



Digital Economy and Society Index (DESI)

2019 Country Report

Estonia

About the DESI

The European Commission has been monitoring Member States' digital competitiveness with the Digital Economy and Society Index (DESI) reports since 2015. The set of reports includes both country profiles and thematic chapters.

The DESI country reports combine quantitative evidence from the DESI indicators across the five dimensions of the index with country-specific policy insights and best practices. An in-depth telecoms chapter is annexed to the reports for each Member State.

The thematic chapters present a European-level analysis of broadband connectivity, digital skills, use of the internet, digitisation of businesses, digital public services, the ICT sector and its R&D spending, and Member States' use of Horizon 2020 funds.

To improve the methodology and take account of the latest technological developments, a number of changes have been made to the DESI for 2019. The DESI now covers:

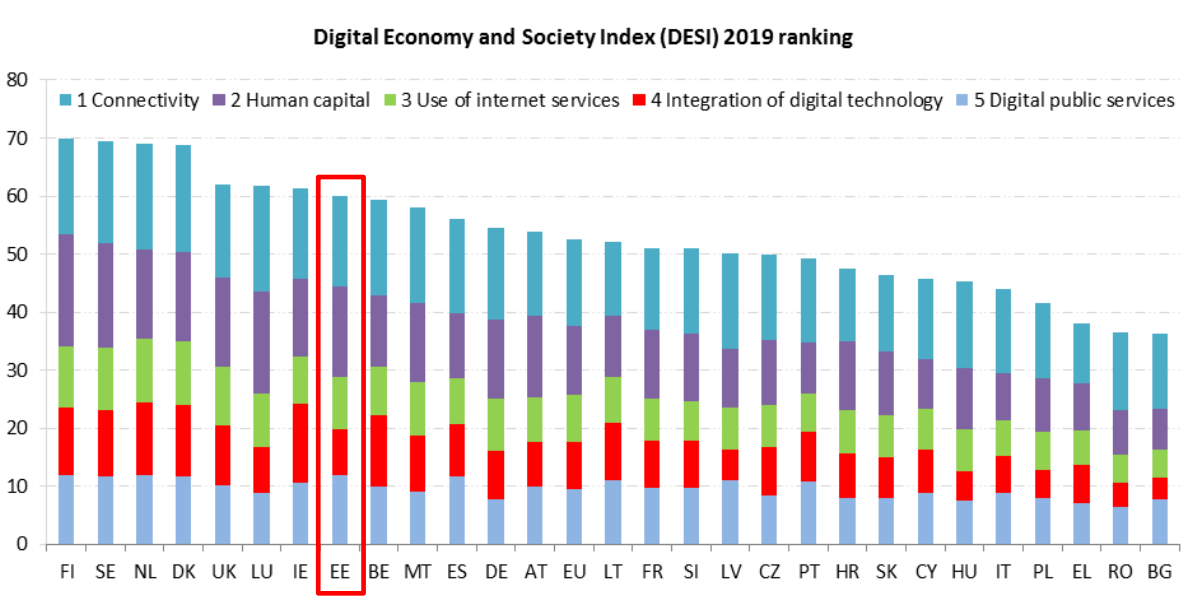
- *5G readiness,*
- *Above basic digital skills,*
- *At least basic software skills,*
- *Female ICT specialists,*
- *ICT graduates,*
- *People who never used the internet,*
- *Professional social networks,*
- *Doing an online course,*
- *Online consultations and voting,*
- *Individuals selling online,*
- *Big data,*
- *Medical data exchange and*
- *e-Prescriptions.*

The DESI was re-calculated for all countries for previous years to reflect the above changes in the choice of indicators and corrections to the underlying data. Country scores and rankings may thus have changed compared with previous publications.

For further information, please consult the DESI website: <https://ec.europa.eu/digital-single-market/en/desi>.

Estonia overview

	Estonia		EU
	rank	score	score
DESI 2019	8	60.0	52.5
DESI 2018	7	57.2	49.8
DESI 2017	9	54.9	46.9



Estonia ranks 8th out of the 28 EU Member States in the European Commission Digital Economy and Society Index (DESI) 2019.

