



# **Digital Economy and Society Index (DESI) 2020**

**Slovakia**

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## About the DESI

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*The European Commission has been monitoring Member States' digital progress through the Digital Economy and Society Index (DESI) reports since 2014. The DESI reports include both country profiles and thematic chapters. In addition, an in-depth telecoms chapter is annexed to the reports for each Member State.*

*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.*

*The current COVID-19 pandemic has shown how important digital assets have become to our economies and how networks and connectivity, data, AI and supercomputing as well as basic and advanced digital skills sustain our economies and societies by allowing work to continue, tracking the spread of the virus and accelerating the search for medications and vaccines.*

*Member States have put in place specific measures to mitigate the impact of the pandemic. A dedicated section in each country details them. Digital will also play a key role in the economic recovery as the European Council and the Commission have undertaken to frame the support to the recovery along the twin transition to a climate neutral and resilient digital transformation. In this framework, the deployment of 5G and very high capacity networks (VHCNs), digital skills, the digitisation of companies and the public administration are crucial for a robust recovery. The DESI monitors their progress in each Member State.*

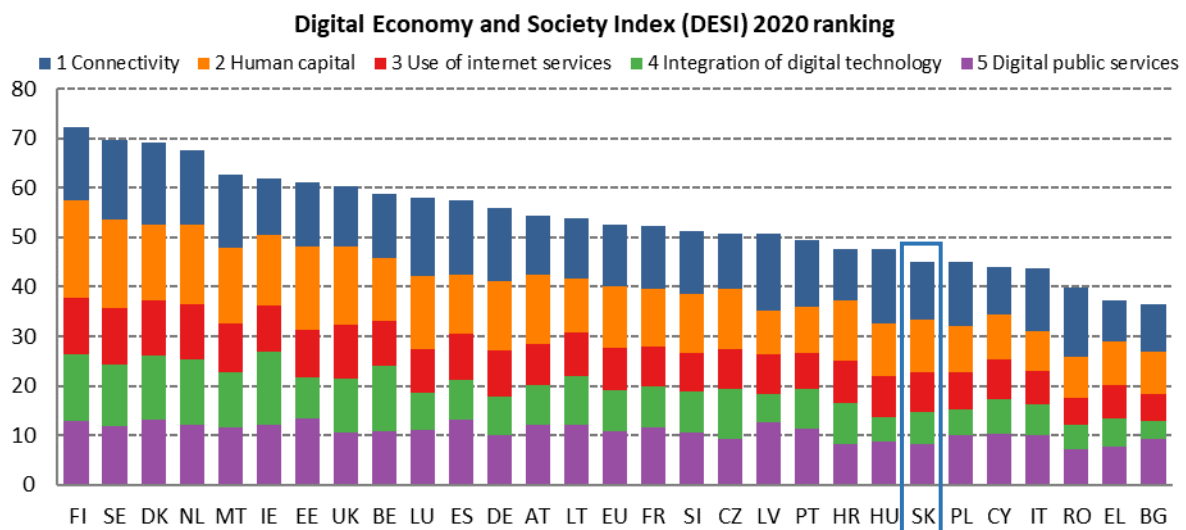
*As regards the thematic chapters, the DESI 2020 report includes a European-level analysis of broadband connectivity, digital skills, use of the internet, digitisation of businesses, digital public services, emerging technologies, cyber security, the ICT sector and its R&D spending and Member States' use of Horizon 2020 funds.*

*To improve the methodology of the index and take account of the latest technological developments, a number of changes were made to the 2020 edition of DESI, which now includes Fixed very high capacity network (VHCN) coverage. The DESI was re-calculated for all countries for previous years to reflect the changes in the choice of indicators and corrections made to the underlying data. Country scores and rankings may thus have changed compared with previous publications. As the figures refer to 2019, the United Kingdom is still included in the 2020 DESI, and EU averages are calculated for 28 Member States. For further information, please consult the DESI website: <https://ec.europa.eu/digital-single-market/en/desi>.*

*It is noted that statements regarding planned or potential State aid measures record intentions declared by Member States and do not pre-judge or pre-empt the assessment of such measures by the Commission under the relevant state aid rules. The DESI report is not meant to provide any assessment of the compliance of such measures with state aid rules and procedures.*

## Overview

	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>22</b>	<b>45.2</b>	<b>52.6</b>
DESI 2019	21	42.9	49.4
DESI 2018	20	41.9	46.5



Slovakia ranks 22<sup>nd</sup> out of the 28 EU Member States in the European Commission Digital Economy and Society Index (DESI) 2020.

