D.

The adoption of an overarching strategy may contribute to improving the economy's digital transformation by, for example, giving SMEs and citizens access to a much larger market.

Highlight 2018: Latvian IT Cluster

The Latvian IT Cluster (http://www.itbaltic.com/en/home/) is a non-governmental organisation that initiates and leads cooperation between the Latvian IT industry and educational and public sector institutions. Its main priority is to seek out new cooperation and development opportunities for member companies and institutions. The cluster includes over 30 top IT companies and a number of partner universities, research institutions and other scientific bodies. In the last 10 years, it has provided a national collaboration platform for the development of innovative IT solutions and products, for example in the health and welfare sectors.

5 Digital Public Services

5 Digital Public Services	Latvia		Cluster	EU
	rank	score	score	score
DESI 2018	**9**	**65.2**	**58.5**	**57.5**
DESI 2017	14	53.7	54.9	53.7

	Latvia				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
5a1 eGovernment Users[46]	**77 %** ↑	**10**	**69 %**	**10**	**58 %**
% internet users needing to submit forms	2017		2016		2017
5a2 Pre-filled Forms	**71** ↑	**11**	**58**	**12**	**53**
Score (0 to 100)	2017		2016		2017
5a3 Online Service Completion	**90** ↓	**10**	**91**	**8**	**84**
Score (0 to 100)	2017		2016		2017
5a4 Digital Public Services for Businesses	**93** →	**6**	**93**	**6**	**83**
Score (0 to 100) — including domestic and cross-border	2017		2016		2017
5a5 Open Data	**68 %** ↑	**18**	**15 %**	**28**	**73 %**
% of maximum score	2017		2016		2017
5b1 eHealth Services	**14 %**	**17**	**NA**		**18 %**
% individuals	2017				

In the Digital Public Services, Latvia has made a substantial improvement in its score (+13 pp.) and its rank (from 14th to 9th in the EU) in the last year. This progress has been driven by improvements in eGovernment use (+8 pp.), the availability of pre-filled forms (+13 pp.) and, in particular, the availability of Open Data (+53 pp.). The latter has been influenced by the opening of the national data portal,[47] which makes it possible to access public administration data sets and metadata directly and to link to other data sets published in other public administration portals. This has substantially improved Latvia's performance in the Open Data area compared to the previous year; the country now ranks 18th in the EU.

Latvia's eGovernment policy is mainly set out in the Information Society Development Guidelines for 2014-2020,[48] where special attention is devoted to implementing open data principles in the public administration and simplifying the delivery of public services, by means of efficient and effective eServices and interoperable information systems. The 'E-Services and Digital Content for Public' pillar includes: making public administration data and transaction services openly available to other users; shared platforms and service development for the provision of public services; allowing inhabitants and entrepreneurs to

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

[47] https://data.gov.lv/.

[48] http://www.varam.gov.lv/eng/darbibas_veidi/e_gov/?doc=13317.

communicate with the government using official e-mail addresses; digitalisation of public services; automated issue and acceptance of electronic invoices; digitisation and accessibility of cultural heritage; stimulation of Latvian language use online; e-health solutions for efficient, safe and patient-oriented health care. Activities undertaken under the 'Advanced and Effective Public administration' pillar include: the modernisation of basic public administration activities; public e-participation and e-democracy; development of a single public administration data space and optimisation of ICT infrastructure.

In February 2018, the Cabinet of Ministers adopted 'The informative statement on the use of Cloud Computing services in public administration',[49] drawing attention to the potential of cloud computing services (CCS) to increase the effectiveness of public administration. The Statement proposes a series of actions that aim to prepare for the efficient use of CCS in public administration, including proposals for centralising certain CCS management functions.

By reducing the administrative burden, it is expected that Latvia will create a more favourable business environment and increase the number of entrepreneurs (especially SMEs), who until now have been deterred from starting a businesses or officially registering it due to the complexity and unwieldiness of bureaucratic procedures.

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[49] (http://tap.mk.gov.lv/lv/mk/tap/?pid=40441825&mode=mk&date=2018-02-20).
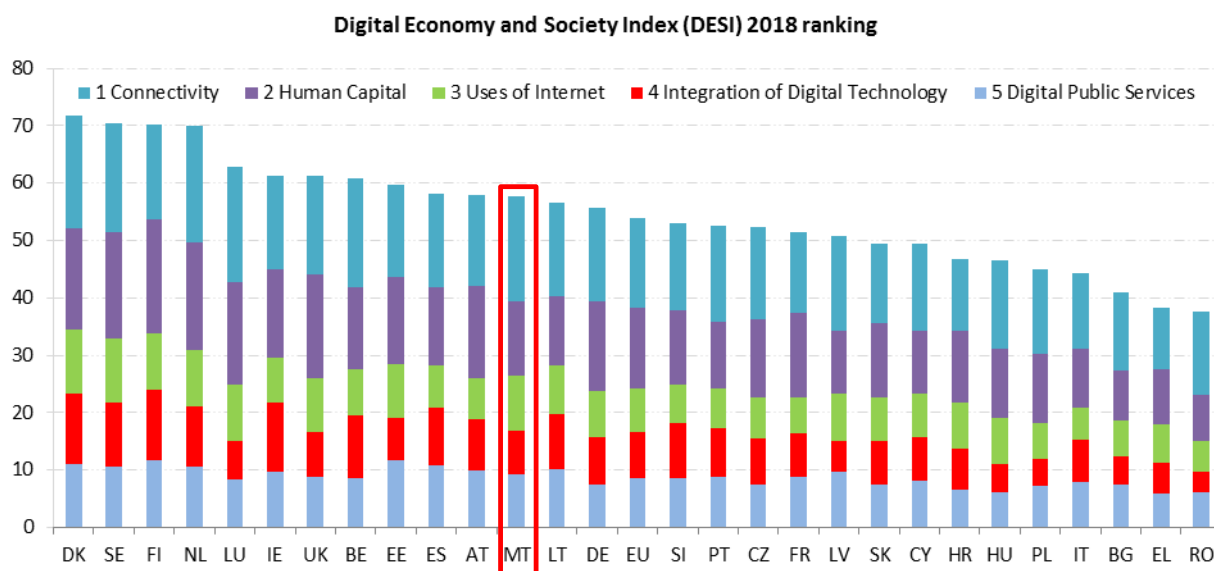
Digital Economy and Society Index (DESI)[50] 2018 Country Report Malta

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1 Connectivity	Fixed broadband, mobile broadband and prices
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3 Use of Internet Services	Citizens' use of content, communication and online transactions
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5 Digital Public Services	eGovernment and eHealth

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Digital Economy and Society Index (DESI) 2018 ranking

	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**57.7**	**54.7**	**54.0**
DESI 2017	10	54.9	51.5	50.8

Malta ranks 12th out of the 28 EU Member States. Overall, it progressed at an average pace over the last few years. Malta performs above EU average in broadband connectivity and the use of internet services by citizens. Malta remains a European leader on the availability of fixed broadband (basic, fast and ultrafast), being the only Member State with full coverage of ultrafast networks. Malta scores also very well in the provision of digital public services. The key challenges are digital skills, especially the low number of STEM (science, technology and mathematics) graduates and open data. The improvement of digital skills is vital also to enhance the integration of digital technologies at enterprises.

Malta belongs to the Medium performing cluster of countries[51].

The Digital Malta Strategy[52] was launched in 2014. This is a policy document to guide the country towards the 2020 Vision that "Malta will prosper as a digitally-enabled nation in all sectors of society". The strategy puts forwards 71 actions under three strategic themes, namely Digital Business, Digital Government and Digital Citizen. These vertical strategic pillars are supported by three driving forces, namely Regulation and Legislation, Infrastructure and Human Capital. In 2017, the Malta Communications Authority (MCA) prepared a Strategy update for 2018-2020[53].
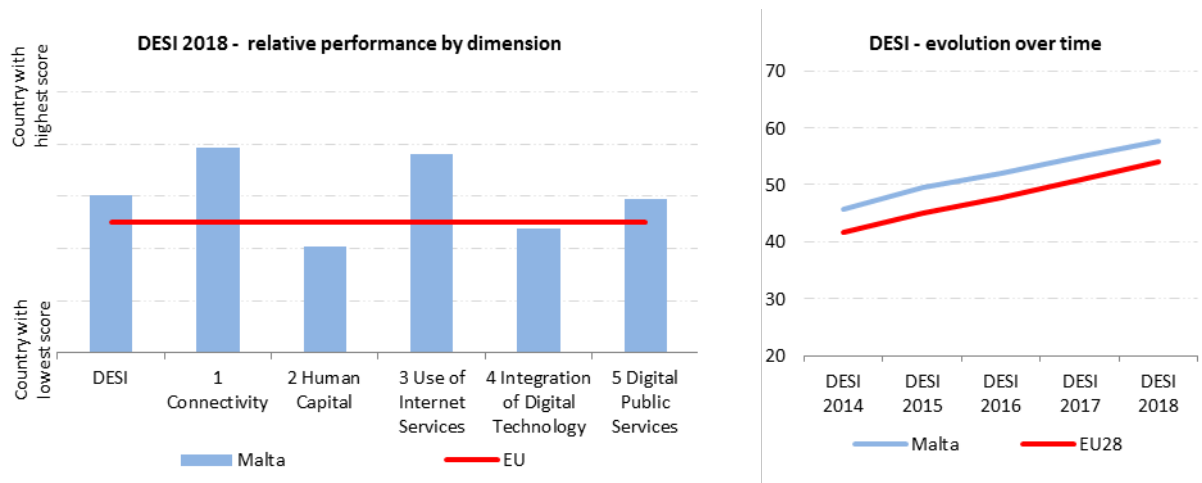
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[51] Medium performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia.
[52] https://digitalmalta.org.mt/en/Pages/Home.aspx
[53] https://www.mca.org.mt/articles/strategy-update-2018-2020

1 Connectivity

1 Connectivity	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**73.1**	**62.4**	**62.6**
DESI 2017	6	67.2	58.8	58.5

	Malta					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**100%** 2017	→	**1**	100% 2016	1	97% 2017
1a2 Fixed Broadband Take-up % households	**84%** 2017	↑	**6**	80% 2016	7	75% 2017
1b1 4G Coverage % households (average of operators)	**99%** 2017	→	**4**	99% 2016	3	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**93** 2017	↑	**10**	68 2016	24	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**100%** 2017	→	**1**	100% 2016	1	80% 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**53%** 2017	↑	**4**	48% 2016	3	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**100%** 2017		**1**	NA 2016		58% 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**11.4%** 2017	↑	**18**	3.4% 2016	23	15.4% 2017
1e1 Broadband Price Index Score (0 to 100)	**NA** 2017			NA 2016		87 2017

With an overall connectivity score of 73.1, Malta ranks 6th among the EU Member States with regard to Connectivity, confirming its last year's ranking. Malta performs above EU average in broadband connectivity: it ranks 1st in terms of fixed Broadband, Fast broadband (NGA) and Ultrafast broadband coverage with 100% of the population covered. Fixed broadband take-up (84%) keeps increasing and is above the EU average (75%). A significant growth was registered in mobile broadband take-up (from 68 subscriptions per 100 people in 2016 to 93 in 2017), and in ultrafast broadband take-up (from 3.4% of the homes subscribing to >=100 Mbps in 2017 to 11.4% in 2017). Underlying the considerable increase in take-up of superfast fixed broadband is the continued drive by service providers to upgrade existing customers to these products and the occasional offers and discounts that characterize this product range, particularly when purchased as part of a bundle. However, the ultrafast take-up rates still appear low in light of the near-universal coverage of such networks

In November 2017 the Maltese NRA (MCA) published its Strategy update for 2018-2020. It, aims *inter alia* at ensuring progress towards the deployment of multiple NGA fixed and mobile networks and improvements in choice and value of retail services, especially in broadband.

Currently, Malta is connected to the global Internet grid by four submarine fibre cables that all land in Sicily. A feasibility study for a new submarine cable connecting Malta to other alternative locations with the objective of enhancing the resilience and quality of the current international electronic communications connectivity was launched by MCA in 2015[54].

In addition in 2017 GO (one of the main operators in Malta) announced that it will be investing more than €100 million in the coming five years to ensure that its infrastructure and systems reflect technological developments and continue to serve the growing demands of the Maltese community and economy. In particular the company is currently upgrading its two submarine cables that connect Malta with mainland Europe via Sicily. These upgrades are near completion, and are expected to (at least) double the data capacity of these links. GO also announced that it is evaluating the feasibility of creating a new link with an existing submarine cable which currently links Tunis with Marseille. It would be the first link that is not entirely dependent on mainland Italy.

As far as spectrum management is concerned, Malta has taken concrete steps in coordinating with EU neighbouring Member States and third countries in view of making the 700 MHz band available for the provision of WBB services. However, the assignment of the 800 MHz band – which was delayed pending the examination of a proposed merger between Vodafone and Melita - should not be subject to further delay after the cancellation of the planned merger. The Maltese authorities should make every possible effort to make progress in ensuring timely availability of harmonised spectrum on the market.

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[54] The study revealed that a new connection to mainland Europe via a locally-owned, 'government-subsidised' branch to a trans-Mediterranean submarine cable would improve Malta's credibility as a destination for international business investment and ensure that the country's future international telecoms connectivity requirements and competitiveness can be met. The MCA is currently in discussion with the local authorities to establish a programme that facilitates the investment with minimal intervention from central government.

2 Human Capital

2 Human Capital	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**17**	**51.6**	**58.6**	**56.5**
DESI 2017	17	50.0	56.5	54.6

	Malta				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
2a1 Internet Users	**79%** ↑	**16**	**76%**	**18**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**56%** ↑	**14**	**49%**	**20**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**3.7%** ↑	**12**	**3.6%**	**13**	**3.7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[55]	**13.1** ↓	**24**	**16.0**	**19**	**19.1**
Per 1000 individuals (aged 20-29)	2016		2014		2015

Malta scores below the average on Human Capital, and ranks 17th on this dimension of the DESI. Internet users went up by 3 percentage points and stands slightly below the average. Basic digital skills improved substantially to 56% (57 % in the EU). As for advances digital skills, the percentage of ICT specialists in the labour force is the same as in the EU. Nevertheless, the share of STEM graduates (Science, Technology and Mathematics) is one of the lowest in Europe.

In 2017, a large number of activities were launched in this area. For example, the MCA together with the Parliamentary Secretariat for Rights of Persons with Disability and Active Ageing launched the Ċavetta Diġitali initiative, a new ICT training programme targeting 2000 senior citizens from day care centres and residents in Government elderly homes[56]. The Malta Information Technology Agency (MITA) continued to organise the Student Placement Programme (SPP) to facilitate the creation of temporary work opportunities for students in the ICT sector. The eSkills Malta Foundation plays a key role in improving digital skills. The foundation aims to decrease the digital skills gap by contributing to the policy, the digital education community, the development of ICT professions and the development of skills in the workforce and society. The foundation organised careers sessions for secondary school students, trained teachers and careers advisors, carried out the EU Code Week in Malta, the IT Professionals Day, launched an ICT Skills Audit, as well as industry visits by teachers and students. In cooperation with the European Commission, it organised a conference on the impact of IT Professionalism in the European Economy[57] . The Foundation was also involved in various EU initiatives including the SCALE Project. Promoting the Information Society remains a priority.

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[55] 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.

[56] Other programmes include the promotion on the safe use of the Internet amongst youths and the establishment of Assistive Technology centres for people with disability.

[57] http://ictprofessionalism.eu/conference-june-14th-2017/

One of the strategic objectives of the MCA for 2018-2020 is to achieve widespread e-literacy and digital inclusion. There is a shift in focus from encouraging the first steps in digital accessibility to the applied use of ICTs to maximise benefits of using the internet. The strategy update identifies five keys tasks: (1) incentivizing digital inclusion via a hardware/connectivity scheme for senior citizens, (2) incrementing schemes for applied ICT learning, (3) managing (and possibly expanding) free wi-fi hotspots initiative, (4) establishing a coding vision for Malta and (5) encouraging e-Business solutions.

3 Use of Internet Services

3 Use of Internet Services	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**63.3**	**48.3**	**50.5**
DESI 2017	8	59.0	45.0	47.5

	Malta				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	**rank**	**value**	**rank**	**value**
3a1 News	**83%** ↑	**12**	**79%**	**14**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**90%**	**4**	**90%**	**4**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**26%**	**8**	**26%**	**8**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**56%** ↑	**9**	**48%**	**11**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**87%** ↑	**1**	**82%**	**2**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**61%** ↑	**17**	**60%**	**15**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**64%** ↑	**15**	**62%**	**14**	**68%**
% individuals who used Internet in the last 12 months	2017		2016		2017

Maltese internet users engage in a broad range of services online. Malta scores well above the EU average on this dimension of the DESI, it performs above average on most of the indicators. 90 % of internet users play music, videos and games (78 % in the EU), 87 % use social media (the highest in Europe, EU average is 65 %) and 83% read news online (72 % in the EU). Malta outperforms the EU also in Video on Demand subscriptions (26 %) and in making video calls (56 %).

However, Malta has an average performance regarding transactional services such as eBanking and shopping online. 64% of internet users shop and 61 % bank online. Malta has recently reviewed its e-commerce strategy to support businesses in selling online.

All indicators showed an increase last year, and Malta managed to improve its rank from 8th to 6th.

4 Integration of Digital Technology

4 Integration of Digital Technology	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**38.9**	**42.1**	**40.1**
DESI 2017	13	38.8	38.5	36.7

	Malta					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**30%**	→	**17**	**30%**	**19**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**6.0%**	↓	**7**	**6.2%**	**5**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**27%**	→	**8**	**27%**	**5**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**9.0%**	**23**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**NA**			**14.5%**	**11**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**16.0%**	↓	**15**	**18.0%**	**12**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerceTurnover	**6.7%**	↑	**20**	**5.9%**	**22**	**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**10.2%**	↓	**9**	**11.7%**	**4**	**8.4%**
% SMEs	2017			2015		2017

Malta performs slightly below EU average in the use of digital technologies by enterprises, falling by two places to rank 13th. Maltese businesses are strong in the use of social media (27 %, EU average 21 %) and RFID technology (6 %, EU 4.2 %), but few of them send electronic invoices (only 9 %). Electronic Information Sharing stands at 30 % compared to 34 % in the EU, while the use of advanced Cloud Computing services is slightly above EU average. In eCommerce, 16 % of SMEs sell online, and e-commerce represents 6.7 % of SMEs turnover, both below the average. At the same time, Malta scores well on cross-border sales of SMEs (10.2 %, compared to 8.4 % in the EU).

In the MCAs mid-term strategy review, the development and uptake of e-commerce and other online services is set as one of the priorities. This includes a number of initiatives targeted at increasing focus on e-commerce uptake by business, launching the EU funded eLearning portal for SMEs, continuing awareness-raising of digital markets and the cloud in the business community, and providing free training on online transactions to individual citizens.

In 2017, the MCA has conducted a comprehensive review of the National e-commerce Strategy. MCA has identified eleven focus areas aimed at ensuring that businesses have the necessary means and skills to capitalise on opportunities brought about by e-commerce. The review acknowledges among other issues that there is still a resistance to new technologies, mostly by business owners, and that there is a digital skills deficit. E-commerce is also hindered by high postal and shipping costs as well as payment processing costs. The

MCA aims to promote the importance of business process transformation, and new technologies such as such as Internet of Things (IoT), Big Data, quantum computing, data analytics, cybersecurity and cloud computing. It is also stated in the review that most businesses have not yet developed a mobile commerce and marketing strategy, an area where the MCA will aim to raise awareness through training programmes on the benefits.

To incentivise digital entrepreneurship, the MITA Innovation Hub continued its accelerator programme, which provides a seed investment to help early-stage startups validate, prototype, test and take their business idea to market. This is supported by the Ministry for Financial Services, Digital Economy and Innovation within the Office of the Prime Minister. The programme runs twice a year and offers a pre-seed investment of €22,000 for up to five startups. In 2018, the programme will favour emerging technologies and/or disruptive models such as Blockchain, Artificial Intelligence and Internet of Things.

Highlight 2017: FastTrakk

Fastrakk is an initiative launched in 2017 by the Malta Communications Authority, in collaboration with the Malta Employers' Association (MEA) and the General Retailers and Traders Union (GRTU). This initiative includes hands-on training sessions on the use of digital marketing. It is to help Maltese companies establishing an effective online presence. Trainings were organised free of charge targeting mainly small businesses. The trainings focussed on the e-commerce grant scheme, digital marketing concepts, social media marketing, email marketing, as well as a general overview of the e-commerce market in Malta. 100 retail shops participated in the mentoring sessions of the initiative.

In 2018, the MCA will launch FastTrak2Mobile, a set of mentoring sessions on how to implement mobile marketing both in the promotion phase and in buyer-seller interaction/relationships.

5 Digital Public Services

5 Digital Public Services	Malta		Cluster	EU
	rank	score	score	score
DESI 2018	**11**	**61.3**	**58.5**	**57.5**
DESI 2017	10	60.0	54.9	53.7

	Malta					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
5a1 eGovernment Users[58] % internet users needing to submit forms	48% 2017	↓	22	60% 2016	15	58% 2017
5a2 Pre-filled Forms Score (0 to 100)	100 2017	↑	1	98 2016	1	53 2017
5a3 Online Service Completion Score (0 to 100)	99 2017	↓	1	100 2016	1	84 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	94 2017	→	4	94 2016	4	83 2017
5a5 Open Data % of maximum score	37% 2017	↑	28	17% 2016	27	73% 2017
5b1 eHealth Services % individuals	6% 2017		28	NA		18%

Overall, Malta ranks 11th in Digital Public Services, above the EU average, but the indicators in this dimension of the index show a mixed picture. Malta is a European leader on the supply of government services for citizens. It ranks first on the re-use of information across administrations to make life easier for citizens (Pre-filled Forms) as well as on the sophistication of services (Online Service Completion), where it has the maximum score. Malta scores also well on the online public services for businesses. However, eGovernment and eHealth use by citizens as well as Open data is below the EU average.

In 2017, Malta continued to improve the digital public service user experience. As part of the Mobile Government Strategy, the first wave of applications has been launched focussing on extending and complementing the existing communication channels between the Government and citizens, targeting a variety of services, such as taxation, customs, health and environmental services59. Malta is developing a National Data Strategy. As part of the strategy, the National Data Infrastructure will be set up to ensure that the once-only principle will be implemented on a national level. To boost trade, MITA together with the Customs Department, started the deployment of the new electronic National Import System (NIS), built on the same technology as the Export System, developed in 2015.

Despite the developments, it remains a challenge to increase the use of digital public services.