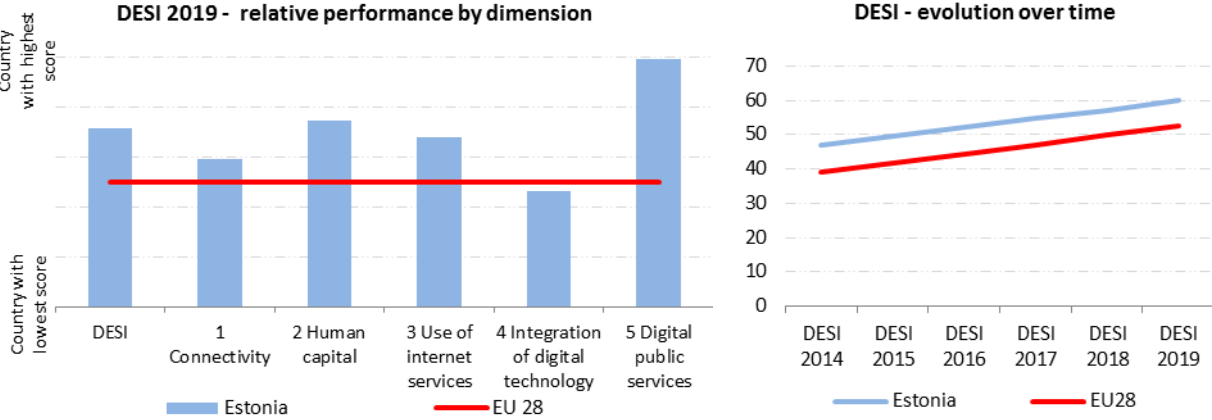
Estonia continues to perform well in the Digital public services dimension and the Human capital dimension. Estonia particularly improved in terms of human capital, scoring well above the EU average. Despite Estonia’s relatively low score in previous years in the Integration of digital technology, the 2019 DESI indicates improvement in this dimension. The Use of internet services remains consistently high in Estonia, with the overall 2019 DESI for Estonia showing high performance across the majority of dimensions, alongside significant improvement in others.

However, the key challenge in the Estonian economy is the digitisation of companies. Estonian companies are still not fully exploiting the opportunities offered by digital technology. Fixed broadband coverage is well below the EU average, mainly due to low rural availability, as is the take-up of ultrafast broadband.

Across all the dimensions measured, Estonia ranks highest in the e-health domain.

The current public sector digital strategy is outlined in the Digital Agenda 2020 for Estonia,¹ which was updated in 2018. The implementation of the strategy in Estonia is steered by the e-Estonia Council, led by the Prime Minister. This is also complemented by the Estonian Lifelong Learning Strategy 2020² and the Estonian Research and Development and Innovation Strategy 2014-2020 – ‘Knowledge Based Estonia’³.

The Digital Agenda 2020 sets out the general objective to “contribute to achieving higher growth, more jobs and increased welfare by creating an environment supporting the use and development of ICT solutions”⁴.



¹ https://www.mkm.ee/sites/default/files/digitalagenda2020_final.pdf

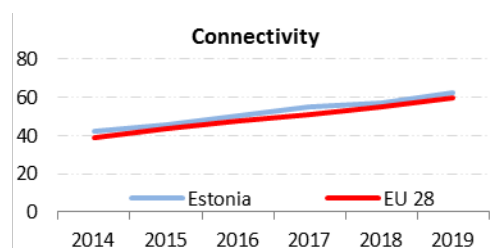
² https://www.hm.ee/sites/default/files/estonian_lifelong_strategy.pdf

³ https://www.hm.ee/sites/default/files/estonian_rdi_strategy_2014-2020.pdf

⁴ Digital Agenda 2020 - https://www.mkm.ee/sites/default/files/digital_agenda_2020_estonia_engf.pdf