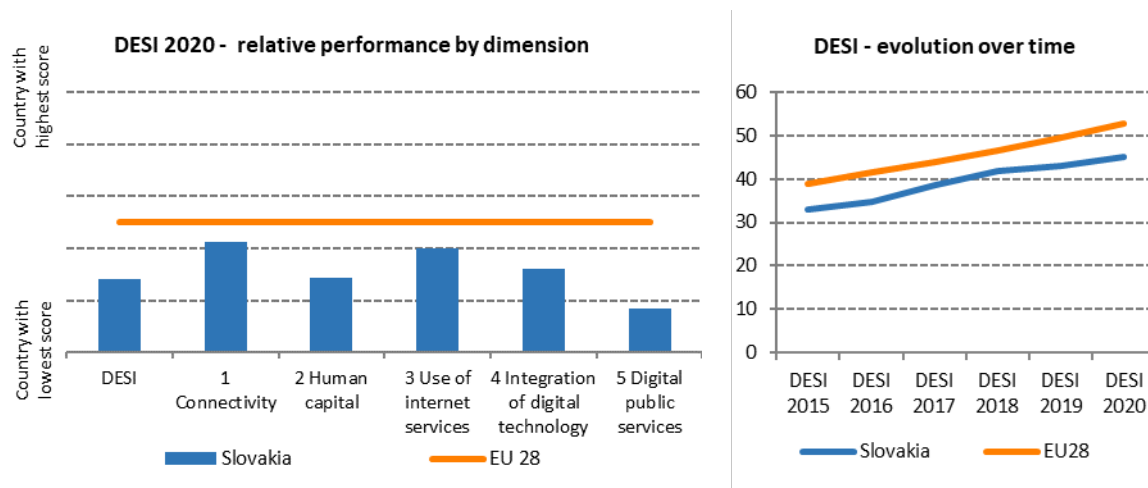
Based on data prior to the pandemic, Slovakia's scores slightly increased thanks to the performance in connectivity, the use of internet services and digital public services. However, the majority of indicators have not improved sufficiently to keep up the pace with the EU average. As a result Slovakia dropped in the ranking in the dimension of human capital and in the use of internet services to the 20<sup>th</sup> position and in digital public services to the 26<sup>th</sup> position.

Slovakia continues to improve the fast and ultrafast broadband coverage. The share of ICT specialists on total employment has increased and there are less Slovaks who have never used the internet. An increasing share of internet users make video calls and use online banking services. E-Commerce is stagnating as the share of SMEs selling online decreased for the second year in a row. The e-Government quality indicators are growing but remain below the EU average.

In 2019, Slovak government adopted a new Strategy for the digital transformation of Slovakia 2030<sup>(1)</sup>. This document lays down a longterm vision and aims to guide the economy, society and public administration through the technological change. Its goals are also to stimulate smart regional development and help researchers and innovators to keep the pace with global trends.

The strategy aims to reach its objectives through the related Action plans. The first one for the years 2019-2022 lists four main objectives: digital transformation of schools, conditions for a data-based economy, innovating public administration and support for the development of Artificial Intelligence (AI).

<sup>(1)</sup> <https://www.vicpremier.gov.sk/wp-content/uploads/2019/10/SDT-English-Version-FINAL.pdf>



### The role of digital to manage the coronavirus pandemic and to support the economic recovery

The current COVID-19 crisis is having an important impact on key societal indicators, relating to the use of internet services by citizens. This does not show in the latest 2019 official statistics as reported in DESI. Consequently, the DESI 2020 findings need to be read in conjunction with the strained demand that has been put on digital infrastructure and services during the pandemic and the immediate actions taken by the Member States. Similarly, as Europe progressively exits from the pandemic, the recovery must be planned taking into account the lessons learnt from this crisis. This means a particular attention to the indicators relevant for a stronger and more resilient digital transformation and economic recovery, notably very high capacity networks (VHCNs) and 5G, digital skills, advanced digital technologies for businesses and digital public services.