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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 MITA has also contributed with the launch of 'Maltapps to enhance the visibility and access of Government mServices and improving public service user experience.
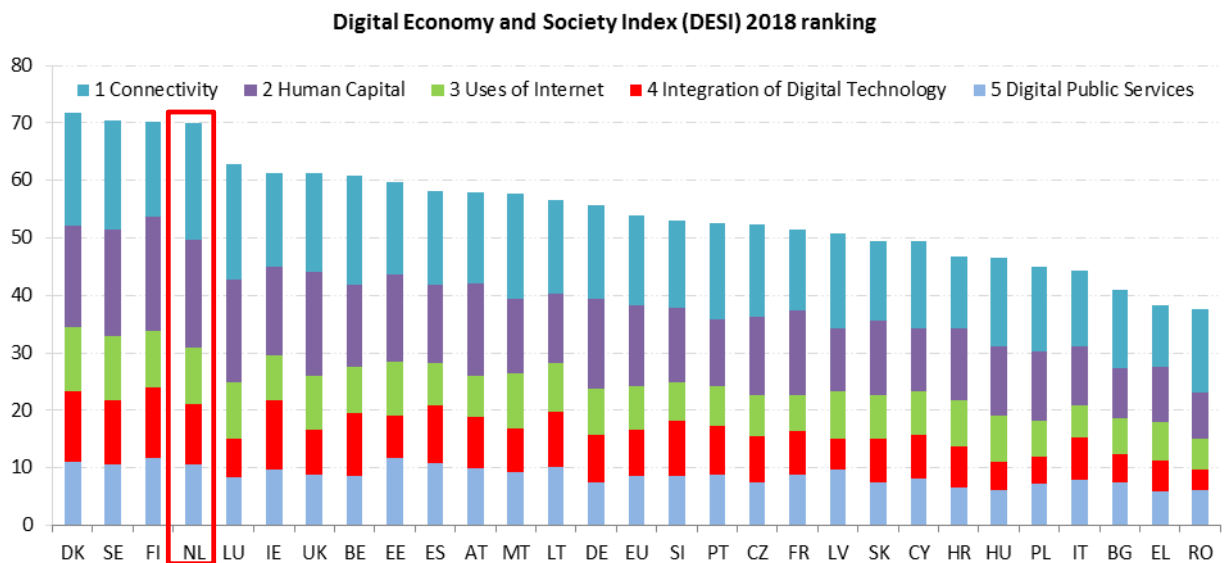
Digital Economy and Society Index (DESI)[60] 2018 Country Report The Netherlands

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 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


Digital Economy and Society Index (DESI) 2018 ranking

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

	Netherlands		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**69.9**	**64.0**	**54.0**
DESI 2017	4	66.5	61.2	50.8

The Netherlands ranks 4th out of the 28 Member States, only 0.02 score from 2nd position. The country progressed at a faster pace than the EU average, outperforming the other Member States in all five DESI dimensions while improving its ranking in two of them compared to the previous year. The Netherlands continues to be the European leader in connectivity with a high-quality, ubiquitous digital infrastructure. These advanced digital networks boost the growth of the Dutch digital economy and society, support a highly advanced business, education and science environment and attract international investments. Almost all Dutch individuals (94 %) make extensive use of internet services, especially for banking (93 %) and shopping (82 %). Integration of Digital Technology (rank 6) has increased over the last year in most DESI categories. In Digital Public Services (rank 6), the Netherlands improved its scores in terms of all relevant parameters and remains way above the EU average.

The Netherlands belongs to the **high-performing** cluster of countries[61].

The Dutch digitisation strategy is set by the Dutch Digital Agenda[62], which is expected to be updated this year. Sector-specific guidelines are set by the Knowledge and Innovation Agenda ICT[63] and other research innovation agendas such as Smart Industry. The new government, in its 2017-2021 coalition agreement, cited cybersecurity, digitisation of public services and digital skills among its main priorities.

DESI 2018 - relative performance by dimension

DESI - evolution over time

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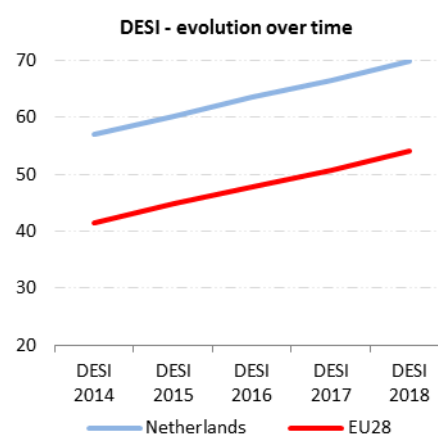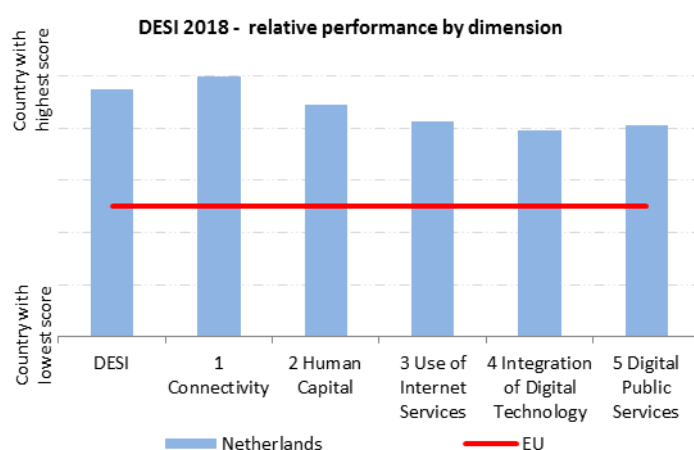
[61] High performing countries are Denmark, Finland, Sweden, the Netherlands, Belgium, the UK, Ireland, Luxembourg and Estonia.
[62] https://hollandfintech.com/digital-agenda-renew-trust-accelerate/
[63] https://www.4tu.nl/nirict/en/Research/knowledge-and-innovation-agenda-ict-2016-2020.pdf

1 Connectivity

1 Connectivity	Netherlands		Cluster	EU
	rank	score	score	Score
DESI 2018	1	81.1	71.9	62.6
DESI 2017	1	77.8	67.9	58.5

	Netherlands				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage % households	>99.5% 2017	→ 2	100% 2016	2	97% 2017
1a2 Fixed Broadband Take-up % households	98% 2017	↑ 1	95% 2016	2	75% 2017
1b1 4G Coverage % households (average of operators)	100% 2017	↑ 3	91% 2016	16	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	88 2017	↑ 14	85 2016	12	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	98% 2017	→ 3	98% 2016	3	80% 2017
1c2 Fast broadband take-up % homes subscribing to >= 30 Mbps	73% 2017	↑ 1	65% 2016	1	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	97% 2017	2	NA		58% 2017
1d2 Ultrafast Broadband take-up % homes subscribing to >= 100 Mbps	32.2% 2017	↑ 6	30.6% 2016	3	15.4% 2017
1e1 Broadband price index Score (0 to 100)	90 2017	↑ 6	88 2016	10	87 2017

The Netherlands is one of the best performers in the area of connectivity. Fixed broadband coverage and take-up are high (>99.5 % and 98 % respectively) and 4G mobile broadband is available to the entire population. Ultrafast broadband coverage is nearly complete (97 %) while the take-up is at around one third of households. Broadband services are available throughout the country (through fixed, mobile and satellite networks). On the other hand, the mobile broadband take-up is relatively low (88 subscriptions per 100 people).

The Dutch telecommunications services market is still characterised by the major players KPN and VodafoneZiggo holding very strong positions. According to the provisional conclusion of the regulatory authority AGM (in public consultation), they both hold dominant positions on the wholesale and retail markets.

The Dutch authorities help regional and local authorities create the right conditions for market players to roll out fast internet without public funding by sharing knowledge and best practices. The Netherlands is focusing its future efforts on 5G applications and the Internet of Things as key drivers for future communications technologies. In this context, a 5G frequency auction is planned for 2019.

In a near duopoly situation at fixed network level, the mobile market seems to be under intense pressure due to the fact that bundled packages require access to fixed infrastructure, which pure-

play mobile operators lack. This resulted in T-Mobile moving to acquire Tele2 (still subject to merger control).

2 Human Capital

2 Human Capital	Netherlands		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**74.3**	**70.7**	**56.5**
DESI 2017	3	72.3	69.4	54.6

	Netherlands					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users % individuals	**94 %** 2017	↑	**4**	**92 %** 2016	**4**	**81 %** 2017
2a2 At Least Basic Digital Skills % individuals	**79 %** 2017	↑	**2**	**77 %** 2016	**3**	**57 %** 2017
2b1 ICT Specialists % of total employment	**5.0 %** 2016	→	**5**	**5.0 %** 2015	**3**	**3.7 %** 2016
2b2 STEM Graduates Per 1 000 individuals (aged 20-29)	**NA** 2015 or 2016			**NA** 2014		**19.1** 2015

The Netherlands ranks among the frontrunners in terms of the number of individuals using the internet and those with advanced digital skills, and has further improved its score. While the supply of ICT specialists is higher than the EU average (3.7 %), it remains stable at around 5 %.

There is significant demand for highly skilled ICT professionals in big data, cybersecurity and artificial intelligence. In January 2018, there were more than 33 000 online ICT vacancies, with demand growing by 50 % over the last 12 months[64]. The shortage of ICT professionals is a major issue for the development of the Dutch digital economy and society and may hamper the integration of digital technology by businesses and public services. According to the Dutch employee insurance agency (UWV)[65], the shortage is expected to continue and requires continuous policy focus and monitoring.

The Dutch Digital Agenda addresses talent development and the supply of professionals with the right skills by implementing a number of policy measures that aim to integrate ICT in the education system, improve the connection between skills supply and demand and stimulate lifelong learning. The Human Capital Agenda for ICT targets the growing demand for ICT professionals by bringing together companies and educational institutions to get more young people interested in the jobs of the future, scholarships, internships and further training of ICT professionals. ICT skills play an important role and are a common objective in the Technology Pact 2020[66], where public-private cooperation is a key mechanism for improving the link between education and the workplace. Coordination between consortia and the centres for professional education will be strengthened and further public-private partnership will be developed into 'learning communities' in which learning, work and innovation are closely linked[67].

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[64] http://www.pocbigdata.eu/monitorICTonlinevacancies
[65] Van der Aalst and Van den Beukel, 2017.
[66] https://www.techniekpact.nl/cdi/files/e3bd421f98a0f362b6a13091de60d08978df34e9.pdf
[67] http://www.socialinnovationlab.nl/

3 Use of Internet Services

3 Use of Internet	Netherlands		Cluster	EU
	rank	score	score	score
DESI 2018	**3**	**66.5**	**63.4**	**50.5**
DESI 2017	4	62.2	60.5	47.5

	Netherlands				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**80%** ↑	**15**	**75%**	**17**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**88%**	**6**	**88%**	**6**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**39%**	**3**	**39%**	**3**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**46%** ↑	**19**	**39%**	**20**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**70%** ↑	**18**	**66%**	**19**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**93%** ↑	**2**	**91%**	**2**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**82%** ↑	**4**	**79%**	**6**	**68%**
% internet users (last year)	2017		2016		2017

In terms of individuals using Internet services, the Netherlands made progress over the last year and now ranks 3rd. It progressed in almost all fields: more Dutch Internet users read news online (80 %); they also listen to music, watch videos and play games online more than Europeans on average (88 % compared to 78 % for the EU-28). Dutch Internet users are also increasingly using video calls (from 39 % to 46 %) and social networks (from 66 % to 70 %), which improved the ranking in both fields. Internet users in the Netherlands continue to outperform those in other EU countries in the use of online banking (93 % compared with 61 % in the EU-28), and rank 2 among Member States. They also use the Internet for online shopping more than most other Europeans (82 % compared with 68 % in the EU-28), with the Netherlands improving its ranking from 6 to 4 over the last year.

4 Integration of Digital Technology

4 Integration of Digital Technology	Netherlands		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**52.3**	**47.0**	**40.1**
DESI 2017	6	48.0	44.0	36.7

	Netherlands				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
4a1 Electronic Information Sharing	**48%** ↑	**2**	**45%**	**3**	**34%**
% enterprises	2017		2015		2017
4a2 RFID	**5.0%** ↑	**12**	**3.1%**	**19**	**4.2%**
% enterprises	2017		2014		2017
4a3 Social Media	**39%** ↑	**2**	**38%**	**2**	**21%**
% enterprises	2017		2016		2017
4a4 eInvoices	**19.0%** ↑	**11**	**18.8%**	**11**	**NA**
% enterprises	2017		2016		2017
4a5 Cloud	**NA**		**29.4%**	**4**	**NA**
% enterprises	2017		2016		2017
4b1 SMEs Selling Online	**15.3%** ↓	**18**	**16.1%**	**14**	**17.2%**
% SMEs	2017		2016		2017
4b2 E-commerce Turnover	**9.5%** ↑	**15**	**9.2%**	**14**	**10.3%**
% SME turnover	2017		2016		2017
4b3 Selling Online Cross-border	**11.1%** ↑	**8**	**10.3%**	**7**	**8.4%**
% SMEs	2017		2015		2017

The Netherlands ranks 6th th in the Integration of Digital Technology by businesses and made progress over the last year. Dutch enterprises have stepped up their digitisation efforts. For example, they increasingly use radio-frequency identification (RFID) technology, share information digitally, make use of electronic invoices and exploit the power of social media. Although SMEs selling online have improved their turnover, the percentage exploiting the opportunities of e-commerce is still below the EU average and has slightly decreased over the last year. The Netherlands ranks 1st among EU countries in terms of enterprises analysing big data from any source (19 %).

The Knowledge and Innovation Agenda 2018-2021[68] opens up new topics (such as design) and more cross-sectoral ones, while developing societal challenges and key technologies. The ICT agenda is instrumental in developing a more cross-sectoral approach and in fostering radical innovation. For 2018-2021, it recognises the strategic cross-sectoral impact of big data, cybersecurity, artificial intelligence, blockchain and 5G.

Over the last 2 years the Smart Industry programme[69], the most important cross-cutting scheme for digitisation of the manufacturing industry, has created 32 field labs in which companies and knowledge institutes develop and test ICT applications. EUR 165 million is being invested in

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[68] https://www.clicknl.nl/en/news/new-knowledge-and-innovation-agenda-2018-2021/
[69] http://smartindustry.nl/wp-content/uploads/2017/08/The-Dutch-Smart-Industry-action-program-with-fieldlabs.pdf

these 32 field labs, with 40 % coming from the business community and 60 % from knowledge institutions and the government. The Smart Industry Implementation Agenda 2018 – 2021[70] aims to further increase productivity, create more jobs (and new ones) and therefore help solve societal challenges such as reducing raw materials and energy consumption. The new Agenda will stimulate regional cooperation with the help of field labs, invest in knowledge and skills and help companies and knowledge institutions to share their data safely and effectively.

Highlight 2018:   MAKE IT WORK!

'Make IT Work' helps those with university degrees but no specific IT background to retrain for an IT position at higher professional education level and to start a job right away.

It is an initiative of the Amsterdam University of Applied Sciences and the affiliated companies of Netherlands ICT.

Students are selected following a 'career fair event where employers and prospective students meet. If the employer and candidate reach an agreement, the candidate can retrain as a software engineer, cyber security expert or business analytics specialist. In addition to programming, attention is also paid to cooperation and communication skills. The courses are run by the Amsterdam University of Applied Sciences.

Training is divided into two parts: the first part takes 5 months, where students follow a full-time course. The second part lasts 6 months, where they work and go to university one day a week.

The employer covers the retraining costs and offers an employment contract of 6 months comprising a 32-hour week with a market-based salary.

Make IT Work is one of the measures to tackle the shortage of ICT professionals by responding to the urgent demands of employers and also offering job opportunities to highly educated people who are unemployed. For more info, see the Make IT Work website[71].

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5 Digital Public Services

5 Digital Public Services	Netherlands		Cluster	EU
	rank	score	score	score
DESI 2018	**6**	**70.5**	**63.0**	**57.5**
DESI 2017	6	67.2	60.2	53.7

	Netherlands				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
5a1 eGovernment Users	**84%** ↑	**5**	**83**	**6**	**58%**
% internet users needing to submit forms	2017		2016		2017
5a2 Pre-filled Forms	**77** ↑	**6**	**74**	**5**	**53**
Score (0 to 100)	2017		2016		2017
5a3 Online Service Completion	**90** ↑	**9**	**89**	**11**	**84**
Score (0 to 100)	2017		2016		2017
5a4 Digital Public Services for Businesses	**81** ↑	**18**	**79**	**18**	**83**
Score (0 to 100) - including domestic and cross-border	2017		2016		2017
5a4 Open Data	**92%** ↑	**3**	**79%**	**4**	**73%**
% of maximum score	2017		2016		2017
5b1 eHealth Services	**23%**	**9**	**NA**		**18%**
% individuals	2017				

In Digital Public Services, the Netherlands ranks 6th among EU countries.

Its continued strong performance in the area of open government data is particularly noteworthy — it achieved a score of 92 % in 2017 (up from 79 % in 2016) in the European Open Data Index, which measures open data policies, use, portal readiness and impact. This trend is expected to continue, with the Dutch government having formulated a strong open government data policy in its 2017 coalition agreement. It includes the aim of providing government information on traffic and transport for vehicles, apps and journey and route planners as well as a commitment to improving electronic public service provision across the board[72]. The Netherlands improved its scores for all relevant parameters and remains way above the EU average.

At the same time, it performs below the EU average in terms of digital public services implemented and available online for both domestic and foreign businesses. Nevertheless, it continues to modernise its public administration, and the 2017 progress report on digital public service availability showed that 90 % of the 550 most used government-wide services were already available digitally[73].

On eHealth services, a newly introduced parameter that measures the percentage of people who use health and care services provided online, the Netherlands ranks 9th with a score of 23 %, which is above the EU average (18 %). Despite a limited (albeit slight increase) uptake of eHealth services, the Netherlands does have a substantial eHealth offering. Against this background, it is

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[72] 'Confidence in the Future', 2017-2021 coalition agreement involving the People's Party for Freedom and Democracy (VVD), Christian Democratic Alliance (CDA), Democrats '66 (D66) and Christian Union (CU), of 10 October 2017.
[73] Meting Aanbod Digitale Dienstverlening 2017, of 1 September 2017

encouraging that the Dutch government is committed to promoting the use of eHealth, for which it has set aside a EUR 40 million budget that covers its term in office. This should help strengthen the progress made, which is crucial also in light of the enormous potential: in 2017, 75 % of internet users in the Netherlands searched for health information online — way above the EU average.
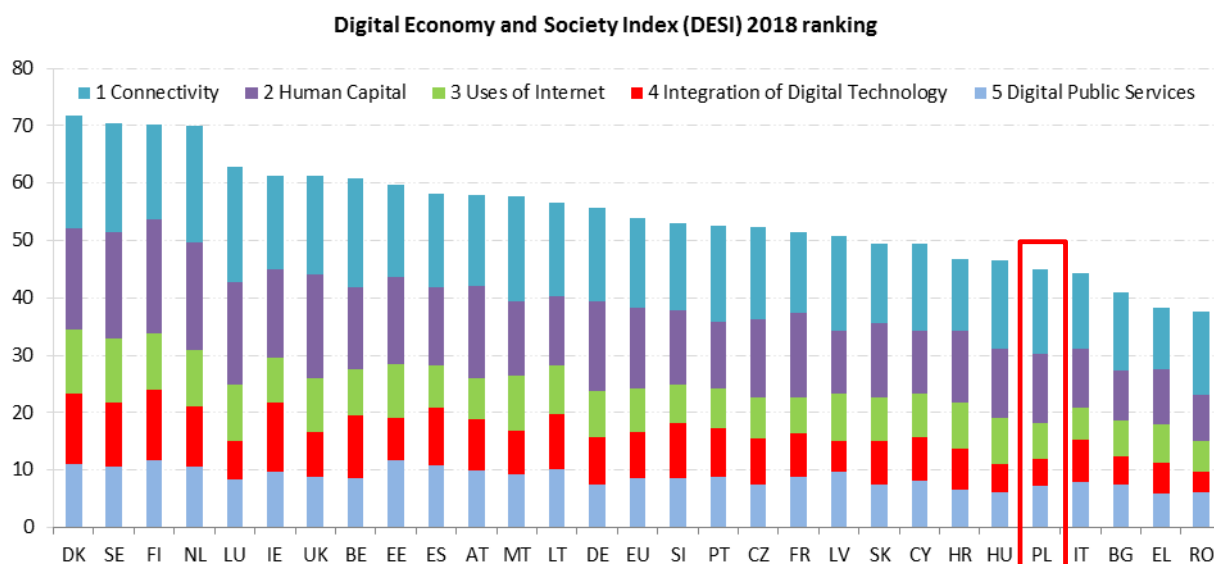
Digital Economy and Society Index (DESI)[74] 2018 Country Report Poland

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**45,0**	**43,5**	**54,0**
DESI 2017	24	42,1	40,4	50,8

In the Digital Economy and Society Index Poland ranks 24th out of the 28 EU Member States the same as compared with DESI 2017. Poland has been steadily progressing in DESI over time at a pace equal to the EU. Over 2017, Poland has improved its ranking in the Connectivity and Human Capital dimensions. It has also improved its performance within the dimensions of Use of Internet, Integration of Digital Technology and Digital Public Services. Poland has visibly advanced in mobile broadband take-up, fast and ultra-fast broadband take-up and it has moderately advanced in all Human Capital indicators. Despite improvements in the usage of video calls, social networks and online shopping Poland's rank slipped down in the Use of Internet dimension. Poland remained in the same rank as regards Integration of Digital Technology despite significant improvements in electronic information sharing, the use of cloud services and eInvoices.

Poland belongs to the low-performing cluster of countries[75].

Poland is implementing the Operational Programme Digital Poland for 2014-2020 (OPDP) co-financed by the EU structural funds. The aim of the programme is to strengthen digital foundations for national development: common access to high-speed Internet, effective and user-friendly public e-services and a continually rising level of digital competences. In 2017 Poland has introduced the 5G for Poland programme that is to enable effective implementation of 5G technology in Poland ensuring access to its benefits to citizens and businesses to increase their competitiveness.

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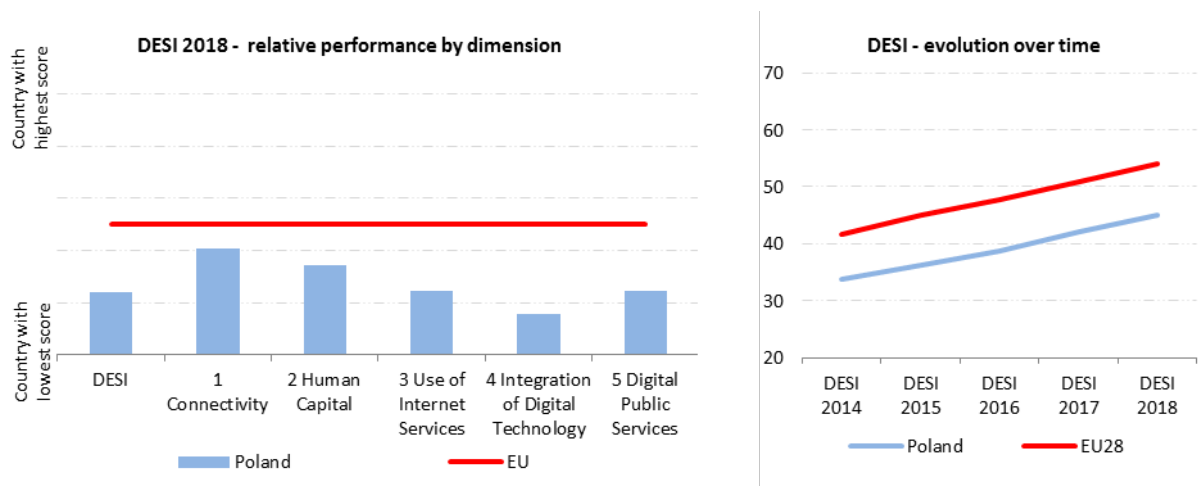
[75] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.