1 Connectivity

1 Connectivity	Estonia		EU
	rank	score	score
DESI 2019	13	62.0	59.3
DESI 2018	13	56.9	54.8
DESI 2017	11	54.8	51.2



	Estonia		EU	
	DESI 2017	DESI 2018	DESI 2019	DESI 2019
	value	value	value rank	value
1a1 Fixed broadband coverage % households	91% 2016	89% 2017	92% 24 2018	97% 2018
1a2 Fixed broadband take-up % households	77% 2016	78% 2017	81% 9 2018	77% 2018
1b1 4G coverage % households (average of operators)	94% 2016	98% 2017	99% 7 2018	94% 2018
1b2 Mobile broadband take-up Subscriptions per 100 people	116 2016	125 2017	144 3 2018	96 2018
1b3 5G readiness Assigned spectrum as a % of total harmonised 5G spectrum	NA	NA	0% 13 2018	14% 2018
1c1 Fast broadband (NGA) coverage % households	79% 2016	80% 2017	83% 19 2018	83% 2018
1c2 Fast broadband take-up % households	24% 2016	29% 2017	34% 21 2018	41% 2018
1d1 Ultrafast broadband coverage % households	NA	71% 2017	83% 9 2018	60% 2018
1d2 Ultrafast broadband take-up % households	7% 2016	9% 2017	11% 22 2018	20% 2017
1e1 Broadband price index Score (0 to 100)	83 2016	85 2017	85 18 2018	87 2017

Estonia's overall connectivity score has risen since 2018, bringing the country to 13. While it has improved both its fixed (92 %) and fast (83 %) broadband coverage by three percentage points compared with 2017, it still ranks under the EU average for the first indicator. The situation is far better with regard to ultrafast broadband, where Estonia ranks ninth with 83 % of its households being covered (all NGA networks are ultra-fast), against an EU average of 60 %. The progress is more important as regards rural ultrafast broadband coverage (from 37.8 of the households in 2017 to 79.7 % against 19.4 % at EU level in 2018). The country performed very well in the take-up of mobile broadband, with 144 subscriptions per 100 people; the EU average is 96 subscriptions per 100 people. Estonia also scores quite well on fixed broadband take-up, reaching 81 %. Estonia's weak spot is the take-up of fast and ultrafast broadband, where, despite the wide availability of ultra-fast networks, it lies well below the EU average; only 11 % of households subscribe to ultrafast broadband. Fixed broadband prices in Estonia are higher but close to the EU average.

While a new broadband strategy is currently under development to align the country's connectivity targets with those of the gigabit society, its short-term targets are to provide all residents with internet access above 30 Mbps and to achieve at least 60 % household subscription rates for speeds

above 100 Mbps by 2020. One key measure to achieve the 2020 connectivity targets is the Estonian Wideband Infrastructure Network (EstWin) project, launched by the Estonian Ministry of Economic Affairs and Communications in 2009 with the target of bringing the EstWin network to not more than 1.5 km away from 98 % of households, businesses and institutions and connecting all existing network nodes with core networks. This is being achieved by intensive fibre backhaul rollout in rural and semi-urban white areas. In 2018, a state aid scheme was established to support the last mile access part in NGA white areas and a single public tender for the whole of Estonia was carried out for €20 million government support. With this state support, Elektrilevi (part of the state-owned energy operator) committed to connect, starting in March 2019, 40,000 addresses in white areas. These should be added to the 60,000 addresses it plans to cover through its own investments.

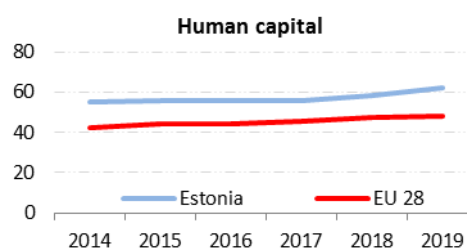
As regards mobile connectivity ambitions, the 700 MHz roadmap was adopted in September 2018 and a broader 5G roadmap was developed by the Ministry and published in February 2019.⁵ The strategy rests on four pillars: 1) a clearer legal environment; 2) infrastructure investments; 3) innovation of services; and 4) frequencies. All operators have 5G test licences and have already performed 5G tests. For instance, Telia and Ericsson have launched a 5G pilot network at the Tallinn University of Technology that can be used by businesses and research institutions. It is anticipated that more specific 5G plans will be known once the 3.4-3.8 GHz auction, planned for the first half of 2019, has been held. To address unresolved spectrum coordination issues with third countries, Estonia requested the assistance of the Commission. In the 700 MHz band, while the target is to hold the auction in the second quarter of 2020, the Interior Ministry's request that part of the spectrum be allocated to PPDR (2 times 10 MHz) may influence the full implementation of mobile broadband in the band in question. 46 % of the spectrum harmonised at EU level for wireless broadband has now been assigned in Estonia.

The smooth implementation of 5G will rely on awarding the 3.4-3.8 GHz and the 700 MHz bands in good time. Coverage with fixed ultra-fast networks in rural areas significantly improved and the successful completion of the EstWin project and the last mile scheme could help further improve it.

⁵ Available only in Estonian at: https://www.mkm.ee/sites/default/files/eesti_5g_teekaart.pdf

2 Human capital

2 Human capital	Estonia		EU
	rank	score	score
DESI 2019	4	62.4	48.0
DESI 2018	7	58.3	47.6
DESI 2017	8	55.9	45.4



	Estonia		EU	
	DESI 2017 value	DESI 2018 value	DESI 2019 value	DESI 2019 rank
2a1 At least basic digital skills % individuals	60%	60%	60%	10
2a2 Above basic digital skills % individuals	35%	35%	35%	11
2a3 At least basic software skills % individuals	61%	61%	61%	12
2b1 ICT specialists % total employment	4,4%	5,3%	5,6%	3
2b2 Female ICT specialists % female employment	1,9%	2,0%	2,2%	3
2b3 ICT graduates % graduates	5,2%	4,9%	6,4%	4

As regards the Human capital dimension, Estonia ranks fourth among EU countries and well above the EU average. The Estonian Lifelong Learning Strategy aims to ensure that 80 % of the population possess digital competences by 2020.⁶ In 2019, 60 % of the population have at least basic digital skills. The level of basic digital skills among women in Estonia (60 %) is higher than the EU average (55 %).⁷ However, there is still a need for investment in Estonia, as skills shortages and mismatches are among the main obstacles to business investment.⁸ For example, the percentage of people with at least basic digital skills is lower among the unemployed (53.5 %, compared with people in employment: 67.8 %) and in rural areas (56.4 %, against 66 % in urban areas)⁹.

The Estonian Lifelong Learning Strategy 2020 has 'A digital focus on lifelong learning' as one of five priorities. There are several types of action that have been implemented through the strategy, such as the inclusion of standard tests of digital competence in the ninth grade which started in the 2017 / 2018 academic year. Between 2012 and 2017, the public-private initiative ProgeTiger boosted learners' technological literacy and digital skills, through providing programming and robotics resources to participating schools, and providing specialised training for teachers. The programme reached 85 % of Estonian schools and 44 % of Estonian kindergartens, with more than 4100 teachers

⁶ Individuals aged 18-74 with computer skills

⁷ Women in Digital Scoreboard 2019

⁸ EIB 2018

⁹ <https://www.oecdskillsforjobsdatabase.org/#FR/>

having participated in ProgeTiger training sessions.¹⁰ In 2018, there were 355 activities organised during Code Week, in which there were 11.400 participants.

The percentage of ICT graduates in 2017 was high in comparison with the EU average. Estonia ranks third for ICT specialists as a percentage of total employment, with the percentage of ICT Specialists (5.6 %) higher than the EU average of 3.7 %. Indeed, Estonia has already exceeded the fourth general objective in the Digital Agenda 2020 of increasing the share of ICT professionals in total employment to 4.5 %. The number of female ICT specialists is also above the EU average. However, the proportion of female STEM graduates per 1000 individuals (aged 20-29) is slightly lower in Estonia (12.9) than the EU average (13.1).

Nevertheless, in the third quarter of 2018, nearly 27 % of employers in industry and one third of employers in services indicated that labour shortages limited their production. 85 % of firms cited the lack of skilled staff as a barrier to investment – representing a five-point increase since 2017¹¹. The unmet demand for labour is particularly high in the information technology and communication (ICT) sector. To ensure that the number of ICT professionals matches the development needs in the ICT sector, Estonia will need a total of 37,000 ICT professionals.¹² However, the percentage of enterprises providing their employees with training in ICT skills (14 %) is below the EU average (18%).¹³ In general, SMEs would benefit from additional financial support to train their employees in digital skills¹⁴.

To address skills shortages in the ICT sector, Estonia has lifted the immigration quota on ICT specialists from countries outside the EU and is in the process of launching support for the recruitment of ICT specialists in industry, including through the proposed Digital Nomad Visa scheme. Furthermore, Estonia proactively promotes work opportunities via Enterprise Estonia - a national foundation to support entrepreneurship. The initiative *Work in Estonia* is to introduce Estonia as an attractive place to work and live to talented specialists worldwide.¹⁵ The work revolves, inter alia, around simplifying the process for local companies to employ overseas ICT experts and engineers. The 'Select IT' training pilot programme is also offering intensive targeted skills retraining in the ICT sector to selected participants with a Higher Education qualification.¹⁶

Despite the high percentage of ICT specialists, enterprises provide only limited skills training to meet the needs of the ICT sector in Estonia. Further increasing the number of ICT specialists, by making it easier for ICT specialists from outside of Estonia to work in the country, maintaining a high number of ICT graduates and financing the upskilling of workers in the public and private sectors will enable Estonia to tap into the full potential of the Digital Economy.