1 Connectivity

1 Connectivity	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**21**	**58,8**	**55,0**	**62,6**
DESI 2017	22	52,0	50,1	58,5

	Poland					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	87%	↑	28	86%	28	97%
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	61%	↑	25	59%	26	75%
% households	2017			2016		2017
1b1 4G Coverage	91%	→	19	91%	14	91%
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	144	↑	2	115	6	90
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	67%	↑	26	64%	25	80%
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast Broadband Take-up	32%	↑	18	26%	18	33%
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultrafast Broadband Coverage	53%		23	NA		58%
% households covered by FTTP or Docsis 3.0	2017					2017
1d2 Ultrafast Broadband Take-up	13,2%	↑	17	8,2%	18	15,4%
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband Price Index	88	→	8	88	13	87
Score (0 to 100)	2017			2016		2017

In the Connectivity Dimension, Poland progressed in 2017 and now ranks 21st[nd] compared to the 22nd rank a year ago (under the 2018 methodology). The biggest progress has been made in respect of mobile broadband take-up where Poland achieved better results than the EU average. 2016 was the first year when subscriptions to mobile Internet exceeded subscriptions to fixed connections. Poland is close or equal to the EU average in terms of 4G coverage (91 %), fast broadband take-up (32 %) and the broadband price index (88 out of 100), and slightly further from it as regards ultrafast broadband coverage (53 %) and take-up (13.2 %). Nevertheless, Poland's performance is still being tarnished by its low fixed broadband coverage (87 %), fixed broadband take-up (61 %) and NGA coverage (67 %).

In 2014, Poland had adopted the National Broadband Plan (NBP, '*Narodowy Plan Szerokopasmowy*'). It envisages 100% coverage with 30 Mbps and 50% of households accessing broadband with 100 Mbps by 2020. Despite a number of tasks completed in the NBP Poland is still far from achieving goals 2 and 3 of the Digital Agenda for Europe. The main difficulties relate to the geographical conditions that cause high costs of developing networks. In particular, many rural areas are not attractive to operators. What is more, local authorities often charge telecom operators high fees for using installation spaces on roads, which significantly raises its maintenance costs. Another factor impeding the implementation of the objectives is the lack of adequate demand for very high-speed networks (over 100

Mbps) and, as a result, the lack of private investment in that access – a perspective that may be shifting with significant (>50%) increase in take-up of such services over the last year. Nevertheless, planned fiber networks are distributed evenly and are reaching most rural areas due to the obligation to connect all educational institutions and the prioritisation of unprofitable areas in the Operational Programme Digital Poland. (*'Program Operacyjny Polska Cyfrowa'*). In 2017 the second call of the OPDP was finalized. Subsidies were granted to 58 out of 76 areas of support. The total value of financing granted amounts to more than 2 billion PLN (500 million EUR), which is however only 68% of the available funding for this call. 1 349 620 households are declared to have access to broadband of at least 100 Mbps in these 58 areas (amounting to 175% of the minimum value indicated in the call documentation). However, the actual realisation of the projects remains to be seen. The implementation under the first priority axis of the OPDP is well on track. In 2017 the third call was formally launched with the total budget reaching 2 billion PLN (500 million EUR).

The revision of the NBP is currently being prepared and should be adopted in 2018. It will contain a new action plan and tools for implementing new connectivity objectives contained in the Communication on 'Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society'.

The Ministry of Digital Affairs, developed the "5G for Poland" Strategy[76] which was under public consultation in February 2018. The strategy is to enable efficient implementation of the 5G network in Poland, provide citizens with access to the latest technologies, and an effective competitive advantage for entrepreneurs operating in Poland.

Poland's development in terms of the Connectivity Dimension remains asymmetric. The progress made in fixed broadband coverage is slow, especially in rural areas, and lags behind the dynamic mobile broadband take-up. Nevertheless, progress has been made in almost all connectivity indicators. Therefore, with the increased investment efforts, Poland should be able to make further progress and come closer to EU-average indicators in the near future.

More coordinated efforts will be necessary in order to ensure a proper regulatory environment to roll-out 5G networks. In this context, it would be beneficial for Poland to revise its rules concerning spectrum auctions in view of the 700 MHz band assignments and the ongoing infringement proceedings related to the assignment of 800 MHz spectrum to the Polish operator Sferia. Furthermore, predictability of investment and competitive conditions could have been supported in recent years by more timely review of wholesale market regulation.

Finally, further monitoring of the Polish roaming market would be needed since it has not yet stabilised after the introduction of RLAH.

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[76] https://www.gov.pl/cyfryzacja/strategia-5g-dla-polski

2 Human Capital

2 Human Capital	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**48,3**	**42,2**	**56,5**
DESI 2017	21	45,7	40,6	54,6

	Poland				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
2a1 Internet Users	**73%** ↑	**22**	**70%**	**23**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**46%** ↑	**24**	**44%**	**23**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**2,7%** ↑	**20**	**2,6%**	**19**	**3,7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[77]	**21,5** ↑	**8**	**20,5**	**9**	**19,1**
Per 1000 individuals (aged 20-29)	2016		2014		2015

In the Human Capital dimension, Poland has progressed moderately over the last year. The numbers of Poles having at least basic digital skills and using internet have increased compared to 2017. There is a growing interest in using digital technology in Poland which is demonstrated by an increased number of internet users who wrote a computer programme from 2.6% in 2016 to 4,12% in 2017, compared to 7,17% for the EU. IT has remained a popular field of study which is reflected in the growing number of STEM graduates, which is above the EU average.

Digital skills are covered by the third priority axis of the OPDP. The Program channels funds to education and information campaigns that promote benefits of digital technologies. Poland has developed a comprehensive approach to digital skills education. As of September 2017 programming is part of the primary curriculum. In the first three years programming is used as a tool in teaching curriculum. In the remaining five years of primary schools programming is taught as a subject. The National Education Network project (see highlight) co-financed by the OPDP will ensure access to fast Internet for all schools by 2020. Accompanying actions to be implemented in 2018 include development of programming skills of teachers. PLN 100 million (EUR 25 million) have been earmarked to training teachers of three primary years to use programming in teaching, including tutors to accompany teachers for further 30 hours of teaching.

Under the OPDP, Poland has launched a project to further develop ICT professional skills – IT Master Centre (*Centrum Mistrzostwa Informatycznego[78]*). The project will strengthen ICT specialist skills of thousands of pupils in upper primary and secondary schools until 2023.

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[77] 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..

[78] https://www.gov.pl/cyfryzacja/centrum-mistrzostwa-informatycznego-start-kuni-polskich-talentw

In 2017 a Polish project "IT for She[79]" was awarded a Digital Skills Award 2017 in the Digital skills for women and girls category. IT for SHE is a programme which aims to increase the participation of women in the high tech industry, by helping talented female students from IT faculties to enter the labour market. There three main actions of the programme include Women in Tech Camp, the Kids in IT and the Mentoring Program for female IT students, which is run by representatives of technology companies in Poland.

The actions taken by the Broad Alliance on Digital Skills in Poland[80], active participation in EU Code Week, successful development of Coding Masters and SuperCoders programmes, have contributed to increasing awareness of the importance of digital skills, to integrating them in school curricula and to building teacher capacity. Connection of schools to fast Internet as well as introduction of programming combined with support to teachers in developing their digital skills is expected to have a positive effect on both the internet use and the level of digital skills.

Highlight 2018 - The National Education Network (*Ogólnopolska Siec Edukacyjna - OSE[81]*) project foresees that all primary and post-primary schools both public and private will be connected to fast broadband with a minimum speed of 100 Mb/s by the end of 2020 and already 1,500 locations will be connected by end of 2018. The target number is 19,500 locations connecting over 30,000 schools by end of 2020. Currently, in Poland only about 23% of schools have access to fast Internet network with a bandwidth of at least 100 Mb/s. Lack of universal access to high-speed Internet is considered a barrier to the development of the intellectual potential of society and to maintaining an effective competitive advantage of the economy. Therefore, since September 2017, programming in Poland has been included in the curriculum of primary schools. Achieving this task is a big challenge and requires, among others, providing adequate telecommunications infrastructure and access to high-speed Internet in schools. OSE will also provide access to identical educational materials for all students. The project is financed under the OPDP. OSE has an implementation budget of PLN 320 mln (EUR 80 million) and the operational budget of PLN 1,3 billion (EUR 325 billion). In March 2018 the project won prestigious WSIS (World Summit on the Information Society) Project Prize 2018, awarded by the UN agency the International Telecommunication Union.

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[79] http://www.itforshe.pl/

[80] http://umiejetnoscicyfrowe.pl/#

[81] https://www.gov.pl/cyfryzacja/ogolnopolska-siec-edukacyjna1 ; https://www.gov.pl/cyfryzacja/zaglosuj-na-projekt-ose-w-ogolnoswiatowym-konkursie-wsis-prizes-2018

3 Use of Internet Services

3 Use of Internet Services	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**25**	**42,1**	**41,0**	**50,5**
DESI 2017	24	40,4	38,7	47,5

	Poland				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	79% →	16	79%	13	72%
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	68%	26	68%	26	78%
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	6%	26	6%	26	21%
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	42% ↑	24	38%	22	46%
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	63% ↑	22	60%	23	65%
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	52% ↓	19	53%	19	61%
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	58% ↑	17	56%	16	68%
% individuals who used Internet in the last 12 months	2017		2016		2017

Poland has made moderate progress as regards the use of video calls, social networks and online shopping when compared to 2017. Poland remains at the same rank as regards online banking. Poles are however above the EU average as regards reading online news. Despite moderate improvements, Poland's rank went down by one to 25th in DESI 2018.

Poland has been taking actions to address the obstacles to better use of internet. Poland has launched a number of initiatives to encourage citizens to go online. Under the OPDP, new educational and awareness raising campaigns[82] will be launched as of 2018 and until 2021 to increase the level of awareness and digital skills of citizens. A focus is given to areas such as programming, cybersecurity, eGovernment, banking and media literacy. The campaigns will encourage citizens to use Internet by showing how modern technologies can improve their quality of life and increase their participation in the society. The senior internet users will be inclused as one of target audiences. 230,000 Polish citizens will be trained in 8 thematic digital skills areas. The project has a budget of PLN 25 million (EUR 6,25 million), is funded under OPDP and will be carried out until June 2021.

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[82] https://www.gov.pl/cyfryzacja/34-start

4 Integration of Digital Technology

4 Integration of Digital Technology	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**27**	**23,5**	**29,2**	**40,1**
DESI 2017	27	21,6	26,7	36,7

	Poland					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**26%**	↑	**22**	**21%**	**25**	**34%**
% enterprises	2017			2015		2017
4a2 RFID	**3,4%**	↑	**20**	**2,8%**	**22**	**4,2%**
% enterprises	2017			2014		2017
4a3 Social Media	**10%**	↑	**26**	**9%**	**27**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**13,2%**	↑	**20**	**12,8%**	**19**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**6,3%**	↑	**25**	**5,2%**	**27**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**9,5%**	↓	**24**	**9,9%**	**23**	**17,2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**6,6%**	→	**21**	**6,6%**	**20**	**10,3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**3,9%**	↑	**26**	**3,8%**	**25**	**8,4%**
% SMEs	2017			2015		2017

Poland has made some progress in the Integration of Digital Technology dimension, however, other coutries have been progressing faster and Poland's rank has remained the same as in DESI 2017. The use of social media, cloud services eInvoices and electronic information sharing by companies has slightly improved. Only 9,5% of Polish SMEs sell online and 3,9% sell online cross border. SME e-commerce turnover is only 6,6% compared with the EU average of 10,3%.

The main challenges in the digitalisation of the enterprises in Poland are the lack of awareness regarding the opportunities, the limited access to a digitally skilled workforce and the lack of funding. Moreover, the Polish enterprises are reluctant to invest in upskilling their employees in digital skills or in new technologies.

The launch of the Polish Platform of Industry 4.0 (*Platforma Przemysłu Przyszłości*[83]) has been postponed from October 2017 to the beginning of 2018. The Platform will integrate all relevant stakeholders and act as and accelerator of the digital transformation of Polish industry. The Platform will seek to provide an effective institutional support for technology diffusion, which should stimulate both: demand and supply for digital technologies. The demand side will be stimulated by awareness raising, advisory, and financial support to

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[83] http://finanse.wnp.pl/powstanie-fundacja-platforma-przemyslu-przyszlosci,309109_1_0_0.html

SMEs. The supply side will be enhanced by financial support instruments, development of competence centers to provide testing infrastructure and trainings for SMEs. The Platform will be operational in 2018. The annual budget of the Platform is foreseen at PLN 20 million (EUR 5 million).

Poland needs to accelerate its efforts to get companies to use and benefit from the commercial potential of digital technologies. The actions being taken should in the long term bring positive synergies brought about by better connectivity, higher digital skills of citizens and the workforce and increased business participation in the digital economy.

5 Digital Public Services

5 Digital Public Services	Poland		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**48,2**	**48,0**	**57,5**
DESI 2017	18	48,5	44,2	53,7

	Poland					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
5a1 eGovernment Users[84] % internet users needing to submit forms	**45%** 2017	→	**23**	**45%** 2016	**23**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**48** 2017	↓	**17**	**58** 2016	**12**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**80** 2017	↑	**20**	**79** 2016	**18**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**70** 2017	↑	**25**	**69** 2016	**22**	**83** 2017
5a5 Open Data % of maximum score	**62%** 2017	↑	**22**	**56%** 2016	**16**	**73%** 2017
5b1 eHealth Services % individuals	**14%** 2017		**17**	**NA**		**18%**

In Digital Public Services Poland ranks 24th in DESI 2018[85]. Poland remains stable in the number of eGovernment users, and has slightly improved its performance as regards the online service completion, digital public services for businesses and open data. In the new eHealth services indicator measuring the number of people who used health and care services provided online without having to go to the hospital or doctors surgery, Poland ranks slightly below the EU average.

eGovernment is also among the priorities of OPDP, which aims to improve the quality and efficiency of public services through digitisation. Moreover, the National Development Strategy 2020 promotes introduction of uniform rules for eGovernment in administration. Planned actions are envisaged and being implemented to digitise public administration, to simplify administrative processes, to create structured digital knowledge resources, and to enable auditing of public information quality. The Programme for the Integrated Digitisation of the Country (*Program Zintegrowanej Informatyzacji Państwa[86]),* and the national Head of Computer Science (*Główny Informatyk Kraju*), which is a set of tools to enable the Minister of Digital Affairs to control the digitisation process of the country, are to create an efficient and coherent information system for the country.

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[84] 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.
[85] Poland's 14th rank in DESI 2017 has been changed due to the inclusion of two new indicators in DESI 2018 in the Digital Public Services dimension: Digital Public Services for Businesses, eHealth Services.
[86] https://www.gov.pl/cyfryzacja/program-zintegrowanej-informatyzacji-panstwa

The online platform Obywatel.gov.pl[87] provides a one-stop-shop for the citizens and is a gateway to the eGovernment services. It allowes the creation of a Trusted Profile which is a prerequisite for access to online services. There are currently 1 621 870 active Trusted Profiles. The successful use of electronic banking personal identification and of the Trusted Profile in "Family 500 plus" programme shows that online banking identification could also be applied to public services. Since January 2018 online registration of a company is also possible for the Trusted Profile owners.

In 2017 more digital services became available to citizens. Forms, designed from the perspective of the user's needs, where possible were automatically supplemented with data available in state registers. This applies in particular to the application for issuing an ID card (over 100,000 applications in one year), notification of its loss or damage or issuing of civil status documents. As of January 2018, citizens can also register their residence online.

In 2017 the Ministry of Digital Affairs launched a smart devices application mCitizen[88] (mObywatel) allowing quick online identification (mIdentity) and access to online documents (mDocuments). The project is now piloted and will be expanded in the future. An extremely popular service in 2017 was online tax settlement, used by nearly 10 million citizens.

The new roadmap for electronic ID implementation foresees the introduction of electronic ID as of 2019.

Poland is taking measures to improve its digital public services. Assuming these improvements continue, it is expected that the number of users will increase as a result of easier access and improved user-friendliness of the services offered. The foreseen communication and awareness-raising campaigns on a national scale are expected to increase the citizens' buy-in of eGovernment. There is a need in parallel for the development of better services directed at businesses.
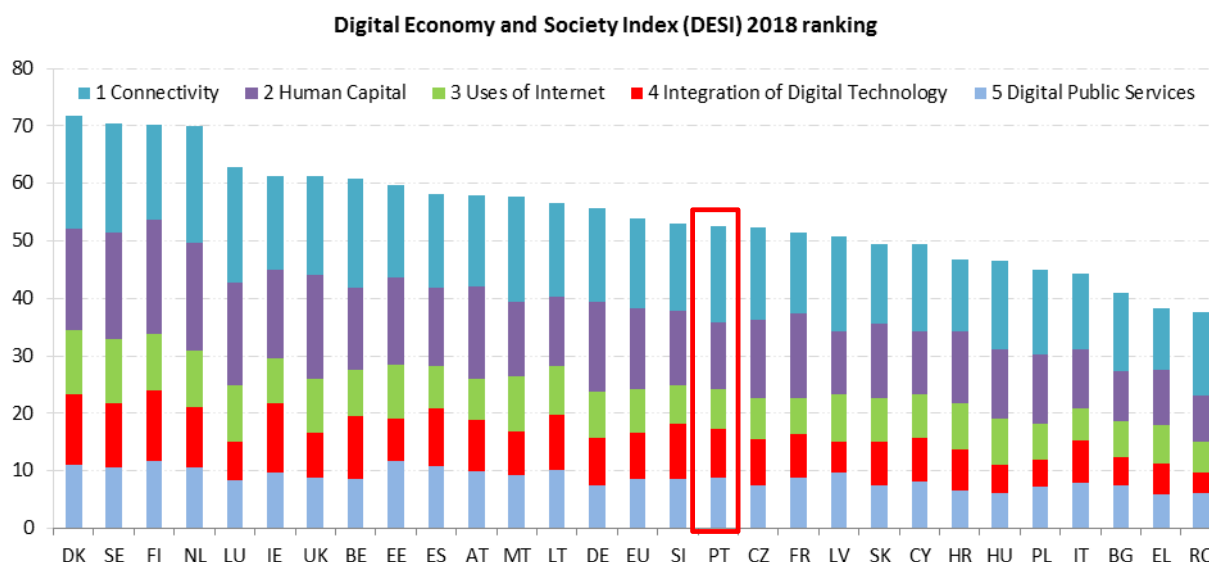
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[87] https://obywatel.gov.pl/
[88] https://www.gov.pl/cyfryzacja/aplikacja-mobywatel-dostepna-rowniez-na-ios

Digital Economy and Society Index (DESI)[89]
2018 Country Report Portugal

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**52.6**	**54.7**	**54.0**
DESI 2017	15	50.7	51.5	50.8

Portugal ranks 16th out of the 28 EU Member States in DESI 2018. The country's overall score increased slightly, although in a smaller proportion than the EU average. Portugal's scores have gone up in all of DESI's dimensions except for Integration of Digital Technologies. Noteworthy improvements relate to take-up of fixed and mobile broadband services as well as internet usage by citizens, although there is still room for further progress in all of these areas. Although Portugal progressed faster than the EU average in all the components of the Human Capital dimension, low digital skills levels, particularly among the elderly and those with low levels of education or on low incomes, continue to entail risks of digital exclusion and hinder progress in most of the other dimensions of DESI.

Portugal belongs to the Medium performing cluster of countries[90].

Over the course of 2017, Portugal has launched and started to implement two comprehensive policy initiatives on, respectively, digital competences and digitisation of the economy: *INCoDe.2030* and *Indústria 4.0* (see sections 2 and 4 for further details).

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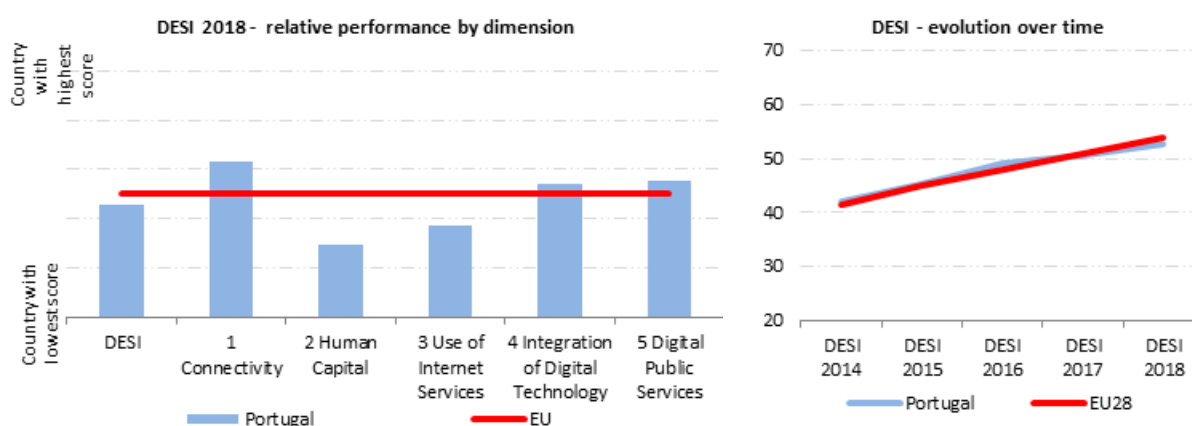
[90] Medium performing countries are Spain, Austria, Malta, Lithuania, Germany, Slovenia, Portugal, Czech Republic, France and Latvia.

1 Connectivity

1 Connectivity	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**67.4**	**62.4**	**62.6**
DESI 2017	9	63.8	58.8	58.5

	Portugal				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**99.5%** → 2017	**8**	99.5% 2016	8	97% 2017
1a2 Fixed Broadband Take-up % households	**72%** ↑ 2017	**16**	68% 2016	19	75% 2017
1b1 4G Coverage % households (average of operators)	**94%** ↑ 2017	**15**	93% 2016	10	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**65** ↑ 2017	**26**	55 2016	25	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**95%** → 2017	**4**	95% 2016	4	80% 2017
1c2 Fast broadband take-up % homes subscribing to >= 30Mbps	**51%** ↑ 2017	**9**	43% 2016	7	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**95%** 2017	**4**	NA		58% 2017
1d2 Ultrafast Broadband take-up % homes subscribing to >= 100Mbps	**35.4%** ↑ 2017	**4**	25.0% 2016	6	15.4% 2017
1e1 Broadband price index Score (0 to 100)	**66** ↓ 2017	**26**	69 2016	23	87 2017

Portugal further improved its overall connectivity ranking in DESI 2018, moving into 8th place in the EU, but despite good coverage is handicapped by its performance on take-up and prices. In Portugal, broadband is available to all homes and ultrafast broadband networks are already available to 95% of households, well above the EU average of 58%. 4G Coverage has progressed (from 93% to 94%), 4 p.p. above the UE average (91%). Broadband take up, both in fixed and mobile, improved in 2017 but still remains a challenge. Fixed broadband take-up has increased by 4 p.p. (68% in 2016 to 72% in 2017), narrowing the gap with the EU average (75%). Improvement of mobile broadband take-up was very substantial (55 subscriptions per 100 people in 2016 to 65 subscriptions per 100 people in 2017), but still remains far behind the EU average (90). While Portugal's performance in the Broadband Price Index worsened during the reporting period, it should be noted that convergent bundling (i.e. including fixed and mobile internet and voice services) is the most

representative method used by operators to sell electronic communications services in the country, which makes the assessment more complex[91].