¹⁰ <https://www.hitsa.ee/about-us/news/technology-education-has-reached-majority-of-estonian-schools-by-support-of-the-progetiger-program>

¹¹ EIB, 'EIB Group Survey on Investment and Investment Finance Country Overview: Estonia', European Investment Bank, 2018.

¹² http://oska.kutsekoda.ee/wp-content/uploads/2016/05/Key_messages_ICT.pdf

¹³ 2018 SBA Fact Sheet – Estonia p.11

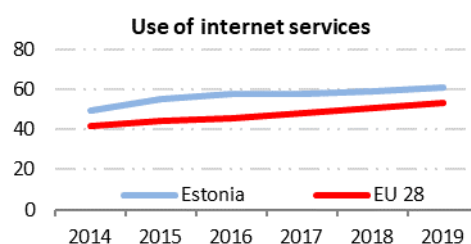
¹⁴ 2018 SBA Fact Sheet – Estonia p.11

¹⁵ <https://www.workinestonia.com/>

¹⁶ <http://vali-it.ee/>

3 Use of internet services

3 Use of internet services	Estonia		EU
	rank	score	score
DESI 2019	7	60.7	53.4
DESI 2018	7	59.1	50.7
DESI 2017	7	57.8	47.8



	DESI 2017	Estonia	DESI 2019	EU
	value	DESI 2018	value rank	DESI 2019
	2016	value	2018	value
3a1 People who never used the internet	10%	9%	8% 9	11%
% individuals	2016	2017	2018	2018
3a2 Internet users	85%	86%	87% 8	83%
% individuals	2016	2017	2018	2018
3b1 News	89%	90%	90% 5	72%
% internet users	2016	2017	2017	2017
3b2 Music, videos and games	84%	84%	83% 12	81%
% internet users	2016	2016	2018	2018
3b3 Video on demand	24%	24%	27% 11	31%
% internet users	2016	2016	2018	2018
3b4 Video calls	47%	50%	49% 17	49%
% internet users	2016	2017	2018	2018
3b5 Social networks	66%	68%	69% 18	65%
% internet users	2016	2017	2018	2018
3b6 Professional social networks	16%	17%	17% 8	15%
% internet users	2015	2017	2017	2017
3b7 Doing an online course	10%	13%	13% 5	9%
% internet users	2016	2017	2017	2017
3b8 Online consultations and voting	13%	9%	9% ¹⁷ 13	10%
% internet users	2015	2017	2017	2017
3c1 Banking	90%	90%	90% 5	64%
% internet users	2016	2017	2018	2018
3c2 Shopping	64%	65%	68% 12	69%
% internet users	2016	2017	2018	2018
3c3 Selling online	22%	21%	27% 11	23%
% internet users	2016	2017	2018	2018

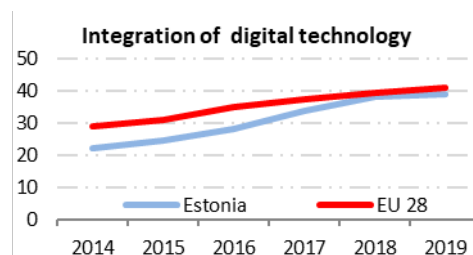
Overall, the use of internet services in Estonia is high (87 % of people). People in Estonia are keen to engage in a variety of online activities, the most popular of which are reading the news and banking. The proportion of people taking an online course is higher in Estonia (13 %), than in the EU as a whole (9 %). *i-Voting* has been possible since 2005, and an estimated 30 % of Estonians used it in the 2015 parliamentary elections¹⁸. The percentage of Estonians using internet banking has also remained consistent, with Estonia ranking fifth in the EU.

¹⁷ Data was collected in the first quarter of 2017, so it does not include those having voted on line in the municipal elections in the autumn of 2017.