Investment and competition between private operators have driven the extension of ultrafast broadband coverage in Portugal. No public funding or European Structural and Investment Funds are currently being used to support broadband roll-out but the Portuguese authorities continue monitoring projects in rural areas that benefitted from state aid in the past, to ensure compliance with requirements of non-discriminatory wholesale access and no more subsidy than necessary. In October 2017, ANACOM, the Portuguese national regulatory authority, concluded that wholesale access tariffs applied by Fibroglobal in the Center, Madeira and Azores regions were substantially higher than those of DSTelecom, which operates the subsidized rural broadband networks in the North, Alentejo and Algarve. As a result ANACOM proposed to the Portuguese Government a reduction (between 24% and 55% according to the type of access) of the wholesale prices applied by Fibroglobal.

The extensive deployment of FTTH places Portugal in a good position to achieve the European broadband coverage objectives for 2020 and 2025. Still, an additional effort is required to reach the last 5% of households without NGA coverage and to increase take-up.

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[91] Convergent bundles including fixed broadband, fixed telephone service, Pay-TV, mobile telephone service and mobile broadband (known as 5 play), became the most popular bundle in the Portuguese market in Q3-2017.

2 Human Capital

2 Human Capital	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**45.8**	**58.6**	**56.5**
DESI 2017	23	42.9	56.5	54.6

	Portugal				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
2a1 Internet Users	**71%** ↑	**24**	**68%**	**24**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**50%** ↑	**20**	**48%**	**21**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**2.4%** ↑	**24**	**2.3%**	**22**	**3.7%**
% overall employment	2016		2015		2016
2b2 STEM Graduates[92]	**18.6** ↑	**12**	**17.8**	**14**	**19.1**
Per 1000 individuals (aged 20-29)	2015		2014		2015

Portugal made progress in all of the indicators in this dimension and gained one position in DESI 2018. The share of Portuguese citizens who use the internet at least weekly increased by 3 pp. (to 71 %) in 2017 compared to a year earlier but it is still 10 pp. below the EU average. The share of those who have never used the internet, in turn, went down by almost 4 pp. and now stands at 22% compared with 13% for the EU as a whole. Half the Portuguese population hasn't got the basic digital skills required to function effectively online and 30 % has no digital skills at all (mostly because they do not use the internet or do so only seldom). This compares with an EU average of, respectively, 43 % and 17 %. Furthermore, 18 % of the Portuguese active labour force (employed and unemployed individuals) has no digital skills, compared with an EU average of about 10%. Certain population groups, such as the elderly (particularly in rural areas) or those on low incomes or with low education levels face serious digital exclusion risks in Portugal, as shown by the fact that only 31 % of people belonging to at least one of these groups[93] had basic digital skills in 2017 (9 pp. below the EU average).

Portugal is one of the EU Member States with the lowest share of professionals with specialised ICT skills in total employment: in 2016, it reached 2.4 % compared to an EU average of 3.7 %. However, at nearly 20 %, the share of enterprises employing ICT specialists is slightly above the EU average. It is also worth noting that comparatively fewer companies reported hard-to-fill vacancies requiring ICT specialist skills in Portugal than in the EU as a whole (respectively, 31 % and 47.5 % of companies having recruited or tried to

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[92] 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 have been updated by Eurostat.

[93] This figure refers to individuals with at least one of the 3 following characteristics: 55 to 74 years old; low education; unemployed or inactive or retired. Both low levels of education and unemployment are correlated with low income levels.

recruit personnel for jobs requiring ICT specialist skills[94]). The proportion of people aged 20 to 29 years old with STEM (science, technology and mathematics) degrees in Portugal is, in turn, roughly in line with the EU average of about 19 ‰.

In April 2017 Portugal launched its new National Digital Competences Initiative (*INCoDe.2030*)[95], which aims at enhancing digital literacy and promoting employability and professional training as well as R&D (including participation in international networks) in all areas associated to the digital transformation. *INCoDe.2030* also acts as Portugal's National Coalition in the context of the Digital Skills and Jobs Coalition. Flagship projects covering the initiative's five main action lines (*inclusion, education, qualification, specialisation, research*) have been presented as part of the first phase of its implementation. These include, among others, the setting-up of internet access points, an interactive platform to gather and disseminate examples of promising measures to fight digital exclusion, and a range of training actions to promote 'digital citizenship' (*cidadania digital*) through the use of online public services as well as tools such as *Qualifica+*, which seeks to address skills deficits among social groups at high risk of social exclusion. The Permanent Forum for Digital Competences has been designated as the governance body in charge of monitoring and evaluating *INCoDe.2030* initiatives. It held its first annual conference on December 6th, 2017[96]. Action to ensure that all citizens benefit from the digital transformation has also come from the Portuguese private sector and civil society, as illustrated by the launch of the *Movimento pela Utilização Digital Ativa* (MUDA)[97], which aims at helping to reduce the number of people who have never used the internet while promoting the acquisition of advanced digital competences.

Given Portugal's challenges with regard to the enhancement of its citizens' digital skills, particularly among vulnerable groups, as well as the importance of digital skills for reaping the benefits of digitisation, it will be crucial to closely monitor the contribution of these initiatives to the attainment of strategic policy goals in this respect.

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[94] Figures exclude financial sector and companies with fewer than 10 employees.
[95] www.incode.2030.pt
[96] http://www.incode2030.gov.pt/en/forum/conferencia2017
[97] https://www.muda.pt/quem-somos/

3 Use of Internet Services

3 Use of Internet	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**21**	**46.3**	**48.3**	**50.5**
DESI 2017	19	43.9	45.0	47.5

	Portugal				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	Value	**rank**	**value**	**rank**	**value**
3a1 News	**80%** ↑	**13**	**78%**	**15**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**83%**	**10**	**83%**	**10**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**9%**	**22**	**9%**	**22**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**44%** ↑	**21**	**39%**	**21**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**76%** ↑	**8**	**74%**	**9**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**42%** ↑	**24**	**41%**	**24**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**45%** ↑	**24**	**43%**	**24**	**68%**
% internet users (last year)	2017		2016		2017

Despite registering improvements in nearly all of the indicators considered under this dimension, Portugal slipped to the 21st position in the DESI 2018 ranking (it was 19th in the previous edition). The country continues to be among the EU's top ten Member States by share of internet users using social networks and playing or downloading games, images, films or music. However, it is significantly lagging behind with respect to uptake of online shopping and online banking: respectively, only 45 % and 42 % of internet users in Portugal compared with EU average values of 68 % and 61 %. Although this situation can be partly explained by idiosyncratic factors, the country ranks 24th out of 28 Member States in both these activities.

4 Integration of Digital Technology

4 Integration of Digital Technology	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**11**	**41.9**	**42.1**	**40.1**
DESI 2017	9	42.9	38.5	36.7

	Portugal					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	40%	↓	8	44%	4	34%
% enterprises	2017			2015		2017
4a2 RFID	5.6%	↓	10	8.0%	2	4.2%
% enterprises	2017			2014		2017
4a3 Social Media	16%	↓	19	17%	17	21%
% enterprises	2017			2016		2017
4a4 eInvoices	NA			19.0%	9	NA
% enterprises	2017			2016		2017
4a5 Cloud	14.4%	↑	18	11.2%	18	NA
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	17.3%	↓	12	18.1%	10	17.2%
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	13.1%	↑	6	12.0%	7	10.3%
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	8.0%	↑	16	7.9%	16	8.4%
% SMEs	2017			2015		2017

Portugal's score in this dimension improved in 2017, albeit only to a limited extent (1 pp.). As a result, it went down from the 9th to the 11th position in the ranking. The country's scores worsened substantially in some of the indicators where it had outperformed the majority of its counterparts in the past, such as the share of companies using information sharing and Radio Frequency Identification (RFID) technologies. About 25 % of Portuguese companies can be considered to have high or very high levels of digital intensity as measured by the Commission's Digital Intensity Index, compared to an EU average of 21.5 %. Conversely, the share of e-commerce in corporate turnover (16 %) is almost 2 pp. below the EU average, and the share of companies selling online seems to be flattening out. SMEs are significantly less active in both respects than their larger counterparts.

Portugal's national digital agenda includes a target to increase by 55 % by 2020 (baseline 2011) the number of companies using e-commerce as well as measures to increase SME participation in the digital economy. In January 2017, Portugal's Prime Minister presented the national strategy for the digitisation of the economy, *Indústria 4.0*. It encompasses 64 measures involving both public and private sector actors and has a strong focus on human capital development. It is expected to mobilise EUR 4.5 billion, including EUR 2.26 billion from the European Structural and Investment Funds over a four-year period. Implementation has already begun, with five calls for applications closed as of end-2017 for actions to promote digitisation of SMEs via technology upgrades, productive innovation and training and re-skilling.

Promising initiatives have been recently adopted to enhance Portugal's competitiveness in the digital economy. For example, the Startup Visa Programme[98], which was launched in November 2017[99] and involves the National Network of Incubators, seeks to support the development of the Portuguese startup ecosystem by attracting startup founders from abroad. The 'Suppliers Clubs' (*Clubes de Fornecedores*) initiative[100], in turn, aims at promoting the integration and participation of Portuguese companies, especially SMEs, in international value chains through cooperation with leading (or 'nuclear') companies, thus improving their access to markets, technologies and skills. The protocol to set up the support network for the creation of the 'Suppliers Clubs' was agreed in February 2017 and includes EUR 1.4 billion worth of funding over a six-year period. The first phase of implementation resulted in the selection of BOSCH as 'nuclear company'. The second phase, which is currently underway, corresponds to the launch of calls dedicated to capacity building in those companies that will be part of the BOSCH supplier network.

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[98] http://startupportugal.com/startup-visa
[99] Regulation No. 344/2017, 13th November 2017.
[100] https://www.iapmei.pt/PRODUTOS-E-SERVICOS/Incentivos-Financiamento/Portugal-2020/Clube-de-Fornecedores.aspx

5 Digital Public Services

5 Digital Public Services	Portugal		Cluster	EU
	rank	score	score	score
DESI 2018	**12**	**59.6**	**58.5**	**57.5**
DESI 2017	11	59.0	54.9	53.7

	Portugal				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[101] % internet users needing to submit forms	56% ↓ 2017	16	58% 2016	17	58% 2017
5a2 Pre-filled Forms Score (0 to 100)	74 → 2017	7	74 2016	4	53 2017
5a3 Online Service Completion Score (0 to 100)	96 → 2017	2	96 2016	4	84 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	88 → 2017	12	88 2016	12	83 2017
5a5 Open Data % of maximum score	47% ↓ 2017	27	41% 2016	25	73% 2017
5b1 eHealth Services % individuals	14% 2017	17	NA		18%

In general terms, Portugal's made limited progress under this dimension in DESI 2018 compared to a year earlier. To some extent, this may be explained by the relatively large share of the population with insufficient digital skills and who do not use the Internet or do so only seldom (see section 2 for further details).

The share of eGovernment users decreased by 2 pp. between 2016 and 2017, whereas open data use increased by about 6 pp. The level of online service completion, in turn, remained roughly unchanged (with Portugal as one of the EU leaders in this respect), as did both the amount of data being pre-filled in public services' online forms and the country's score for Digital Public Services for Businesses.

About 14 % of the country's citizens used eHealth services in 2017, compared to an EU average of 18 %. Further efforts will therefore be required to ensure that broader segments of the population enjoy the benefits from digitisation in this area. Portugal has recently launched a promising online-based initiative to promote health literacy which could be instrumental in this regard (see Highlight 2018 below).

> **Highlight 2018: Health Literacy Library**[102]
>
> The Portuguese national health system is undergoing a process of modernisation through the

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[101] 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.
[102] Chapter 5 - Section 5.1 in Online HiT Portugal. Available at
http://www.hspm.org/countries/portugal25062012/countrypage.aspx

SNS+Proximidade project, which aims to place the citizen at the centre of the health system. One of the cornerstones of this process is health literacy promotion, under which the Health Literacy Library[103] was created in June 2017. This online tool facilitates access to health information, promoting people's autonomy towards their own health and that of those around them.

The Health Literacy Library collects, analyses, selects and disseminates resources for good practice in health education, literacy and self-care. Currently, the available resources cover topics such as active life and health promotion and protection in different life stages, without focusing on specific conditions. These themes will be gradually expanded and an Intelligent Network on Health Literacy will be developed. The Library also provides access to a Personal Health Agenda, which is an online, personalised and confidential tool that includes relevant information on an individual's health. These instruments are pivotal to empower citizens and, consequently, to promote their participation in decisions regarding their healthcare.
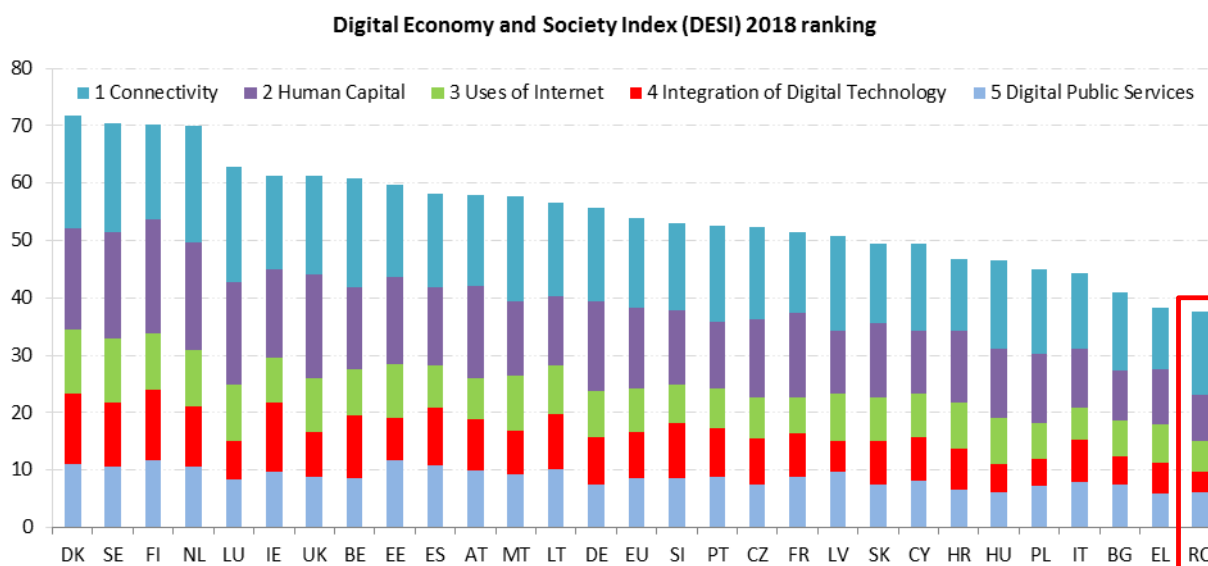
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[103] http://biblioteca.sns.gov.pt

Digital Economy and Society Index (DESI)[104] 2018 Country Report Romania

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

| | Romania | | Cluster | EU |
	rank	score	score	score
DESI 2018	**28**	**37,5**	**43,5**	**54,0**
DESI 2017	28	33,7	40,4	50,8

Romania ranks last out of the EU-28 in the DESI 2018. While its ranking remained unchanged over 2017, its score increased thanks to an improved performance in four of the five DESI dimensions. However, overall progress last year was slow and Romania did not manage to catch up. Digitisation of the economy and digital skills in the population is low and hinders progress in most of the DESI dimensions. On the other hand, 44% of Romanian homes subscribe to ultrafast broadband (which is the 2nd highest in the EU). ICT contributes 6-7% to Romania's GDP and the digital sector is growing, with two major hubs in Bucharest and Cluj as well as significant ICT investments in other cities.

Romania belongs to the low-performing cluster of countries[105].

Romania adopted its National Strategy for the Romanian Digital Agenda 2020 in February 2015[106]. It is the Chief Information Officerthat coordinates the development of digital policy in Romania. Progress in implementing digital policy has been limited over the last years.

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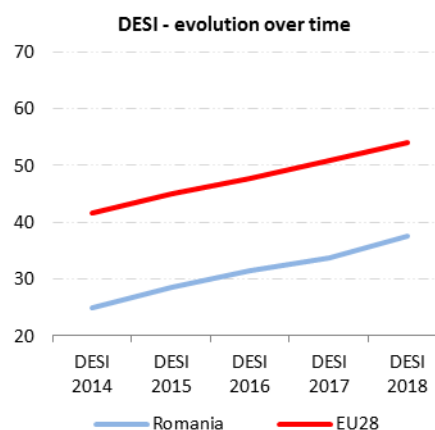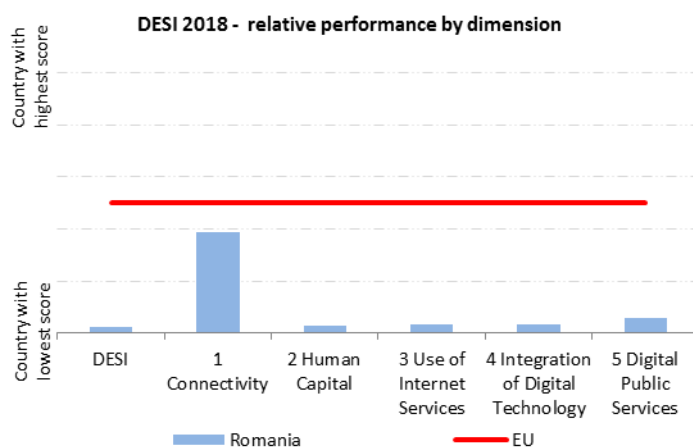
[105] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.
[106] Strategia Națională privind Agenda Digitală pentru România
https://www.comunicatii.gov.ro/?page_id=3496

1 Connectivity

1 Connectivity	Romania		Cluster	EU
	rank	score	score	score
DESI 2018	**22**	**58,1**	**55,0**	**62,6**
DESI 2017	26	49,5	50,1	58,5

	Romania				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
1a1 Fixed Broadband Coverage	88% ↓	27	89%	26	97%
% households	2017		2016		2017
1a2 Fixed Broadband Take-up	67% ↑	22	63%	23	75%
% households	2017		2016		2017
1b1 4G Coverage	72% ↑	27	45%	28	91%
% households (average of operators)	2017		2016		2017
1b2 Mobile Broadband Take-up	82 ↑	19	71	22	90
Subscriptions per 100 people	2017		2016		2017
1c1 Fast Broadband (NGA) Coverage	74% ↑	24	72%	24	80%
% households covered by VDSL, FTTP or Docsis 3.0	2017		2016		2017
1c2 Fast broadband take-up	53% ↑	5	44%	6	33%
% homes subscribing to >= 30Mbps	2017		2016		2017
1d1 Ultrafast Broadband Coverage	73%	15	NA		58%
% households covered by FTTP or Docsis 3.0	2017				2017
1d2 Ultrafast Broadband take-up	43,8% ↑	2	31,9%	2	15,4%
% homes subscribing to >= 100Mbps	2017		2016		2017
1e1 Broadband price index	87 ↑	12	85	16	87
Score (0 to 100)	2017		2016		2017

In 2017, Romania continued to make progress in achieving the Digital Agenda for Europe objectives, for example in improving the Connectivity index. However, Romania's fixed broadband coverage stagnated around 88% in the past year and still lags behind most Member States (ranked 27th in the EU). Broadband take-up reached 67% of households but was still below the EU average of 75%. Romania's urban-rural digital divide is best illustrated by the figures for next-generation access (NGA) coverage, where under 40% of rural areas are covered. Romania also lags behind on mobile 4G broadband coverage despite a leap from 45% in 2016 to 72% in 2017. The strong infrastructure-based competition in Romania, mainly in urban areas, is reflected in the indicators where Romania's performance is outstanding, namely the fast broadband take-up. A significantly higher ratio of homes (53%) are subscribing to fast broadband (>=30 Mbps) than the EU average of 33%. With almost three times as many subscriptions to ultra-fast broadband (43.8% of subscriptions to >100Mbps), Romania largely outperforms the EU average of 15.4%. This is due to the large share of fibre deployment in urban markets. In the fixed broadband market, an alternative operator has the biggest market share by relying on fibre access network infrastructure and has further increased its market share in 2017.

To address the urban-rural digital divide, under the 2014-2020 financial framework, the Romanian Operational Programme for Competitiveness (2014-2020) has earmarked EUR

100 million from the European Regional Development Fund (ERDF), while the 2014-2020 Rural Development Operational Programme has allocated EUR 25 million from the European Agricultural Fund for Rural Development (EAFRD). The RoNet project to support deployment of backhaul networks in "white areas" was granted ERDF financing of EUR 57 million in the previous financing period but could only absorb EUR 12.6 million by the end of the eligibility period (December 2015). Consequently, Romania re-allocated structural funds (EUR 44.95 million from the ERDF) to finalise the RoNet project in the current financing period, ensuring broadband backhaul infrastructure for 684 localities. At the end of 2017, the national authorities reported the signing off of works in 212 localities while in 367 localities the works have been finalised and are ready for signing off. For a significant part of the remaining white areas, a grant scheme of EUR 65 million (EUR 55.45 million from the ERDF) will provide support to private operators deploying last-mile access infrastructure. A public consultation was launched in September 2017 by the Ministry of communications and information society on the grant scheme. The state aid scheme is under preparation and the call should be launched in 2018.

While Romania lags behind on both fixed and 4G coverage, the Romanian legislative framework, and in particular the Infrastructure law, provides for the removal of bottlenecks in broadband network deployment, in particular the cumbersome authorisation and permitting process at local level. A better coordination between national ministries, National Authority for Management and Regulation in Communications (ANCOM) and local authorities is needed to deliver the secondary legislation 'that was planned for 2017', which would ensure a streamlined assistance to operators interested in investing in broadband.

2 Human Capital

2 Human Capital	Romania		Cluster	EU
	rank	score	score	score
DESI 2018	**28**	**32,1**	**42,2**	**56,5**
DESI 2017	28	30,9	40,6	54,6

	Romania				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
2a1 Internet Users	**61%** ↑	**28**	**56%**	**28**	**81%**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**29%** ↑	**28**	**28%**	**27**	**57%**
% individuals	2017		2016		2017
2b1 ICT Specialists	**2.0%** ↑	**27**	**1.9%**	**27**	**3.7%**
% total employment	2016		2015		2016
2b2 STEM Graduates[107]	**14.4** ↓	**20**	**16.6**	**16**	**19.1**
Per 1000 individuals (aged 20-29)	2016		2014		2015

In Human Capital, Romania ranks well below the EU average in terms of internet users, but there is progress with more and more people getting online and gradually improving their digital skills. Only 61% Romanians are regular internet users compared to the EU average of 81%. When it comes to basic digital skills, Romania does not show significant improvement on last year, and the EU average is almost twice as high (57%). On ICT specialists, Romania shows little progress, with only 2% of employed people working in the field. That said, the increasing number of IT vacancies may trigger an increase in ICT specialists in the future. However, this could be affected by recent changes in the taxation of wages, which may affect the tax exemptions for ICT professionals. The number of Romanians aged 20-29 holding a science, technology, engineering and maths (STEM) degree has been reduced from 16.6 to 14.4, compared to 19.1 in the EU.

Private companies have introduced IT specialisation programmes, while the number of places at universities is limited. Several Romanian universities have started offering a limited number of online courses (MOOC)[108.] The number of STEM students has doubled in 2017, but the number of teachers has remained the same.

As of this year, coding and technology classes are introduced as of the 5th grade in school. This complements what is already introduced at high-school level. The required hardware will be available in all schools (especially in rural areas), while the software used will be open source or freeware in order to ensure low costs.

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[107] 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.
[108] https://www.mooc-list.com/countries/romania

Following the same direction as last year's GovIThub[109], the University of Bucharest aims to create an innovation hub for digital skills. This initiative, supported by the national digital coalition of Romania, the industry and academia, will increase the number of competent digitally skilled university graduates that are available to the business sector.

Progress in industry and academia requires increasing the number of ICT specialists and filling the gap between supply and demand for STEM graduates, by considering the needs of the industry. Overall, there continues to be a significant mismatch between market demand and what universities are supplying. Only about 20% of market needs are currently met. This is also caused by a significant lack of teachers at the STEM University. In addition, it is important that teachers continue to receiving training to ensure that they are kept up to date with fast moving developments in the field.

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[109] http://ithub.gov.ro/

3 Use of Internet

3 Use of Internet	Romania		Cluster	EU
	rank	score	score	score
DESI 2018	**28**	**35,0**	**41,0**	**50,5**
DESI 2017	28	29,0	38,7	47,5

	Romania				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	Value	**rank**	**value**	**rank**	**value**
3a1 News % individuals who used Internet in the last 3 months	**69%** ↑ 2017	**24**	**63%** 2016	**25**	**72%** 2017
3a2 Music, Videos and Games % individuals who used Internet in the last 3 months	**67%** 2016	**27**	**67%** 2016	**27**	**78%** 2016
3a3 Video on Demand % individuals who used Internet in the last 3 months	**6%** 2016	**27**	**6%** 2016	**27**	**21%** 2016
3b1 Video Calls % individuals who used Internet in the last 3 months	**53%** ↑ 2017	**13**	**45%** 2016	**15**	**46%** 2017
3b2 Social Networks % individuals who used Internet in the last 3 months	**82%** ↑ 2017	**4**	**74%** 2016	**8**	**65%** 2017
3c1 Banking % individuals who used Internet in the last 3 months	**11%** ↑ 2017	**27**	**8%** 2016	**27**	**61%** 2017
3c2 Shopping % internet users (last year)	**23%** ↑ 2017	**28**	**18%** 2016	**28**	**68%** 2017

Although there is gradual progress year-on-year, Romania continues to rank last among the EU-28. Romanians read the news online (69%), listen to music, watch videos and play games (67%) and use the Internet for voice or video calls (53%). While Romanians are keen to engage in social networks and video calls, they are not so keen to use the Internet for online shopping (23% — ranked 28th) and eBanking (11% — ranked 27th) compared to the EU average.

The Romanian authorities have yet to present a policy on promoting e-commerce that includes shopping online. Initially, the policy was planned to be finalised in 2017, but the deadline was extended and it is now planned for 2018. Romanians are very reluctant to take up eBanking services, as there appears to be an overall lack of trust. Similarly to e-commerce, there is no clear public policy to stimulate the use of eBanking.

To increase public trust in shopping online and using eBanking services, it is important for the government to develop a strategy and promote the use of online services (e.g. via an awareness-raising campaign). Additional measures, such as encouraging banks to limit or not charge fees for eBanking and promoting eBanking in public institutions could encourage Romanians to use these services.

4 Integration of Digital Technology

4 Integration of Digital Technology	Romania		Cluster	EU
	rank	score	score	score
DESI 2018	**28**	**17,8**	**29,2**	**40,1**
DESI 2017	28	18,6	26,7	36,7

	Romania					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	17% 2017	↓	27	22% 2015	24	34% 2017
4a2 RFID % enterprises	2,4% 2017	↓	24	4,0% 2014	14	4,2% 2017
4a3 Social Media % enterprises	9% 2017	↑	27	8% 2016	28	21% 2017
4a4 eInvoices % enterprises	10,9% 2017	↑	24	8,7% 2016	24	NA 2017
4a5 Cloud % enterprises	6,0% 2017	↑	26	5,2% 2016	26	NA 2017
4b1 SMEs Selling Online % SMEs	7,7% 2017	↑	27	7,2% 2016	27	17,2% 2017
4b2 e-commerce Turnover % SME turnover	5,2% 2017	↑	25	4,3% 2016	26	10,3% 2017
4b3 Selling Online Cross-border % SMEs	1,8% 2017	↓	28	1,9% 2015	28	8,4% 2017

In the Integration of Digital Technologies by businesses, Romania remains at the bottom of the ranking and is not progressing. Romania scores 17.8, recording a drop of 4% compared to last year, while the EU average increased by 9% compared to the DESI 2017. The percentage of businesses using technologies such as electronic information sharing (17% - ranked 27th) and RFID (2.4% - ranked 24th), have decreased.On RFID, the decrease was sharp, since Romania dropped 10 places, from 14th to 24th. Also, no significant progress has been registered in terms of SMEs selling online (7.7% - ranked 27th), use of Cloud services (6% - ranked 26th) and e-commerce turnover for SMEs (5.2% - ranked 25th), while a small decrease was observed in selling online cross-border (1.8%) where Romania ranks last, while the EU average is 8.4%.

In terms of policy, although in 2016 the Prime Minister launched the Manifesto for Digital Romania[110], which sets out principles aligned with the vision for a digital future, Romania does not yet have a clear national strategy for digitising its industry.

In order to exploit digital opportunities, it is very important to have a clear strategy to digitise businesses covering the ICT and creative industries, communities of programmers, entrepreneurs as well as civil and professional associations.

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[110] https://see40.org/2017forum/

5 Digital Public Services

5 Digital Public Services	Romania		Cluster	EU
	rank	score	score	score
DESI 2018	**26**	**41,4**	**48,0**	**57,5**
DESI 2017	26	37,1	44,2	53,7

	Romania					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
5a1 eGovernment Users[111]	**80%**	↓	**7**	**84%**	**4**	**58%**
% internet users needing to submit forms	2017			2016		2017
5a2 Pre-filled Forms	**12**	→	**28**	**12**	**27**	**53**
Score (0 to 100)	2017			2016		2017
5a3 Online Service Completion	**61**	↑	**28**	**55**	**28**	**84**
Score (0 to 100)	2017			2016		2017
5a4 Digital Public Services for Businesses	**51**	↑	**28**	**48**	**28**	**83**
Score (0 to 100) - including domestic and cross-border	2017			2016		2017
5a5 Open Data	**79%**	↑	**10**	**63%**	**11**	**73%**
% of maximum score	2017			2016		2017
5b1 eHealth Services	**11%**		**21**	**NA**		**18%**
% individuals	2017					

Romania's performance is well below the EU average in terms of digital public services, but has made progress compared to last year. Romania has advanced mainly on the supply side by increasing the number of services that can be completed online and by improving on automatically pre-filling forms for citizens. That said, Romania still ranks 28th on digital public services. Romania has also made progress in promoting an Open Data policy and ranks 10th on this indicator. eGovenrment users stands at 80%, which is still higher than the EU average despite a slight decline compared to last year.

The national administration's IT system is fragmented, adding to the administrative burden for citizens and businesses. Additionally, the GovITHub project launched in 2016 by the previous government, which entailed a public-private partnership based on fellowships and voluntary work in order to develop public services, has been put on hold as the managing team resigned in early 2017. The Chief Information Officer explained that some of the projects that were started by GovITHub may be finalised at a later stage, but there are several issues that need to be solved, such as getting enough skilled people to further advance the projects. In the current competitive environment, the national administration has difficulties in attracting and retaining ICT specialists that can develop efficient digital public services. In order to address this issue, Romania is running two main projects that focus on simplification:

- A guide for the simplification of the national companies' registrar, provided as an eService. The goal is to make launching a start-up business easier, as this is the focal

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

point in their interaction with the state.

- A guide for eGovernment, which aims to identify the links between business processes and legislation, resulting in a mapping of existing procedures and relevant changes in the legislation.

In addition, a new centre for financial information will allow the government to communicate by electronic means with taxpayers, whether companies or citizens, and to receive tax declarations online. This will also include being able to submit and pay tax dues by Romanians working abroad. Discussions in this respect are ongoing with the tax authorities in Italy and Spain (the countries with the highest number of Romanians living abroad).

Establishing a consistent and long-term eGovernment strategy is very important for Romania. Further improvement and investment in online services is crucial.

Highlight 2018: Electronic Identification System (eID)

Romania is planning to introduce an electronic identification system (eID), an ambitious project, to provide chip-based ID cards. The Romanian Government is planning to use the eID as the legal tool for the interaction between citizens and companies with the government.

The envisaged system would, on a voluntary basis, include a certified electronic signature, as well as an interconnection with the national health card. In terms of timeline, the first large-scale deployment of the new ID cards is scheduled for 2019 (18 months from the adoption of the legislative act). The system will be financed from the national budget, with an allocated sum of around RON 2 million (around EUR 450 000) per year.

The establishment and use of an easy to use and highly secure eID system would significantly facilitate electronic interactions between citizens and SME's with the Romanian Government. Additionally, the system would considerably reduce administrative burdens, such as the current additional costs for relying on different electronic signature certifications schemes.
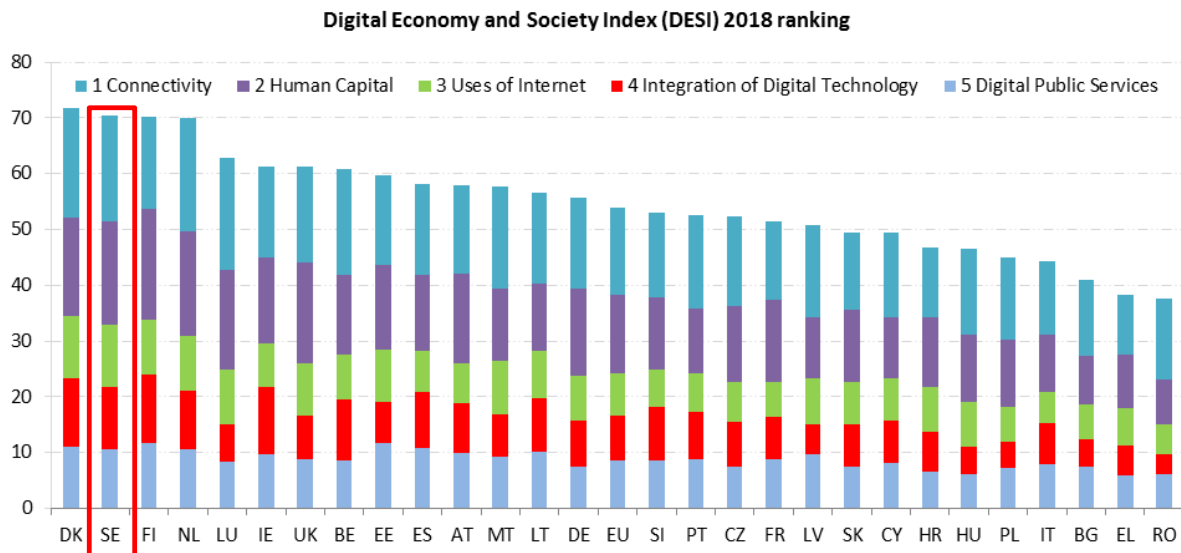

Digital Economy and Society Index (DESI)[112] 2018 Country Report Sweden

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


Digital Economy and Society Index (DESI) 2018 ranking

	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**70.4**	**64.0**	**54.0**
DESI 2017	3	67.0	61.2	50.8

In DESI 2018, Sweden now ranks 2nd after Denmark. Overall progress is in line with the EU average as well as the countries in the high-performance cluster[113].

Sweden is well connected and ranks 4th in the EU. However, reaching the remaining remote regions is a challenge. 95% of Swedes are online and make good use of a variety of services. In human capital, Sweden ranks third and shows progress in all DESI dimensions. Despite having the second highest number of ICT specialists in the workforce, demand exceeds supply and the relatively low numbers of STEM graduates are not expected to increase in the coming years. Swedish business actively use digital technologies to improve efficiency, productivity and sales and the country continues to rank 4th. In Digital public services Sweden now ranks 5th but open data is still an area were Sweden performance is relatively weak.

In May 2017, the Swedish government adopted a digitisation strategy[114] that focuses on five areas: digital skills, digital security, digital innovation, digital leadership and digital infrastructure. Sweden aims to become the world leader in harnessing the opportunities of digital transformation. To support the implementation of the strategy, a Digitalisation Council[115] has been set up. It consists of ten advisors, including the Digital Champion, led by the Minister of Digitalisation.

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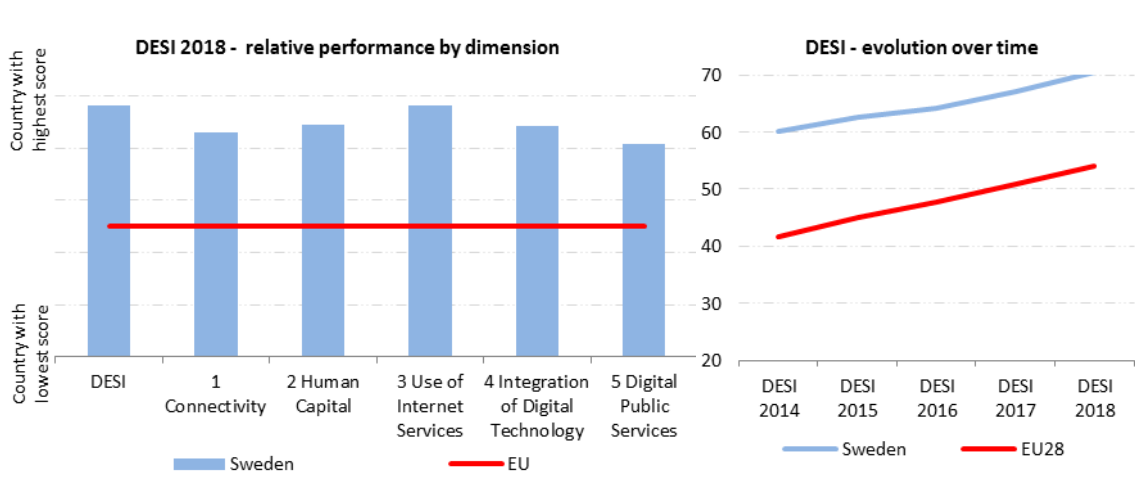
[113] High performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.
[114] Swedish Digitalisation Strategy
[115] Digitaliseringsrådet

1 Connectivity

1 Connectivity	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**76.0**	**71.9**	**62.6**
DESI 2017	5	72.5	67.9	58.5

	Sweden					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	**99%**	→	**14**	**99%**	**13**	**97%**
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	**78%**	↑	**8**	**72%**	**14**	**75%**
% households	2017			2016		2017
1b1 4G Coverage	**100%**	→	**1**	**100%**	**1**	**91%**
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	**123**	↑	**6**	**120**	**3**	**90**
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	**78%**	↑	**21**	**75%**	**19**	**80%**
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast Broadband Take-up	**57%**	↑	**3**	**45%**	**5**	**33%**
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultrafast Broadband Coverage	**73%**		**14**	**NA**		**58%**
% households covered by FTTP or Docsis 3.0	2017					2017
1d2 Ultrafast Broadband Take-up	**47.5%**	↑	**1**	**35.5%**	**1**	**15.4%**
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband Price Index	**87**	↓	**13**	**97**	**1**	**87**
Score (0 to 100)	2017			2016		2017

Sweden ranks 4th in connectivity among the EU Member States and scores well above the EU average (with a score of 76 against 62.6 for the EU). Take-up of fixed broadband has increased over the past year from 72 % in 2016 to 78 % in 2017. The share of fast broadband connections (providing at least 30 Mbps) is significantly higher than the EU average (57 % compared with 33 % across the EU) and has increased since last year, when it stood at 45%. Sweden is also approaching a 50 % take-up rate for ultrafast broadband, over three times the EU average.

Sweden's new broadband strategy, as adopted in December 2016, aims at having a completely connected country by 2025 and has the following three objectives: by 2020 95% (as opposed to the initial 90% target) of all households and businesses should have access to broadband of at least 100 Mbps; by 2023 the whole country should have access to stable mobile services of good quality; by 2025 the whole country should have access to high-speed broadband.

Sweden is a front runner on high speed Internet connectivity in the EU. Nevertheless, remaining sparsely populated areas are increasingly difficult to cover. In those areas, operators have fewer incentives incentivises to invest due to decreasing economic

profitability but also time consuming permit processes for broadband roll-out. In order to expand high speed Internet connectivity to those remote areas, broadband infrastructure roll-out might be incentivised by alleviating the relevant administrative procedures related to permit granting. Alternatively, any unwillingness to invest on the part of private operators might be offset by more public funding as far as roll-out of broadband infrastructure is concerned.

Both of the issues mentioned above have been taken into account by Sweden's new broadband strategy. As recommended in the strategy PTS has been given the task to analyse in which ways administrative permit-related processes can be rendered more efficient.

As to funding, Government funds for broadband expansion are today allocated in the form of governmental support, mainly by way of the EAFRD, but also via the ERDF in the northern parts of the country. In order to better meet evolving connectivity needs, as stated in the broadband strategy, PTS has been given the task to review the most efficient way to allocate future governmental funding. The report was delivered in November 2017[116].

It remains to be seen whether the implementation of the new broadband strategy will generate visible results by 2020 already.

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[116] Framtida stödinsatser på bredbandsområdet
(http://www.pts.se/contentassets/72d03bb4853f4cb4a24feb346efbaa3e/framtida-stodinsatser-pa-bredbandsomradet.pdf)

2 Human Capital

2 Human Capital	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**3**	**74.2**	**70.7**	**56.5**
DESI 2017	5	69.3	69.4	54.6

	Sweden				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
2a1 Internet Users % individuals	95% ↑ 2017	3	91% 2016	6	81% 2017
2a2 At Least Basic Digital Skills % individuals	77% ↑ 2017	3	69% 2016	6	57% 2017
2b1 ICT Specialists % individuals	6.3% ↑ 2016	2	6.1% 2015	2	3.7% 2016
2b2 STEM Graduates[117] Per 1000 individuals (aged 20-29)	15.3 ↑ 2015	19	14.6 2014	21	19.1 2015

In 2017, Sweden made good progress and performed third best in the human capital. All indicators have improved. 46% have of Swedes have above basic digital skills, 31% basic, 18% low and 5% have no digital skills at all.

Sweden continues to have the second highest number of ICT specialists. There is a comparatively high share of women working as ICT specialists (20%) and Sweden ranks 6th in this respect. However, demand for ICT skilled workers exceeds supply and the gap may remain for many years[118.] IT&Telekomföretagen[119] estimate a shortage of 70,000 ICT specialists by 2022. At the same time, the number of science, technology, engineering and maths (STEM) graduates continues to lag behind many EU countries. Roughly twice as many men as women graduate in STEM. Encouraging more women to study STEM and take up work as ICT specialists could consist of an untapped potential for the Swedish economy.

In 2017, the government adopted a national digitisation strategy for compulsory and upper secondary school[120.] The aim is that all children have adequate digital competences by 2022. The strategy focuses on four aspects of digital skills: understanding how digitisation affects the society and the individual; using and understanding digital tools and media; ensuring critical and responsible behaviour; and enabling problem solving and translating ideas to

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[117] 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.

[118] Trender och prognoser 2017 – Befolkningen, Utbildningen, Arbetsmarkande med sikte på år 2035

[119] IT-komptensbristen, En rapport om den svenska digitala sektorns behov av spetskomptens

[120] Nationell strategi för digitalisering av skolväsendet

actions. The implementation of the strategy includes curricula changes and training for school leaders and teachers. Digital skills will mainly be taught through the subjects of maths, civics, Swedish and technology. Programming is viewed as a tool for problem solving in all subjects but teaching is accentuated in maths. In parallel the National Agency for Education will digitise all national tests, which may serve as a catalyst of the digitisation of schools. The first digital national tests will be carried out in the autumn of 2018.

The social partners emphasise the need for life-long learning. A report[121] by Swedish Association of Graduate Engineers underlines that despite strong economy many companies do not allocate budget for skills development and do not have long-term plans on how to recruit talent to their companies.

In 2018, the Swedish innovation agency will pilot short university courses[122] at advanced level for professionals in jobs which are expected to be transformed by digitisation. The courses will be developed in collaboration with universities, business and public sector and focus on fulfilling the skills needs of large as well as SMEs.

Digital skills are addressed in one of five areas in the national digitalisation strategy[123] adopted in 2017. It highlights the need for all citizens to contribute and participate in a digital society; to modernise the education system including ensuring that tertiary education corresponds to students and the labour market's need for digital skills; focusing on life-long learning and increasing digital competences in the public sector especially among local communes and authorities who deliver services to the citizens. The Smart Industry strategy[124] from 2016 also focuses on tackling the shortage of skilled labour.

In January 2018 stakeholders met to set up a National Digital Skills and Jobs Coalition that will be launched in 2018.

Sweden is well advanced in digital skills but the persistent lack of people with ICT specialist skills could hamper economic development.

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[121] Innovations- och konjunkturrapport. Stark ekonomi. Svag satsning på komptens. Oktober 2017.
[122] Korta specialistkurser för livslångt lärande
[123] För ett hållbart Sverige – en digitaliseringsstrategi
[124] Smart industry - a strategy for new industrialisation for Sweden

3 Use of Internet Services

3 Use of Internet Services	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**2**	**73.4**	**63.4**	**50.5**
DESI 2017	2	71.4	60.5	47.5

	Sweden				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**88%** ↑	**6**	**87%**	**7**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**91%**	**1**	**91%**	**1**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**49%**	**2**	**49%**	**2**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**58%** ↑	**7**	**51%**	**8**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**74%** ↓	**11**	**75%**	**7**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**90%** ↑	**5**	**89%**	**5**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**84%** ↑	**2**	**80%**	**5**	**68%**
% individuals who used Internet in the last 12 months	2017		2016		2017

Sweden tops the European country league when it comes to using the internet to listen to music watching videos and playing games (91%), using video on demand (49%) and shopping online (84%).

95% of 16-74 year olds use the internet regularly. According to *The Swedes and the internet*[125] also 56% of those aged 75 and older are regular internet users and 79% of children aged as young as two watch TV and videos or play games online. By six years of age 98% use the internet. 90% of Swedes do banking online. Many use mobile Bank ID to identify themselves and one payment app is used by 71% of internet users[126].

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[125] The Swedes and the internet
[126] The Swedes and the internet

4 Integration of Digital Technology

4 Integration of Digital Technology	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**56.4**	**47.0**	**40.1**
DESI 2017	4	53.8	44.0	36.7

	Sweden					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**31%**		**15**	**NA**		**34%**
% enterprises	2017			2015		2017
4a2 RFID	**2.2%**	↓	**25**	**2.7%**	**23**	**4.2%**
% enterprises	2017			2014		2017
4a3 Social Media	**25%**	↑	**9**	**24%**	**9**	**21%**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**33.1%**	**4**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**NA**			**32.7%**	**2**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**28.5%**	↑	**2**	**26.1%**	**3**	**17.2%**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**15.0%**	↑	**4**	**14.7%**	**5**	**10.3%**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**9.7%**	→	**10**	**9.7%**	**10**	**8.4%**
% SMEs	2017			2015		2017

Swedish businesses actively use digital technologies to improve efficiency, productivity and sales.