¹⁸ See official statistics at: <https://www.valimised.ee/en/archive/statistics-about-internet-voting-estonia>; furthermore: <https://e-estonia.com/solutions/e-governance/i-voting/>

4 Integration of digital technology

4 Integration of digital technology	Estonia		EU
	rank	score	score
DESI 2019	16	39.2	41.1
DESI 2018	17	38.1	39.6
DESI 2017	19	33.7	37.6



	DESI 2017	Estonia	DESI 2019	EU
	value	DESI 2018 value	value rank	DESI 2019 value
4a1 Electronic information sharing % enterprises	22%	28%	28% 21	34%
4a2 Social media % enterprises	12%	13%	13% 24	21%
4a3 Big data % enterprises	13%	13%	11% 15	12%
4a4 Cloud % enterprises	17%	NA	26% 8	18%
4b1 SMEs selling online % SMEs	15%	15%	16% 16	17%
4b2 e-Commerce turnover % SME turnover	11%	11%	12% 9	10%
4b3 Selling online cross-border % SMEs	6%	8%	8% 15	8%

Estonia scores below the EU average in the Integration of digital technology in industry – in which it now ranks 16th - despite some recent progress.

The country has made some progress on certain indicators. The share of Estonian SMEs selling online (16 %) remains slightly below the EU average of 17 %. The percentage of SMEs purchasing online in Estonia (12 %) is around half the EU average of 26 %.¹⁹ Approximately 8% of SMEs are also selling online cross-border. However, for 17 % of SMEs high delivery costs are the main trade barrier.

On a positive note, Estonia has improved in terms of turnover from e-commerce (12 % versus 11 %). For example, the Ministry of Economic Affairs and Communications has organised information days for entrepreneurs to improve their awareness of EU legislation, and it has developed better cooperation with the e-Commerce Association for mapping the needs and opportunities of entrepreneurs.²⁰ 28 % of enterprises use social media (up from 24 % in 2016), while 18 % use cloud services (13 % in 2016). 98 % of companies are established online.²¹

¹⁹ 2018 SBA Fact Sheet – Estonia p.11

²⁰ <https://ec.europa.eu/info/sites/info/files/2018-european-semester-national-reform-programme-annex-estonia-en.pdf>

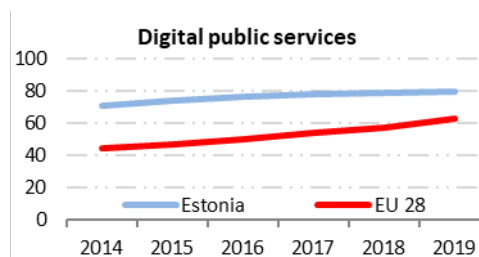
²¹ E-Estonia

Estonia is committed to making progress with new digital technologies and to strategically investing in them through EU-coordinated programmes. For instance, the country is a member of the EuroHPC Joint Undertaking; it has also signed the Declaration of European Blockchain Partnership, as well as the Declaration on Cooperation on Artificial Intelligence, the Declaration of cooperation towards access to at least 1 million sequenced genomes in the European Union by 2022 and the Declaration on the Cooperation framework on HPC.

To boost the digital transformation of the Estonian economy, it is important to raise awareness of the relevance of better integration of digital technologies, particularly for SMEs.

5 Digital public services

5 Digital public services	Estonia		EU
	rank	score	score
DESI 2019	2	79.5	62.9
DESI 2018	1	79.4	57.9
DESI 2017	1	78.5	54.0



	DESI 2017	Estonia	DESI 2019	EU
	value	DESI 2018	value rank	DESI 2019
		value	value	value
5a1 e-Government users % internet users needing to submit forms	93%	96%	92% 2	64%
	2016	2017	2018	2018
5a2 Pre-filled forms Score (0 to 100)	89	88	89 2	58
	2016	2017	2018	2018
5a3 Online service completion Score (0 to 100)	97	97	98 3	87
	2016	2017	2018	2018
5a4 Digital public services for businesses Score (0 to 100) - including domestic and cross-border	93	93	93 8	85
	2016	2017	2018	2018
5a5 Open data % of maximum score	NA	NA	44% 25	64%
			2018	2018
5b1 e-Health services % individuals	NA	49%	49% 1	18%
		2017	2017	2017
5b2 Medical data exchange²² % of general practitioners	NA	NA	NA	43%
			2018	2018
5b3 e-Prescription % of general practitioners	NA	NA	96% 7	50%
			2018	2018

On digital public services, Estonia ranks second among EU countries - well above the EU average. Estonia has well-developed e-government and e-health systems, with all central government services, as well as municipalities providing services online²³. The country is a frontrunner as regards the digital provision of public services and has one of the highest shares (92 %) of e-government users in Europe. Furthermore, X-road, the backbone of e-Estonia, is a digital information infrastructure that securely connects over 900 organisations daily²⁴.