An indicator[127] for digital maturity shows that the ICT sector, trade, other service companies and manufacturing are outperforming sectors such as construction, transport and real estate companies. The indicator also shows that small businesses lag behind bigger ones. The government recognises that the rapid digitisation has made it difficult for smaller companies to keep up with technological development in the Smart Industry Strategy 2030[128] and its action plan from 2016.

The Swedish research agency, Vinnova, runs 16 innovation initiatives relevant for Smart Industry. One example is Produktion 2030[129], which is a strategic research and innovation

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[127] Digital mognad I svenskt näringsliv
[128] Smart industry - a strategy for new industrialisation for Sweden
[129] Produktion 2030

programme aiming to make Sweden a frontrunner in investments in sustainable production by 2030. P2030 is a public-private partnership and brings together industry, academia and research associations. In 2017 P2030 launched a call for test bed projects to test new production methods and technologies or systems in the manufacturing industry.

On the startup side, Sweden has a clear venture capital strategy and infrastructure to fund young companies and high-risk projects. Sweden will spend €1.2 million until 2020 to promote investment related to smart industry. Investors in startups are stimulated to place or expand production, industrial services, research, development and testing in Sweden.

In 2017 a public enquiry on the sharing economy[130] was presented. It concludes that the sharing economy is still at an early stage and if larger groups of the population are to participate, more information and guidance is needed.

Swedish businesses are embracing digitisation, but more efforts could be taken to come to to terms with the lack of digitisation among small and medium enterprises.

Highlight 2018 Digilyftet

Digilyftet[131] is a pilot project which aims at developing methodologies to get small and medium-sized industrial companies (SMEs), including industrial service companies, interested in using digital technologies. The goals are to increase awareness about the potential of digitisation to improve competitiveness and create business value as well as to build networks and exchange practices.

The programme includes awareness raising workshops, information from companies who had already undergone digitisation and individual coaching for companies. Following Digilyftet 58% of companies started a digitisation project and a further 32% were going to start in the coming months. Digilyftet was coupled by business development vouchers[132] for digitisation where companies who had taken part could apply for support for their digitisation initiative.

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[130] Delningsekonomi på användarns villkor
[131] Slutrapport Digilyftet
[132] Vouchers for digitisation of SMEs

5 Digital Public Services

5 Digital Public Services	Sweden		Cluster	EU
	rank	score	score	score
DESI 2018	**5**	**70.8**	**63.0**	**57.5**
DESI 2017	5	67.4	60.2	53.7

	Sweden				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[133]	90% ↑	3	83%	5	58%
% internet users needing to submit forms	2017		2016		2017
5a2 Pre-filled Forms	74 ↑	8	71	8	53
Score (0 to 100)	2017		2016		2017
5a3 Online Service Completion	89 ↓	11	90	9	84
Score (0 to 100)	2017		2016		2017
5a4 Digital Public Services for Businesses	92 ↓	9	99	2	83
Score (0 to 100) - including domestic and cross-border	2017		2016		2017
5a5 Open Data	65% ↑	21	44%	22	73%
% of maximum score	2017		2016		2017
5b1 eHealth Services	33%	4	NA		18%
% individuals	2017				

Implementation and uptake of digital public services is high in Sweden. 90% of internet users needing to submit administrative forms do so online. Data that is already known to the public administrations are frequently pre-filled in forms in Sweden – for example when submitting tax declarations. When it comes to interaction with public administrations for life-events many steps can be performed completely online.

Sweden wants to speed up the digitisation of the public sector and announced several actions in the 2018 budget amounting to €20 million for the next three years, such as setting up a new agency[134] for digitisation of the public administration in September 2018. The agency will develop, coordinate and support the digitisation of state authorities, municipalities and county council and develop national digital infrastructure such as data management standards, eID and digital post. It will also promote open data and data driven innovation – an area where Sweden's performance is relatively weak. In 2017 some laws have been adjusted to the digital world, e.g. allowing automatization of certain decisions.

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[133] 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.
[134] Ny myndighet för digitalisering av den offentliga sektorn till Sundsvall

When it comes to eHealth services, a third of citizens use online health services for example, to book a consultation online. 99% of all recipes in Sweden are electronic[135]. The eHealth Agency implements of the 2017-2019 eHealth action plan[136]. The largest initiative is to set up a national online list of prescribed medicines that can be consulted by the patient, the healthcare provider and pharmacists to see which drugs are prescribed for a patient, regardless of who has prescribed them.

The agency also works on rules and regulations, definitions and standards for more efficient and secure health care. A challenge related to the exchange of patient information is that health care is decentralised.

The Swedish cybersecurity strategy[137] was adopted in June 2017 setting out six priorities: securing a systematic approach in cybersecurity efforts; enhancing network, product and system security; improving the capability to prevent, detect and manage cyberattacks and other IT incidents; increasing the possibility to prevent and combat cybercrime; increasing knowledge about vulnerabilities and needs; as well as enhancing international cooperation. In 2017 the government also introduced IT- incident reporting for all government agencies.

Digital public services are rather developed in Sweden both on demand and supply side. A challenge to further development and uptake is the decentralised public administration. Moreover, Sweden continues to lag behind when it comes to open data.

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[135] Swedish eHealth agency
[136] Sweden's eHealth action plan
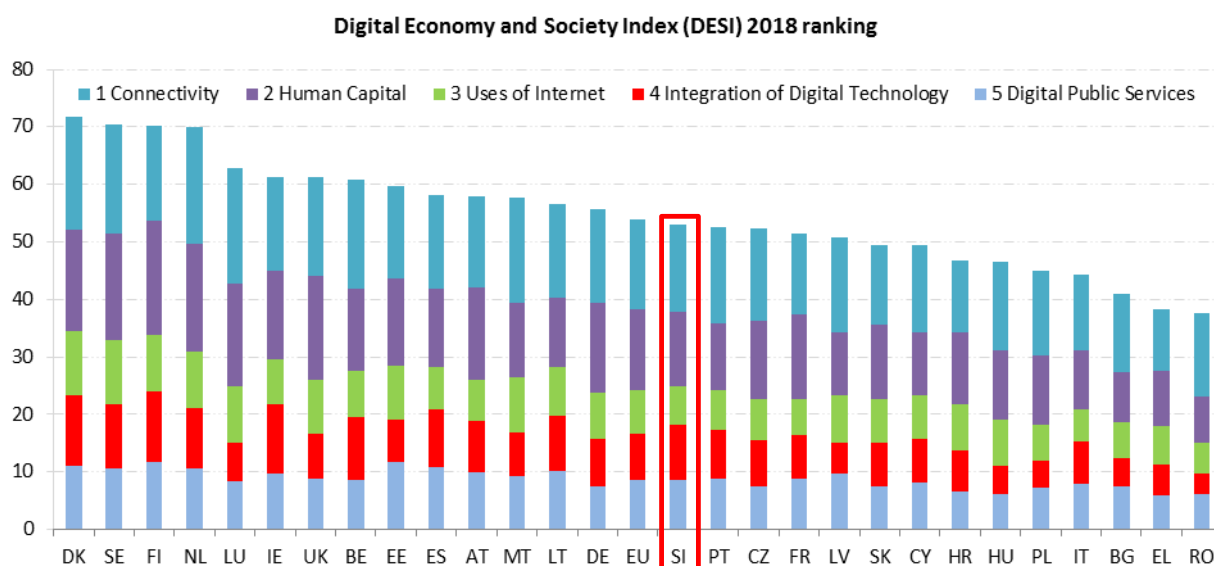[137] Nationell strategi för samhällets informations- och cybersäkerhet

Digital Economy and Society Index (DESI)[138] 2018 Country Report Slovenia

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**53,0**	**54,7**	**54,0**
DESI 2017	16	50,4	51,5	50,8

Slovenia ranks 15th out of the 28 EU Member States in the European Commission's Digital Economy and Society Index (DESI). Slovenia made significant progress in the use of internet services and the delivery of digital public services. Slovenia remains above the EU average in the integration of digital technology. Human capital levels are stable. However, connectivity remains below the EU average, and the roll-out and take-up of fast and mobile broadband is progressing slower than planned. Promoting the use of the internet and digital public services will improve take-up of and demand for digital services. Enhanced efforts to improve connectivity are a necessary precondition for a successful digital transformation in Slovenia.

Slovenia belongs to the medium-performing cluster of countries[139].

Slovenia is implementing its Digital Agenda Slovenia 2020[140] that was adopted in March 2016 and has in place a National Digital Skills and Jobs Coalition.

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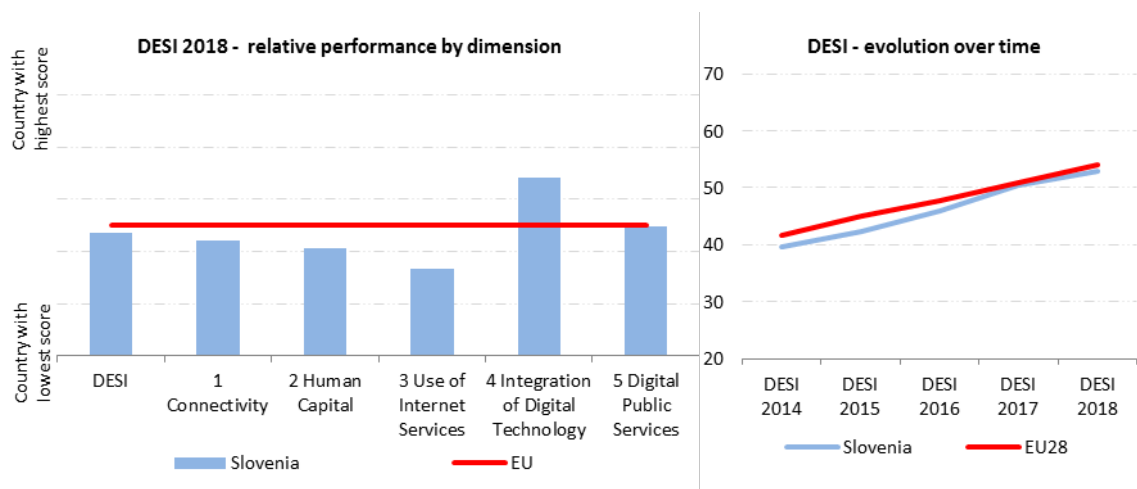
[139] Spain, Austria, Malta, Lithuania, Germany. Slovenia, Portugal, Czech Republic, France and Latvia.
[140] DIGITALNA SLOVENIJA 2020 Strategija razvoja informacijske družbe do leta 2020

1 Connectivity

1 Connectivity	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**60,3**	**62,4**	**62,6**
DESI 2017	19	56,9	58,8	58,5

	Slovenia					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	**98 %**	→	**16**	**98 %**	**15**	**97 %**
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	**77 %**	→	**11**	**77 %**	**9**	**75 %**
% households	2017			2016		2017
1b1 4G Coverage	**96 %**	↑	**13**	**90 %**	**17**	**91 %**
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	**66**	↑	**25**	**54**	**26**	**90**
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	**83 %**	↑	**16**	**82 %**	**13**	**80 %**
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast Broadband Take-up	**24 %**	↑	**21**	**19 %**	**22**	**33 %**
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultra-fast Broadband Coverage	**75 %**		**11**	**NA**		**58 %**
% households covered by FTTP or Docsis 3.0	2017			2016		2017
1d2 Ultrafast Broadband Take-up	**13,4 %**	↑	**16**	**9,4 %**	**16**	**15,4 %**
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband Price Index	**73**	↓	**23**	**75**	**21**	**87**
Score (0 to 100)	2017			2016		2017

Slovenia is progressing in terms of connectivity both on the fixed and mobile segments, but its overall ranking in the connectivity category remains unchanged. Bundled offers, mostly triple-play offers, keep playing a significant role in communications packages, at the expense of mobile operators without good fixed network coverage.

Almost everyone in Slovenia has broadband internet coverage and the country is making progress in fast broadband coverage (98 % and 83 % respectively). At 77 %, fixed broadband internet take-up remains close to the EU average (75 %). In 2016, Slovenia set itself the goal of ensuring 96 % of its population has internet speed of at least 100 Mbps and the remaining 4 % with speeds of at least 30 Mbps by 2020, which is a more ambitious goal than in the Digital Agenda for Europe. In order to achieve these targets, more investments in fixed line connectivity are needed, in particular in rural areas. In this context, Slovenia has launched a public call to invest public funds in the connectivity with fibre access networks in rural areas where there is no commercial interest. Slovenia is currently slightly above the EU coverage average, however, because of ambitious goals set for implementation in national digital agenda there is relatively slow implementation of planned investments. Slovenia might therefore miss the key target under the Digital Agenda for Europe to ensure that the entire population has access to internet with speeds of at least 30 Mbps. Furthermore, relatively

high prices for broadband connectivity (broadband price index 73) might be the reason for low take-up of fast broadband with speeds of 30 Mbps and above. Previous investments in fibre access networks mean that Slovenia is scoring well in ultra-fast broadband coverage (74 %), while take-up of ultra-fast broadband remains close to the EU average (13 %).

Timely regulatory reviews are important for a stable regulatory environment responsive to new developments. Persisting delays in market analysis of the wholesale broadband market for business connectivity prompted the Commission to open infringement proceedings in October 2017. Since then, the national regulatory authority AKOS has completed its analysis of that market.

The 700 MHz auction for 5G is planned for 2018. Moreover, the Ministry of Public Administration has, together with AKOS, launched the initiative for first pilot tests and the future use of 5G technology in Slovenian cities. In terms of competitiveness, the Slovene market remains very dynamic due to the fact that four converged players are offering 3- or 4-play services. Moreover, the government is preparing a number of demand-side initiatives to boost connectivity, such as wireless networks for local communities.

2 Human Capital

2 Human Capital	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**15**	**52,0**	**58,6**	**56,5**
DESI 2017	14	52,4	56,5	54,6

	Slovenia				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
2a1 Internet Users	**77 %** ↑	**19**	**73 %**	**20**	**81 %**
% individuals	2017		2016		2017
2a2 At Least Basic Digital Skills	**54 %** ↑	**18**	**53 %**	**16**	**57 %**
% individuals	2017		2016		2017
2b1 ICT Specialists	**3,5 %** ↓	**15**	**3,6 %**	**13**	**3,7 %**
% total employment	2016		2015		2016
2b2 STEM Graduates[141]	**17,2** ↓	**14**	**19,8**	**10**	**19,1**
Per 1000 individuals (aged 20-29)	2015		2014		2015

In the Human Capital dimension, Slovenia did not progress in 2017, and the gap with the EU average widened in the last year. Despite numbers of regular internet users rising from 73 % to 77 % Slovenia still has a slightly lower percentage of regular internet users compared to the EU average (81 %). However, 68 % of 14-74 year olds use the internet daily[142]. Despite a slightly decreasing share of STEM (science, technology, engineering and mathematics) graduates, it remains close to the EU average. However, companies cannot find enough digitally skilled labour[143].

Younger generations benefit from digital content and digital skills being included in the formal education curricula from elementary school to university level. Additionally, coding is being included in the school curricula of several schools. However, there are significant differences depending on age groups, education levels and income. The Slovenian Digital Coalition (digitalna.si) which brings together stakeholders from business, research, NGOs, local communities, the public sector and government aims to address the existing gaps in digital awareness and digital skills on the labour market by providing life long-learning actions targeting parts of the population not covered by the formal education process (+45 years old, lower education and rural population). A network of about 400 not-for-profit info-points for life-long learning exists throughout the country. Non-governmental organisations also carry out initiatives to increase trust in the use of internet.

All citizens should be able to reap the benefits of the digital transformation. Addressing the rising demand for digital skills remains crucial for supporting the digital economy. Enhancing digital skills outside the school curriculum would further boost the digital transformation.

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[141] 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.
[142] http://www.stat.si/StatWeb/pregled-podrocja?idp=2989&headerbar=8
[143] http://www.delo.si/gospodarstvo/kariera/ze-vsako-tretje-podjetje-ne-dobi-ustreznih-delavcev.html

3 Use of Internet Services

3 Use of Internet Services	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**23**	**44,9**	**48,3**	**50,5**
DESI 2017	23	41,4	45,0	47,5

	Slovenia				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**77 %** ↓	**19**	**80 %**	**12**	**72 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**78 %**	**16**	**78 %**	**16**	**78 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**18 %**	**12**	**18 %**	**12**	**21 %**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**47 %** ↑	**18**	**42 %**	**18**	**46 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**57 %** ↑	**25**	**51 %**	**27**	**65 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**50 %** ↑	**21**	**47 %**	**21**	**61 %**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**57 %** ↑	**18**	**53 %**	**19**	**68 %**
% individuals who used Internet in the last 12 months	2017		2016		2017

Slovenia ranks 23rd in terms of the share of individuals using internet services. More Slovenians use the internet than a year ago, but the gap to the EU average has not changed. Slovenian internet user's habits are mixed when compared to the EU average. While Slovenian internet users increasingly engage in online banking (50 %), social networks (57 %) and online shopping (57 %), the country still lags behind the EU average. Slovenians' use of internet for entertainment — music, videos and games – remains unchanged at the EU average. The use of video calls increased 5 percentage points in the last year and is now slightly above the EU average. Slovene residents are eager readers of news online with 77 % of internet users.

4 Integration of Digital Technology

4 Integration of Digital Technology	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**8**	**47,9**	**42,1**	**40,1**
DESI 2017	7	46,0	38,5	36,7

	Slovenia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
4a1 Electronic Information Sharing	**30 %**	↓	**18**	**33 %**	**16**	**34 %**
% enterprises	2017			2015		2017
4a2 RFID	**4,8 %**	↓	**13**	**4,9 %**	**9**	**4,2 %**
% enterprises	2017			2014		2017
4a3 Social Media	**18 %**	↑	**15**	**17 %**	**16**	**21 %**
% enterprises	2017			2016		2017
4a4 eInvoices	**NA**			**56,7 %**	**3**	**NA**
% enterprises	2017			2016		2017
4a5 Cloud	**13,5 %**	↓	**19**	**14,7 %**	**10**	**NA**
% enterprises	2017			2016		2017
4b1 SMEs Selling Online	**17,7 %**	↑	**11**	**13,1 %**	**18**	**17,2 %**
% SMEs	2017			2016		2017
4b2 E-commerce Turnover	**NA**			**NA**		**10,3 %**
% SME turnover	2017			2016		2017
4b3 Selling Online Cross-border	**11,6 %**	↑	**6**	**10,5 %**	**5**	**8,4 %**
% SMEs	2017			2015		2017

On the Integration of Digital Technology by businesses, Slovenia ranks 8th, well above the EU average. Slovenia managed to improve its score, despite losing one position in rank compared to last year. Slovenian SMEs are increasingly taking advantage of the possibilities offered by online commerce: 17.7 % of them sell online and 11.6 % sell cross-border. These two indicators improved from last year and show that Slovenia is above the EU average. However, it has regressed in electronic information sharing, use of RFID and cloud services. 4.8 % of Slovenian enterprises use RFID, meaning the country remains above the EU average (4.2 %).

Small and medium sized enterprises (SMEs) in Slovenia seem to be on the right track towards integrating digital solutions rapidly into their production processes, business models and distribution channels, as selling online enables them to reach out to cross-border markets. Selling online remains a challenge in the domestic market, even though an increasing number of Slovenians are buying online from foreign vendors. The use of e-invoices in the public sector, including utility enterprises has been common in Slovenia for several years, as the use of e-invoices is mandatory for the business sector in transactions with the public sector. The public authorities intend to promote the use of web-based services among SMEs by organising Internet of Things roadshows in regional centres and fairs and through the roll-out of broadband and 5G.

Strengthening and accelerating the digitisation of industry is a priority for Slovenia's Digital Strategy and the Digital Coalition. The Ministry for Economy and Technological Development (METD) has launched a call for interest for funding (EUR 8 million) to promote the digitisation of businesses processes in SMEs. It is also funding two projects on SMART specialisation in the digital area (factories of the future and SMART cities). Slovenia has no specific and targeted fiscal breaks for investment in digital.

Awareness of the need to integrate digital technologies into business processes is rising, including through newly established Digital Innovation Hubs. An increasing number of companies have appointed a chief information officer[144]. However, the degree of their actual integration varies considerably across the different sectors of the economy, with a higher degree of digitisation in services rather than in manufacturing[145]. The digital transformation is reaching out to some traditional industries as well, for example forestry or for active participation in construction projects. Nevertheless, more efforts could be made to promote the digital transformation to further traditional economy sectors.

Highlight 2018: Slovenia — a blockchain hub in Europe

Blockchain technology has become popular in Slovenia. According to the latest estimates, there are between 30 and 50 companies involved in blockchain technology and the number is constantly increasing. According to Google trends, Slovenia is among the top five countries interested in blockchain technology in global terms[146]. Several start-ups finance the launch of ICT innovative projects by initial coin offers (ICO).

While the question of the legal status of blockchain technology in Slovenia remains unsettled, the Digital Strategy wants to position Slovenia as a recognisable blockchain destination in the EU. In the absence of a regulatory framework, the Ministry of Public Administration, in cooperation with the Slovenian Digital Coalition (digitalna.si), established a Blockchain Think Tank, which connects all stakeholders in this field and monitors the evolution of blockchain technology in Slovenia. Currently around 500 stakeholders are part of the Blockchain Think Tank.

As trading with cryptocurrencies and initial coin offers became very popular in an unregulated environment, financial service regulators and authorities have started monitoring cryptocurrencies in the framework of the Financial Stability Board.

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[144] http://cio.si/
[145] http://www.stat.si/StatWeb/News/Index/6373
[146] https://trends.google.com/trends/explore?date=today%203-m&q=bitcoin

5 Digital Public Services

5 Digital Public Services	Slovenia		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**57,3**	**58,5**	**57,5**
DESI 2017	16	51,0	54,9	53,7

	Slovenia				EU
	DESI 2018		DESI 2017		DESI 2018
	Value	Rank	value	rank	value
5a1 eGovernment Users[147] % internet users needing to submit forms	**54 %** ↑ 2017	**18**	**50 %** 2016	**19**	**58 %** 2017
5a2 Pre-filled Forms Score (0 to 100)	**51** ↑ 2017	**14**	**43** 2016	**16**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**83** ↓ 2017	**17**	**84** 2016	**14**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) — including domestic and cross-border	**73** ↑ 2017	**23**	**67** 2016	**24**	**83** 2017
5a5 Open Data % of maximum score	**82 %** ↑ 2017	**7**	**60 %** 2016	**12**	**73 %** 2017
5b1 eHealth Services	**27 %**	**6**	**NA**		**18 %**

In 2017, Slovenia made more digital public services available which resulted in a higher take-up of eGovernment users and a substantial increase of use of pre-filled forms. However, the values remain lower than the EU average. Slovenia has considerably improved its performance in the Digital Public Services dimension due to a significant increase in the re-use of public sector data (from 60 % to 82 %). Slovenia ranks 7th in the re-use of public sector data and 6th in eHealth services. All basic public services for citizens are available online and for legal entities about 80 % of them are now online. The gap between all citizens and internet users can explain why Slovenia's figures are lower than the EU averages. 65 % of individuals who use the internet have interacted with the public authorities online in the last 12 months.

The Ministry of Public Administration has taken a clear lead in coordinating digital public services in Slovenia. This Ministry is responsible for telecom regulation, e-Government, access to public sector data, data policy, network security and e-IDAS regulation implementation.

Slovenia supports the goals and principles set out in the EU's e-Government Action Plan. The Digital Slovenia 2020 Strategy provides for the roll-out of digital public services by 2020 at all levels of government. The strategy introduces the 'digital by default' and 'once only'

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[147] 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.

principles and encompasses the development of various key enablers for access and interoperability of eGovernment services.

Digitisation contributes to the transparency of public administration in Slovenia. Almost all documents for meetings of the government[148] and parliament[149] are available online. Several applications make it possible to monitor public procurement expenses[150] and the use of public funds (including pensions, salaries of public employees, health expenditure and public utility services)[151].Slovenia is one of the first EU Member States to have a public beneficial owner register online[152].

By the end of 2017, about 65 public institutions had opened their data for re-use and there are now 3 700 data sets available to the public across all governmental departments. The Ministry of Public Administration is harvesting data sets from the Statistical Office and plans to include also data from sources such as the Parliament, the Bank of Slovenia, the cadastre and public utilities providers.

The high ranking in eHealth is explained by a generalised roll-out of e-prescriptions, which allows physicians to prescribe medicines to patients electronically. Patients can fill out their e-prescriptions in any pharmacy, using their health insurance card[153]. The roll-out of e-referrals to secondary care (specialists and hospitals) was also launched in 2017. The Ministry of Health expects that e-referrals will replace paper-based referrals within one year[154].

Slovenia is well on track, but promotion of user-friendly digital public services needs to be enhanced to increase their take-up.

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[148] http://www.vlada.si/delo_vlade/gradiva_v_obravnavi/.
[149] https://www.dz-rs.si/wps/portal/Home/deloDZ/Porocevalec/GradivaDZ.
[150] Statist: https://ejn.gov.si/statist.
[151] https://erar.si/
[152] https://www.ajpes.si/Registri/Drugi_registri/Register_dejanskih_lastnikov/Splosno.
[153] http://www.nijz.si/sl/erecep.
[154] http://www.mz.gov.si/si/medijsko_sredisce/novica/article/670/7411/
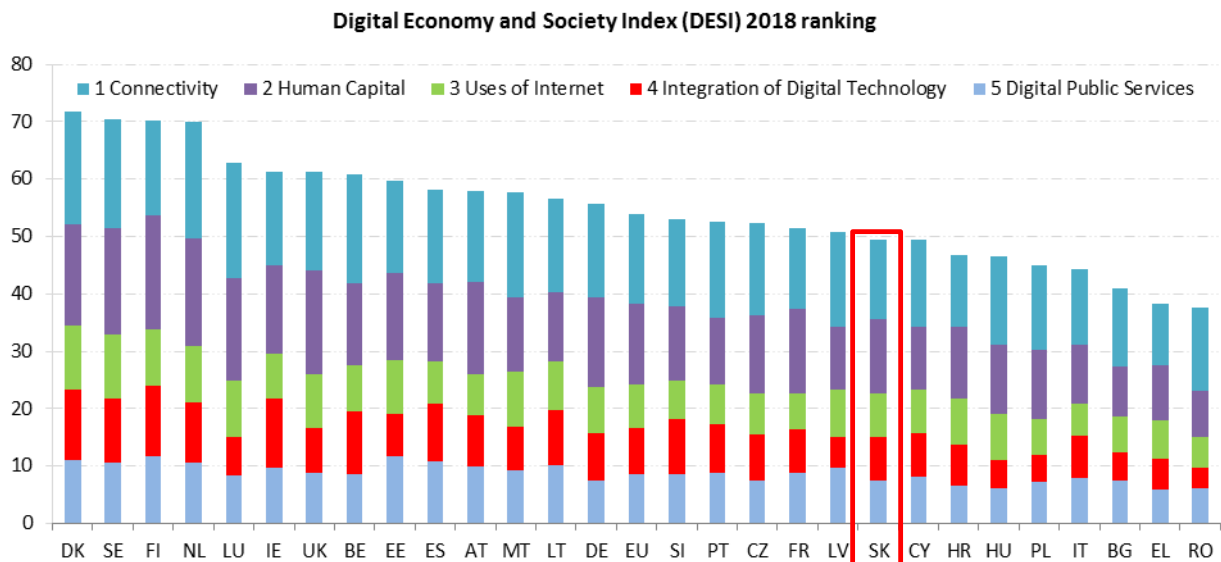
Digital Economy and Society Index (DESI)[155] 2018 Country Report Slovakia

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.


Digital Economy and Society Index (DESI) 2018 ranking

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

	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**49,5**	**43,5**	**54,0**
DESI 2017	20	45,5	40,4	50,8

Slovakia ranks 20th out of the 28 EU Member States in the European Commission's Digital Economy and Society Index (DESI) 2018, having made progress on previous years. While its ranking remained unchanged from 2017, its score increased due to an improved performance in all of the DESI dimensions measured. Slovaks are average internet users and made good use of a variety of online services. Availability of fixed broadband and 4G services are not as widespread as would be desirable, but ultrafast broadband coverage is well above the EU average. For human capital, the supply of ICT specialists is still below the EU average despite growing demand on the labour market. On eGovernment, Slovakia is progressing well and now ranks 20th. However, the number of eGovernment users is below the EU average. Improving its broadband infrastructure will help the country reap the full benefits of digital transformation.

Slovakia belongs to the low-performing cluster of countries[156].

The Slovak digital strategy, entitled the "Strategic Document for Digital Growth and Next Generation Access Infrastructure (2014-2020)"[157], which was drawn up by the Ministry of Finance, provides the direction to be followed on services to citizens and businesses, effective public administration and broadband access.

DESI 2018 - relative performance by dimension

DESI - evolution over time

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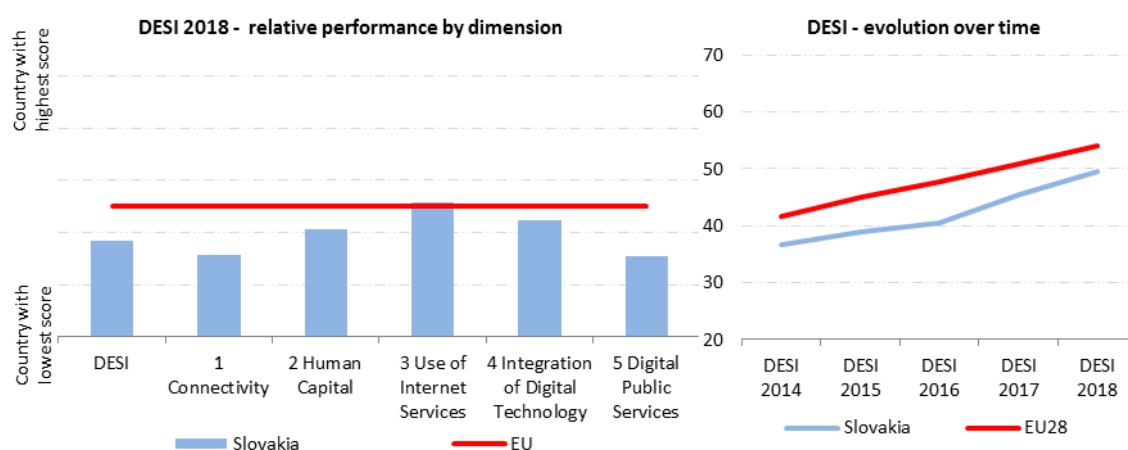
[156] Low performing countries are Romania, Greece, Bulgaria, Italy, Poland, Hungary, Croatia, Cyprus and Slovakia.
[157] http://www.informatizacia.sk/ext_dok-strategicky_dokument_2014_2020_en/16622c

1 Connectivity

1 Connectivity	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**24**	**55,1**	**55,0**	**62,6**
DESI 2017	24	50,8	50,1	58,5

	Slovakia					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage % households	**89%** ↑ 2017		26	88% 2016	27	97% 2017
1a2 Fixed Broadband Take-up % households	**70%** ↓ 2017		20	72% 2016	13	75% 2017
1b1 4G Coverage % households (average of operators)	**82%** ↑ 2017		24	71% 2016	24	91% 2017
1b2 Mobile Broadband Take-up Subscriptions per 100 people	**84** ↑ 2017		18	73 2016	20	90 2017
1c1 Fast Broadband (NGA) Coverage % households covered by VDSL, FTTP or Docsis 3.0	**79%** ↑ 2017		20	75% 2016	18	80% 2017
1c2 Fast Broadband Take-up % homes subscribing to >= 30Mbps	**29%** ↑ 2017		20	23% 2016	20	33% 2017
1d1 Ultrafast Broadband Coverage % households covered by FTTP or Docsis 3.0	**68%** 2017		17	NA 		58% 2017
1d2 Ultrafast Broadband Take-up % homes subscribing to >= 100Mbps	**9,6%** ↑ 2017		21	8,3% 2016	17	15,4% 2017
1e1 Broadband Price Index Score (0 to 100)	**88** → 2017		10	88 2016	12	87 2017

Slovakia's overall performance in connectivity seems to have made slight improvements, although its overall connectivity score of 55.1 is still below the EU average of 62.6. Slovakia has made very slight progress on fixed broadband coverage with 89% of households covered (88% previously) but is still below the EU average (of 97%). Fixed broadband take-up decreased to 70% of households (72% previously) and is still below the EU average of 75%. 4G coverage increased to 82% (71% previously) but remained below the EU average of 91%. Mobile broadband take-up increased to 84 subscriptions per 100 people (73 subscriptions per 100 people previously) but is still below the EU average of 90 subscriptions per 100 people. Slovakia has made some progress on fast broadband NGA coverage with 79% of households covered (75% previously) and appears almost at the EU average of 80%. Similar progress was made on fast broadband take-up, with 29% of homes covered (23% previously), compared to an EU average of 33%. Slovakia performed very well on ultrafast broadband coverage with 68.1% of households covered, well above the EU average of 58%. Slight progress was also made on ultrafast broadband take-up with 9.62% of homes subscribing (8.3% previously). However, the country is still well below the EU average of 15.4%. The broadband price index in Slovakia confirmed its value, which is above the EU average.

One long-term issue that has been going on for approximately 10 years in Slovakia is the provision of broadband coverage for "white spots" (i.e. uncovered municipalities). The Slovak authorities identified 207 "white spots" in early November 2017". Following public hearings to

map current broadband coverage and ascertain market players' future plans relative to the goal to achieve broadband coverage of 30 Mbps in all municipalities by 2020, Orange Slovensko and O2 Slovakia declared in 2017 their intent to cover all 207 remaining 'white spot' municipalities in Slovakia. As these declarations are not binding, another public consultation was launched in 2017 to obtain official commitments from the market players to cover all such "white spots" in Slovakia by the end of 2020. In February 2018, however, only a non-binding memorandum was signed between the relevant Slovak government department and the three major Slovak market players, Slovak Telekom, Orange Slovensko and O2 Slovakia. No binding commitments have yet been made. In the context of the revision of the Operational Programme on Integrated Infrastructure, which includes the objective of increasing broadband coverage, Slovakia will access EUR 118 million in funding from the European Regional Development Fund and the European Agricultural Fund for Rural Development for investment in backhaul and access networks. However, there are uncertainties as to whether this can be carried out with a view to bringing NGA connectivity to "white spots" areas in Slovakia. In May 2017 the Ministry of Transport and Construction cancelled a public tender for the "Atlas for passive infrastructure" project, the purpose of which was to map fixed and mobile telecom infrastructure needed for broadband deployment, and also to map road and energy infrastructure. The relevant Slovak government department has prepared a feasibility study for the intended '*WiFi for You*' demand-oriented measure to reach free WiFi coverage at municipal level which is supposed to be based on principles of the EU's Free Wi-Fi for Europeans scheme. There are however, no demand stimulation measures in place yet.

The Slovak market appears to be on the path to infrastructure-based competition. Market players tend to rely to a significant extent on their own forces and on commercial negotiations and commercial arrangements. This path has achieved solid results on ultrafast broadband coverage, which exceeds the EU average, but has not solved issues connected to total fixed broadband coverage and coverage by 4G networks. Moreover, ultrafast broadband take-up is very low relative to network availability. The issue of low ultrafast broadband take-up might be also linked to lack of demand-side programmes in Slovakia. A swift and effective implementation of the revised Operational Programme on Integrated Infrastructure will be essential for Slovak households and companies. More intense coordination between public and private stakeholders might increase the chance of efficient use of EU funds for total fixed broadband coverage and for coverage of "white spots". Establishment and operation of the single information point under the Broadband Cost Reduction Directive, which was notified by Slovakia as newly transposed, might contribute to this process. If remedies for broadband markets were implemented faster and with greater focus on practical detail, this could result in quicker progress towards the goal of more effective competition. Slovakia will also need to address the assignment of the 700 MHz band for wireless broadband, as the rights of one operator to use this band go beyond the year 2020. In addition, swift solution of the assignment of the 700 MHz band'would positively influence the outlook for 5G network deployment.

2 Human Capital

2 Human Capital	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**51,9**	**42,2**	**56,5**
DESI 2017	15	50,5	40,6	54,6

	Slovakia					EU
	DESI 2018			DESI 2017		DESI 2018
	value		rank	value	rank	value
2a1 Internet Users	**79%**	↑	**15**	**78%**	**14**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**59%**	↑	**12**	**55%**	**12**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**2,9%**	↑	**19**	**2,8%**	**17**	**3,7%**
% total employment	2016			2015		2016
2b2 STEM Graduates[158]	**16,6**	↓	**17**	**17,2**	**15**	**19,1**
Per 1000 individuals (aged 20-29)	2015			2014		2015

Slovakia's performance on Human Capital is below the EU average, and progress has been slower than the EU average. In 2017, 79% of the Slovak population were internet users (versus 78% in 2016), while 59% of Slovaks have at least basic levels of digital skills.

In terms of its ICT specialists, Slovakia performs below the EU average, with specialists of this kind accounting for 2.9% of total employment. Slovakia is performing below the EU average for graduates holding a degree in the fields of science, technology, engineering and mathematics (STEM), with 16.6 graduates per 1 000 individuals.

Slovakia is moving towards building the necessary capacity, using public and mainly private initiatives. In September 2017 Slovakia launched the Digital Coalition[159] (*Digitálna Koalícia*) as part of the Europe-wide Digital Skills and Jobs Coalition initiative[160], focusing on actions to improve students' digital skills and enhancing the digital literacy of employees, job seekers and entrepreneurs.

In further education, the Ministry of Education, Science, Research and Sport(MoESRS) is working together with private entities to produce programmes focusing on the development of digital skills. The programmes are then offered by secondary schools, universities and in the IT sector. For example, the IT Academy's[161] "Learning for the 21st Century" project, launched in February 2017, is supporting the development of the IT sector through changes in the education system at primary, secondary and higher levels. The project is implemented through the European Social Fund (ESF) and the European Regional Development Fund

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[158] 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.
[159] https://ec.europa.eu/digital-single-market/en/news/digital-coalition-launched-slovakia
[160] https://ec.europa.eu/digital-single-market/en/digital-skills-jobs-coalition
[161] http://itakademia.sk/sk/domov/

(ERDF), and has a budget of EUR 17.8 million. Its goal is to develop a model of education and training for young people which addresses the current and prospective needs of the knowledge society and of the labour market, focusing on IT and ICT skills. The main outcome is to generate at least 1 000 new specialists per year in line with the requirements of the IT sector. To achieve this, the project targets students from at least 24 000 elementary schools, 9 000 secondary schools and 3 000 universities.

MoESRS is also working, in cooperation with the Association of Universities of the Third Age, towards the inclusion of people with less digital skills than others (eInclusion). Promotion of eInclusion is one of the objectives in the "Strategic Document for Digital Growth and Next Generation Access Infrastructure (2014-2020)"[162]. This initiative, which has not been launched yet, will target people over 45, encouraging them to take part in digital training courses. The courses range from basic ICT skills to more advanced skills in the use of ICT for creative purposes and web design (e.g. courses for operating ATM machines or using internet banking).

Shortages of digital skills in both the public administration and the business sector are an obstacle to achieving the digital transformation and innovation in ICT. To exploit the opportunities offered by digital technology, it would be beneficial for Slovakia to increase the number of ICT specialists and STEM graduates through retraining initiatives and awareness-raising campaigns.

Highlight 2018: Women and IT

The "Aj Ty v IT"[163] project is an initiative to increase awareness and encourage women to study IT. The project provides a portal that informs female students, their parents and the public about the need for more women in IT. The portal works as a web repository that brings together and presents the profiles of computer scientists who did not study in the IT faculty of a Slovak university , but who gradually developed their IT skills and are now working in IT-related positions in different companies. It also provides information about ICT events specifically for women.

The aim of the project is to present computer science as a suitable field of study and a future career path for women. The next step is to help women to enter IT faculties and later gain employment in this field. This project was initiated by the Faculty of Informatics and Information Technologies (FIIT[164]) of the Technical University of Bratislava when it was noticed that female students in IT faculties represent only 3% to 5% of the total number of students. Over the first two years of the "Aj Ty v IT" project, the number of female students went up from 3% to 10%.

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[162] http://www.informatizacia.sk/ext_dok-strategicky_dokument_2014_2020_en/16622c
[163] http://www.ajtyvit.sk/
[164] https://www.fiit.stuba.sk/

3 Use of Internet

3 Use of Internet	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**16**	**51,3**	**41,0**	**50,5**
DESI 2017	15	49,4	38,7	47,5

	Slovakia				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	**77%** ↑	**18**	**74%**	**18**	**72%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	**69%**	**25**	**69%**	**25**	**78%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	**7%**	**25**	**7%**	**25**	**21%**
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	**55%** ↓	**10**	**57%**	**5**	**46%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	**72%** ↑	**13**	**71%**	**12**	**65%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	**63%** ↑	**15**	**56%**	**17**	**61%**
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	**70%** ↑	**9**	**68%**	**10**	**68%**
% internet users (last year)	2017		2016		2017

Many Slovaks are active internet users, engaging in a wide range of online activities such as reading news online, participating in social networks and using the Internet to communicate via voice or video calls. In all these activities, Slovak internet users are more active than in the EU overall. On the other hand, Slovaks are less active on the web when it comes to listening to music, watching videos on demand and playing video games online, scoring 69%, while the EU average stands at 78%.

63% of Slovaks use eBanking and 70% use online shopping services, scores above the EU average. The main factors that contribute to this are initiatives that promote citizens' awareness of such opportunities. The eInclusion projects described above in the section on human capital are an example of such initiatives.

4 Integration of Digital Technology

4 Integration of Digital Technology	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**18**	**37,4**	**29,2**	**40,1**
DESI 2017	21	30,2	26,7	36,7

	Slovakia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
4a1 Electronic Information Sharing	**31%** ↑	**16**	**30%**	**17**	**34%**
% enterprises	2017		2015		2017
4a2 RFID	**5,7%** ↑	**8**	**3,0%**	**20**	**4,2%**
% enterprises	2017		2014		2017
4a3 Social Media	**17%** ↑	**17**	**13%**	**22**	**21%**
% enterprises	2017		2016		2017
4a4 eInvoices	**17,9%** ↑	**16**	**14,5%**	**17**	**NA**
% enterprises	2017		2016		2017
4a5 Cloud	**15,0%** ↑	**14**	**11,9%**	**15**	**NA**
% enterprises	2017		2016		2017
4b1 SMEs Selling Online	**14,6%** ↑	**19**	**11,3%**	**21**	**17,2%**
% SMEs	2017		2016		2017
4b2 E-commerce Turnover	**12,2%** ↑	**7**	**10,5%**	**9**	**10,3%**
% SME turnover	2017		2016		2017
4b3 Selling Online Cross-border	**7,6%** ↑	**18**	**6,3%**	**17**	**8,4%**
% SMEs	2017		2015		2017

Slovakia made good progress on the Integration of Digital Technology. 31% of enterprises have ERP (enterprise resource planning) software packages to share information between different parts of their operations. 17% of enterprises are using two or more types of social media to interact with their customers, 4 percentage points higher than last year. More and more enterprises are selling online (14.6% v 11.3% in 2016). This has translated into an increase in the e-commerce turnover of those SMEs to 12.2%, while the EU average is 10.3%. Although online cross-border sales and the use of cloud services also increased to 7.6%, and 15% respectively, Slovakia still scores below the EU average in these areas.

One of the key priorities of Slovakia is the creation of conditions and opportunities for the development of e-commerce. The "Strategic Document for Digital Growth and Next Generation Access Infrastructure (2014-2020)"[165] underlines the importance of trusted cloud services that can support SMEs when selling online. The development of electronic and mobile payments is also a clear priority (including in the public administration), with eInvoices planned to be made available in all areas of business.

For SMEs to improve their performance, it is important that they become more aware of the advantages that digitisation can bring.

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[165] http://www.informatizacia.sk/ext_dok-strategicky_dokument_2014_2020_en/16622c

5 Digital Public Services

5 Digital Public Services	Slovakia		Cluster	EU
	rank	score	score	score
DESI 2018	**20**	**50,4**	**48,0**	**57,5**
DESI 2017	24	44,6	44,2	53,7

	Slovakia				EU
	DESI 2018		DESI 2017		DESI 2018
	value	rank	value	rank	value
5a1 eGovernment Users[166] % internet users needing to submit forms	**55%** ↓ 2017	**17**	**65%** 2016	**13**	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**34** ↑ 2017	**20**	**28** 2016	**21**	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**77** ↑ 2017	**22**	**67** 2016	**24**	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**73** ↑ 2017	**22**	**57** 2016	**27**	**83** 2017
5a5 Open Data % of maximum score	**77%** ↑ 2017	**11**	**74%** 2016	**9**	**73%** 2017
5b1 eHealth Services % individuals	**16%** 2017	**15**	**NA**		**18%**

Slovakia made good progress in this field, leaping from 24th to 20th in the DESI 2018 thanks to improvement in almost all categories measured. Slovakia performed better on 'pre-filled forms', scoring 34 compared to 28 last year, although well below the EU average. Its performance on the 'online service completion' and 'digital public services for businesses' indicators also improved, from 67 to 77 and from 57 to 73 respectively. Although Slovakia's performance on the Open Data index increased by 3 percentage points, it dropped two places in the ranking (from 9th to 11th) because the EU average increased from 59% to 73%. Slovakia performs below the EU average on eGovernment users, with 55% of internet users who needed to submit forms doing so.

In October 2017, the "Detailed Action Plan on Digitisation of Public Administration"[167] was published. The aim of the action plan is to develop an eGovernment system that is useful for citizens, public administration, businesses and academia. In addition, the "eHealth Implementation Programme" is under way, aiming at enabling central provision of public health relevant information, electronic booking mainly of laboratory treatment and vaccination, electronic prescription and medication processes and provision of patient health information. The estimated cost for finalising the eHealth system is around EUR 30 million.