There is a 58 % overall satisfaction with e-services. There is therefore a need to make certain services more user-friendly if Estonia is to reach the 'satisfaction with the quality of public services' indicator of 85 % outlined in the Digital Agenda 2020²⁵. Estonia is lagging behind with regard to open data. The availability of open data stands at 44 % - well below the EU average. However, in 2018 the renewed Estonian Open Data Portal was launched, which provides access to public sector data and publishes

²² Data has been removed due to potential inconsistencies

²³ Statistics of e-Government services also available here in the State Services Catalogue: <https://www.mkm.ee/en/service-search>; see also: <http://mkm-itaio.github.io/catalogue/>

²⁴ <https://www.x-tee.ee/factsheets/EE/#eng>

²⁵ https://ristohinno.shinyapps.io/Riigiteenused_dashboard/

blogs to promote Open Data²⁶. Estonia's Fourth Open Government Action Plan for 2018-2020 was implemented in 2018²⁷.

It is estimated that Estonian residents save an average of five working days annually, due to the availability of digital document signing²⁸. In 2019, Estonia performed marginally better than in 2018 both in terms of users using pre-filled forms (88 in 2018, versus 89 in 2019) and in online service completion. Estonia uses blockchain technology to enforce the integrity of government data and systems²⁹. Estonia has also established a high-security data embassy in Luxembourg for hosting critical data and information systems outside Estonia³⁰.

Moreover, the availability of e-government services for business shows a consistently high performance for Estonia, scoring 93 out of 100, the eighth best in the EU. The high take-up of the electronic identity (eID), electronic authentication and digital signatures has reduced the paper trail of bureaucracy and made business more flexible. For example, the Zero Bureaucracy project has created a task force to implement bureaucracy reduction proposals submitted by businesses³¹.

For e-health services, Estonia ranks first in the EU, with 49 % of Estonians having used health and care services provided online. e-Prescriptions are used by 96 % of general practitioners (GPs). 56 % of GPs exchange medical data. To date, 99 % of health data is digitised and 99 % of prescriptions are digital. The European e-Health Digital Service Infrastructure also started operating in Estonia in 2018, to facilitate the exchange of patient data. Finnish digital prescriptions are already available in Estonian pharmacies. In 2019, this exchange will be extended to make Estonian digital prescriptions available in Finnish pharmacies.

As a world leader in digital public services, ensuring that the range of online public services are user-friendly and cost effective will enable Estonia to reach the objectives outlined in the Digital Agenda 2020. Promoting the use and the opening up of information gateways, including the expansion of the Estonian Open Data Portal, would also facilitate easy and secure access to data and information.

2019 Highlight: e-Residency

Estonia's e-residency scheme – in place since 2014 - provides online government services to e-Residents worldwide. e-Residents can remotely set up and manage businesses, add digital signatures to contracts, make payments and use a number of private sector e-services to manage cross-border businesses³². By 2025, Estonia aims to provide a business environment for 10 million e-Residents. As of April 2019, there are 54,500 e-residents, with people from 154 countries worldwide having applied for it. Of these, 67 % cite the 'location of an independent international business' or 'bringing business to Estonia' as their motivation for applying³³. 6,586 new companies have been established by e-residents.

²⁶ <https://opendata.riik.ee/>

²⁷ <https://www.riigikantselei.ee/et/valitsuse-toetamine/avatud-valitsemise-partnerlus/tegevuskava-2018-2020>

²⁸ <https://e-estonia.com/wp-content/uploads/stories-a4-v02-efficiency-1.pdf>

²⁹ <https://e-estonia.com/wp-content/uploads/faq-a4-v03-blockchain-1-1.pdf>

³⁰ <https://e-estonia.com/estonia-to-open-the-worlds-first-data-embassy-in-luxembourg/>

³¹ <https://www.mkm.ee/en/zero-bureaucracy-0>

³² <https://e-estonia.com/wp-content/uploads/stories-a4-v02-efficiency-1.pdf>

³³ <https://app.cyfe.com/dashboards/195223/5587fe4e52036102283711615553>