Slovakia is taking steps towards modernising its public administration. An adequate level of coordination between different public administrative authorities is needed to achieve successful implementation of the action plan and thus bring significant changes to citizens, entrepreneurs and to the public administration itself.

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

[167] http://www.informatizacia.sk/ext_dok-detailny_akcny_plan_schvaleny/26030c
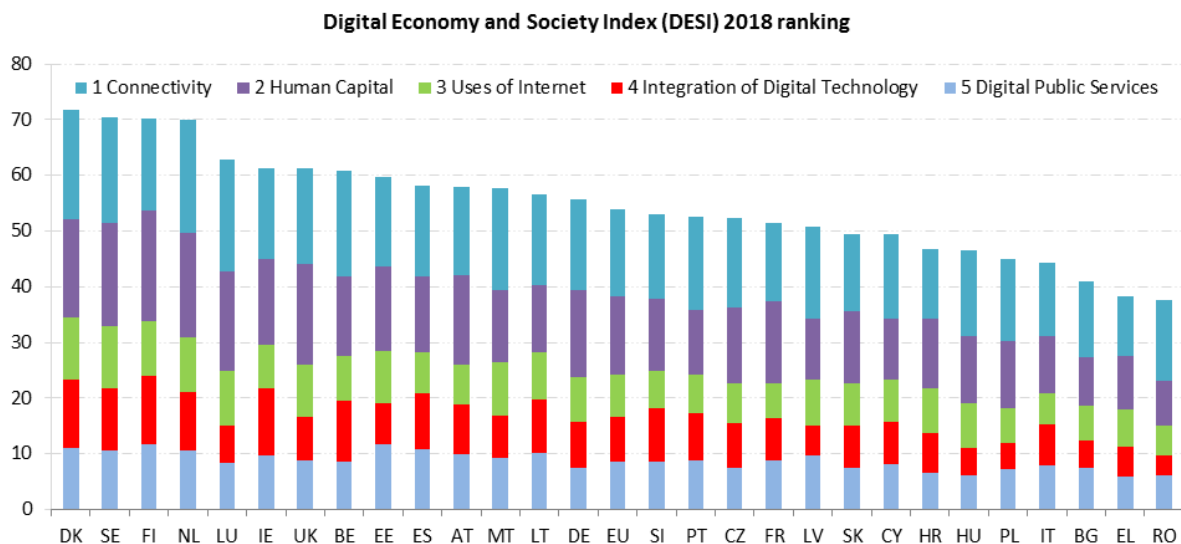
Digital Economy and Society Index (DESI)[168] 2018
Country Report United Kingdom

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 eCommerce
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.


Digital Economy and Society Index (DESI) 2018 ranking

	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**61.2**	**64.0**	**54.0**
DESI 2017	7	58.6	61.2	50.8

The United Kingdom ranks 7th out of the 28 EU Member States in DESI 2018. While its ranking remained unchanged over 2017, its score increased somewhat due to an improved performance in all DESI domains. UK citizens are well connected: broadband coverage and take-up (fixed and mobile), and NGA coverage are high. Furthermore, progress is being made with NGA take-up. Most UK citizens are now online and make good use of a variety of online services, particularly for shopping, accessing online entertainment and for social networking. Their digital skills are also improving. However, some gaps still exist. In particular, a third of citizens still do not have basic digital skills and Computer Science graduate numbers have not increased, despite growing demand on the labour market. Use of digital technologies by businesses in the UK shows a mixed picture. While use of Social Media, Cloud and eCommerce is relatively high, use of Electronic Information Sharing, RFID and eInvoices is very low and showing little improvement. While the UK performs relatively well on a number of eGovernment indicators, online service completion and provision of pre-filled forms is relatively low. To reap the full benefits of the digital transformation, the UK needs, in particular, to improve business integration of digital technologies, the level and availability of digital skills and some elements of its digital public service provision.

The United Kingdom belongs to the high performing cluster of countries[169].

On 1st March 2017 the UK government published its UK Digital Strategy[170] and on 27th April 2017 its Digital Economy Act entered into UK law (see highlight box for further details)[171].
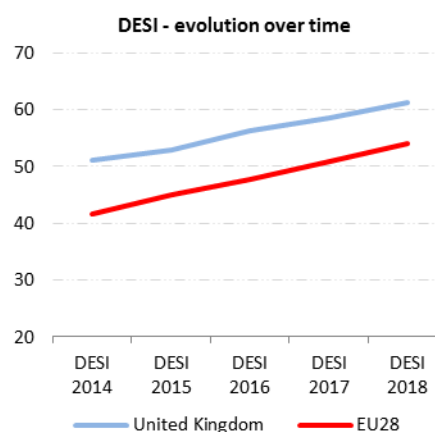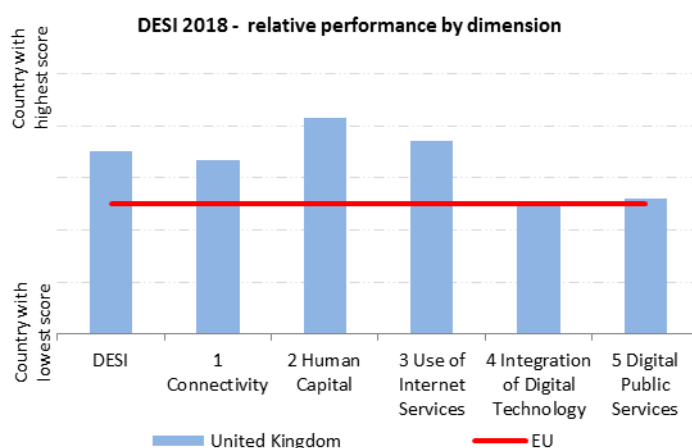
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[169] High performing countries are Denmark, Sweden, Finland, the Netherlands, Luxembourg, Ireland, the UK, Belgium and Estonia.

[170] https://www.gov.uk/government/publications/uk-digital-strategy

[171] https://www.gov.uk/government/collections/digital-economy-bill-2016

1 Connectivity

1 Connectivity	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**68.8**	**71.9**	**62.6**
DESI 2017	8	64.0	67.9	58.5

	United Kingdom					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
1a1 Fixed Broadband Coverage	**>99.5%**	→	**6**	**>99,5%**	**5**	**97%**
% households	2017			2016		2017
1a2 Fixed Broadband Take-up	**88%**	↑	**4**	**87%**	**3**	**75%**
% households	2017			2016		2017
1b1 4G Coverage	**98%**	↑	**10**	**93%**	**11**	**91%**
% households (average of operators)	2017			2016		2017
1b2 Mobile Broadband Take-up	**90**	↓	**13**	**91**	**8**	**90**
Subscriptions per 100 people	2017			2016		2017
1c1 Fast Broadband (NGA) Coverage	**94%**	↑	**7**	**92%**	**7**	**80%**
% households covered by VDSL, FTTP or Docsis 3.0	2017			2016		2017
1c2 Fast broadband take-up	**43%**	↑	**13**	**37%**	**13**	**33%**
% homes subscribing to >= 30Mbps	2017			2016		2017
1d1 Ultrafast Broadband Coverage	**51%**		**24**	**NA**		**58%**
% households covered by FTTP or Docsis 3.0	2017					2017
1d2 Ultrafast Broadband take-up	**14.6%**	↑	**15**	**9.9%**	**15**	**15.4%**
% homes subscribing to >= 100Mbps	2017			2016		2017
1e1 Broadband price index	**86**	→	**16**	**86**	**15**	**87**
Score (0 to 100)	2017			2016		2017

The United Kingdom performed well in 2017 and made important progress regarding almost all Connectivity indicators. The United Kingdom achieved full fixed broadband coverage in 2015. Fixed broadband take-up is at 88 %, well above EU average. NGA coverage is at 94 % of households, significantly above the EU average (80 %). Take-up of mobile broadband, at 90 subscriptions per 100 people, is at the same level as the EU average.

On 1 March 2017, the government published the UK Digital Strategy to support the digitalization of the country.[172] This umbrella strategy set out the government's aim of completing the rollout of 4G and superfast broadband. It also reconfirmed the £1 billion programme of investment in full fibre broadband and 5G. Part of the strategy was introducing a broadband universal service obligation (USO) by 2020. In this regard, the Department for Digital, Culture, Media & Sport (DCMS) did not accept BT's voluntary offer to provide 10 Mbps broadband to 99% of UK premises by 2022 and decided in December 2017 to pursue a regulatory USO that offers the advantage of certainty and legal enforceability.[173] The

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[172] https://www.gov.uk/government/publications/uk-digital-strategy

[173] https://www.gov.uk/government/news/high-speed-broadband-to-become-a-legal-right

Government set out the design of the regulatory USO in secondary legislation laid on 28 March 2018. [174]

There are several challenges regarding broadband deployment in the UK. Four per cent of the UK premises have no access to decent broadband of at least 10 Mbps. Regarding NGA coverage the urban-rural digital divide is still obvious (rural coverage was at 82 %). The share of FTTH/B connections (1 %) is one of the lowest in the EU. The regulatory USO and the measures set out in the UK digital strategy can bring improvements in this regard. The potential of the transposed Broadband Cost Reduction Directive, to contribute to the deployment of high speed broadband connections is not fully exploited yet. The benefits of the legal separation of BT and Openreach, which is not fully completed, are not visible on the market yet. Ofcom's increased focus on consumer matters and targeted actions in this regard bring clear benefits.

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[174] The specification for the USO design includes a download speed of at least 10 Mbps, a per premises cost threshold of £3,400 (enabling coverage to around 99.8% of premises), a requirement for demand aggregation, funded by the industry rather than publicly and uniform pricing (https://www.gov.uk/government/news/countdown-to-high-speed-broadband-for-all-begins--2).

2 Human Capital

2 Human Capital	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**4**	**71.6**	**70.7**	**56.5**
DESI 2017	4	71.3	69.4	54.6

	United Kingdom					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
2a1 Internet Users	**93%**	→	**5**	**93%**	**3**	**81%**
% individuals	2017			2016		2017
2a2 At Least Basic Digital Skills	**71%**	↑	**6**	**69%**	**5**	**57%**
% individuals	2017			2016		2017
2b1 ICT Specialists	**5.1%**	↑	**4**	**5.0%**	**3**	**3.7%**
% individuals	2016			2015		2016
2b2 STEM Graduates[175]	**22.1**	↓	**5**	**22.8**	**3**	**19.1**
Per 1000 individuals (aged 20-29)	2015 or 2016			2014		2015

In Human Capital, the United Kingdom performs very well but its recent progress has been rather limited. A large proportion of the UK population uses the internet regularly (93% - at least once a week); most people do so daily; and only 4% of the population has never used the internet. These figures are well above the averages for the European Union, 81% and 13%, respectively. Nevertheless, the UK faces some digital skills gaps. In terms of basic digital skills, the UK performs above average in the European Union: 71 % of the population had at least basic digital skills in 2017; the EU average was 57%. However, as such, almost 30% of the population does not have basic digital skills. The UK also suffers from a shortage of skilled ICT professionals. While employment of ICT professionals has grown significantly in recent years (+200,000 from 2013-2016), graduations in Computer Science steadily declined from 30,520 in 2011/12 to 26,415 for 2015/16[176]. However, they rebounded in 2016/17 to 27,820 and, as student numbers have also been steadily increasing over the past few years[177], it can be hoped that a corner has been turned and that graduation numbers will also continue to rise in the years to come. There is also a strong and growing gender divide with increasingly fewer women studying for and choosing ICT careers. Only 17% of Computer Science students in the UK are female (2016/17).

On 1 March 2017, the United Kingdom published a new Digital Strategy. One pillar of the strategy addresses digital skills and inclusion.[178] Its focus is on: tackling digital exclusion,

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[175] 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.

[176] https://www.hesa.ac.uk/data-and-analysis/students/outcomes

[177] https://www.hesa.ac.uk/data-and-analysis/students/what-study

[178] https://www.gov.uk/government/publications/uk-digital-strategy/2-digital-skills-and-inclusion-giving-everyone-access-to-the-digital-skills-they-need

developing the full range of digital skills that individuals and companies need and developing strong collaboration between the public, private and third sector. As part of this new strategy the UK plans to develop the role of public institutions such as libraries and the NHS in improving digital inclusion, provide adults in England who lack basic digital skills free access to training and provide support to digital skills development in education. It has also established a new Digital Skills Partnership[179] a new multistakeholder, cross-sectoral, partnership on digital skills, addressing all levels of digital skills. In November 2017 a Board for the Partnership was established[180] and four Delivery Groups[181] were formed.

In January 2018, The Tech Partnership and Lloyds Banking Group, two members of the Partnership, launched a consultation on updating the Basic Digital Skills framework, created in 2015.[182] In August 2017, the Department for Digital, Culture, Media and Sport also commissioned a programme of research to understand the UK's current and future advanced and specialist digital skills needs, as well as the characteristics of the advanced and specialist digital workforce.[183] A key part of this work involves collecting data from employers via an online survey. The findings are intended to support policy development to address the UK's advanced digital skills challenges and to develop the UK's advanced and specialist digital skills pipeline to meet industry demand. The development of advanced digital skills are also supported through a new Insutute for Coding and the National Innovation Centre for Data. The UK is also developing interventions to address the gender imbalance in ICT, including by supporting the Tech Talent Charter.[184] – a private sector initiative promoting recruitment and retention practices to support more gender balance.

The UK is one of the few EU countries to have introduced a comprehensive computing curriculum throughout its compulsory education system (since September 2014). To ensure its successful delivery, it will be important to put attention on developing teachers' competences. The announcement in the Autumn budget of increased funding for digital skills - £84m to train up to an additional 8,000 computer science teachers and open a National Centre for Computing; as well as £30m in England to test the use of AI and innovative EdTech in online digital skills courses as a first step towards the planned National Retraining scheme - is welcome. Earlier this year, the UK Government also confirmed that full funding for basic digital skills courses for adults, based on new national standards, will be introduced from 2020 in England.The UK is taking active steps to address its digital skills challenges of different types and levels, which act as a drag on productivity. Over time these investments should bear fruit.

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[179] https://digitalinclusion.blog.gov.uk/2017/07/20/kicking-off-the-digital-skills-partnership/

[180] https://www.gov.uk/government/publications/the-digital-skills-partnership/the-digital-skills-partnership-board-board-members-and-terms-of-reference

[181] https://digitalskillspartnership.blog.gov.uk/2018/01/26/introducing-the-dsp-delivery-groups/

[182] https://digitalinclusion.blog.gov.uk/2018/01/23/the-basic-digital-skills-framework-is-being-updated-nows-your-chance-to-have-a-say-and-shape-its-future/

[183] https://www.pyetait.com/digitalskills/

[184] https://www.gov.uk/government/news/government-commits-to-signing-tech-talent-charter-to-boost-gender-diversity-in-tech-roles

3 Use of Internet Services

3 Use of Internet Services	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**7**	**62.4**	**63.4**	**50.5**
DESI 2017	7	59.4	60.5	47.5

	United Kingdom				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
3a1 News	72% ↑	22	68%	22	72%
% individuals who used Internet in the last 3 months	2017		2016		2017
3a2 Music, Videos and Games	80%	13	80%	13	78%
% individuals who used Internet in the last 3 months	2016		2016		2016
3a3 Video on Demand	34%	5	34%	5	21%
% individuals who used Internet in the last 3 months	2016		2016		2016
3b1 Video Calls	53% ↑	12	49%	10	46%
% individuals who used Internet in the last 3 months	2017		2016		2017
3b2 Social Networks	75% ↑	9	73%	10	65%
% individuals who used Internet in the last 3 months	2017		2016		2017
3c1 Banking	72% ↑	10	68%	11	61%
% individuals who used Internet in the last 3 months	2017		2016		2017
3c2 Shopping	86% ↓	1	87%	1	68%
% internet users (last year)	2017		2016		2017

In Use of Internet Services, the United Kingdom performs relatively well, ranking 7th out of the 28 Member States. As mentioned above, most UK citizens are now online (93%). By far the most popular online activity in the UK is shopping. 86% of UK internet users buy online. As such, the UK ranks first in terms of online shopping amongst Internet users. This position is unchanged over the last year. Downloading music, videos and games (80%), Social networking (75%), reading online news (72%) and online banking (72%) are also activities undertaken by the majority of internet users. Use of VoD (Video on Demand) is also relatively more widespread than in other EU countries. Furthermore, use of video calls is increasing with just over half of internet users in the UK now using these services.

4 Integration of Digital Technology

4 Integration of Digital Technology	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**14**	**40.0**	**47.0**	**40.1**
DESI 2017	15	36.9	44.0	36.7

	United Kingdom					EU
	DESI 2018			**DESI 2017**		**DESI 2018**
	value		rank	value	rank	value
4a1 Electronic Information Sharing % enterprises	**19%** 2017	↑	26	17% 2015	26	34% 2017
4a2 RFID % enterprises	**1.8%** 2017	↑	28	1.6% 2014	27	4.2% 2017
4a3 Social Media % enterprises	**42%** 2017	↑	1	40% 2016	1	21% 2017
4a4 eInvoices % enterprises	**NA** 2017			5.2% 2016	27	NA 2017
4a5 Cloud % enterprises	**NA** 2017			22.4% 2016	6	NA 2017
4b1 SMEs Selling Online % SMEs	**19.2%** 2017	↑	10	18.7% 2016	7	17.2% 2017
4b2 eCommerce Turnover % SME turnover	**9.3%** 2017	↓	16	9.4% 2016	12	10.3% 2017
4b3 Selling Online Cross-border % SMEs	**8.9%** 2017	↓	12	9.0% 2015	12	8.4% 2017

In Integration of Digital Technologies by businesses, the United Kingdom shows a mixed picture. While its overall progress is on a par with the EU average, adoption of some technologies are far more advanced than others. For example, the percentages of businesses using technologies such as electronic information sharing (ERP – 19%) and RFID (1.8%), are very low; so the UK ranks 26th and last in the EU for these two indicators, respectively. By contrast, take-up of Social Media (42%) is advanced. Domestic eCommerce by SMEs is somewhat above the average for the EU, but turnover is somewhat lower. The percentage of SMEs that sell online cross border is somewhat higher than average.

Digitisation of businesses is addressed under the fourth pillar of the UKs Digital Strategy. Encourgaging the digitisation of businesses is seen as a way of boosting innovation and improving productivity, which is relatively weak. To achieve this, focus is being put on existing initiatives, and plugging gaps where there are specific challenges. To support the implementation of this strategy towards business digitisation £13 million of funding has been allocated to the creation of a private sector-led Productivity Council. The Council will drive engagement to improve productivity across the economy, including through appropriate use of digital technologies. Part of this strategy is to encourage more eCommerce, including cross-borader, by for example negotiating preferential rates with a number of e-marketplaces that are exclusive to government-referred clients. Other elements of the Digital Strategy, e.g. on connectivity and skills, also support these actions.

5 Digital Public Services

5 Digital Public Services	United Kingdom		Cluster	EU
	rank	score	score	score
DESI 2018	**14**	**58.2**	**63.0**	**57.5**
DESI 2017	12	56.2	60.2	53.7

	United Kingdom				EU
	DESI 2018		**DESI 2017**		**DESI 2018**
	value	rank	value	rank	value
5a1 eGovernment Users[185] % internet users needing to submit forms	**80%** ↑ 2017	**8**	**75%** 2016	8	**58%** 2017
5a2 Pre-filled Forms Score (0 to 100)	**17** ↑ 2017	**26**	**16** 2016	26	**53** 2017
5a3 Online Service Completion Score (0 to 100)	**80** ↑ 2017	**21**	**76** 2016	21	**84** 2017
5a4 Digital Public Services for Businesses Score (0 to 100) - including domestic and cross-border	**92** → 2017	**8**	**92** 2016	7	**83** 2017
5a5 Open Data % of maximum score	**80%** ↑ 2017	**9**	**78%** 2016	6	**73%** 2017
5b1 eHealth Services % individuals	**25%** 2017	**7**	**NA**		**18%**

In Digital Public Services, the United Kingdom shows an overall average performance. However, while active eGovernment use and availability of digital public services for businesses is above the EU average, online service completion and, in particular, availability of online forms (17 out of 100) could be improved. However, the latter can in part be attributed to UK citizens' dislike of public administrations retaining their personal information and an adapted public service provision to take account of this. The UK is an above average performer in the use of Open Data. In the area of eHealth services, the UK is an above average performer; with 25% of UK citizens going online to use health and care services such as ePrescriptions and online consultations, compared to 18% for the EU average.

In February 2017 the UK government published a Government Transformation Strategy 2017-2020,[186] which builds on the 2012 Government Digital Strategy[187]. In February 2018, the Government Digital Service published an update on its implementation: Government Transformation Strategy – one year on.[188] More than 175 services across government now use one of the digital service platforms operated by the GDS. Including digital services such as GOV.UK Notify, GOV.UK Platform as a service, GOV.UK Verify and GOV.UK Pay etc.. In the coming year it is planned to put a focus on: exploring how new technologies such as Artificial Intelligence and biometrics can support public service provision; capacity building/skills development of staff and supporting the UKs exit from the EU.

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[185] 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.

[186] https://www.gov.uk/government/publications/government-transformation-strategy-2017-to-2020/government-transformation-strategy

[187] https://www.gov.uk/government/publications/government-digital-strategy

[188] https://gds.blog.gov.uk/2018/02/08/the-government-transformation-strategy-one-year-on/

Published in 2015, the NHS's Five Year Forward View[189] set out the challenges facing the NHS; including expensive to treat conditions are on the rise, people are living longer and an increase in care provision. The strategy's Next Steps[190] (March 2017) and Robert Wachter's Making IT Work report[191] (September 2016) make clear that to meet these challenges, the NHS must make better use of information and technology. The UK is implementing a number of digital health projects and programmes and has made a commitment to use information and technology and make sure patient records are digital and interoperable by 2020. In September 2015 a process began to allow local health and care systems to produce Local Digital Roadmaps, which set out how they will achieve these commitments.[192] These Local Digital Roadmaps were published locally in January 2017.

These policies will help ensure the modernisation of public services in the UK.

Highlight 2018: UK Digital Strategy[193]

The UK published a new Digital Strategy in March 2017; Building on its Industrial Strategy green paper (January 2017), the strategy has seven strands addressing: connectivity, digital skills and inclusion, the digital sectors, the wider economy, a safe and secure cyberspace, digital government and data. The purpose of the strategy is to make the most out of digital for the economy as a whole, by building on its strengths in digital and tackling underlying weaknesses.

The Digital Economy Act 2017**[194]** passed into UK law on 28th April 2017. It is an Act of Parliament addressing key issues relating to electronic communications services. It replaces the Digital Economy Act 2010 introduced by the previous government.

Its key provisions incude:

- An overhaul of telecoms infrastructure regulation;
- Universal service obligation of a minimum broadband speed 10Mbits/sec
- Age verification for pornography;
- Tougher sentences for copyright offenders;
- And more sharing of citizens' data.

In the Autumn 2017 budget[195], the UK government also announced a number of digital economy measures totalling £500m. Measures include money for the development of Artificial Intelligence (AI), investment in 5G networks and digital skills.

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[189] https://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf
[190] https://www.england.nhs.uk/wp-content/uploads/2017/03/NEXT-STEPS-ON-THE-NHS-FIVE-YEAR-FORWARD-VIEW.pdf
[191] https://www.gov.uk/government/publications/using-information-technology-to-improve-the-nhs
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