Slovak public authorities actively used digital technologies across all the monitored dimensions to help the society and economy to cope with the COVID-19 restrictions. The Ministry of education launched a dedicated portal<sup>(2)</sup> to help teachers and schools organise remote classes and online assessment. The Slovak Digital Coalition mobilised organisations and companies who offered services for teamwork or videoconferencing to schools temporarily for free. The government set up a single-access portal<sup>(3)</sup> with information about coronavirus and related restrictions targeting various groups from citizens, sick people, travellers, businesses to employers or health workers. Ministry of health has upgraded current e-health applications to offer instructions, relevant information, notifications and additional services related to COVID-19. The Ministry of economy organised webinars and provided online support to enterprises and self-employed people on how to use EU cohesion funds and national programmes to cope with the restrictions. The innovator community organised a 48-hour hackathon<sup>(4)</sup> to develop new solutions for healthcare providers, cities, the economy and the communities.

Looking forward, as regards the DESI indicators that are especially relevant for the economic recovery after the COVID-19 crisis, Slovakia is advancing on rolling out fast and super-fast broadband. The main features of the national e-health system are sufficiently reliable and can enable new applications. A more user-centric digital public services and especially more people with basic and advanced digital skills would help the society to better cope with the impact of the pandemic.

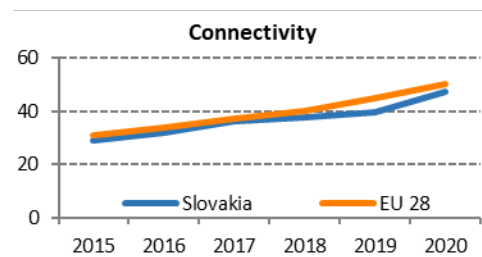
(2) <https://www.ucimenadialku.sk/>

(3) <http://www.korona.gov.sk/>

(4) <https://www.hackthecrisis.sk/>

# 1 Connectivity

1 Connectivity	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>21</b>	<b>47.5</b>	<b>50.1</b>
DESI 2019	24	39.6	44.7
DESI 2018	21	37.9	39.9



	Slovakia			EU
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
<b>1a1 Overall fixed broadband take-up</b>	<b>70%</b>	<b>70%</b>	<b>72%</b>	<b>78%</b>
% households	2017	2018	2019	2019
<b>1a2 At least 100 Mbps fixed broadband take-up</b>	<b>10%</b>	<b>13%</b>	<b>15%</b>	<b>26%</b>
% households	2017	2018	2019	2019
<b>1b1 Fast broadband (NGA) coverage</b>	<b>70%</b>	<b>73%</b>	<b>76%</b>	<b>86%</b>
% households	2017	2018	2019	2019
<b>1b2 Fixed Very High Capacity Network (VHCN) coverage</b>	<b>41%</b>	<b>43%</b>	<b>47%</b>	<b>44%</b>
% households	2017	2018	2019	2019
<b>1c1 4G coverage</b>	<b>82%</b>	<b>87%</b>	<b>89%</b>	<b>96%</b>
% households (average of operators)	2017	2018	2019	2019
<b>1c2 Mobile broadband take-up</b>	<b>84</b>	<b>88</b>	<b>95</b>	<b>100</b>
Subscriptions per 100 people	2017	2018	2019	2019
<b>1c3 5G readiness</b>	<b>NA</b>	<b>0%</b>	<b>33%</b>	<b>21%</b>
Assigned spectrum as a % of total harmonised 5G spectrum		2019	2020	2020
<b>1d1 Broadband price index</b>	<b>NA</b>	<b>NA</b>	<b>60</b>	<b>64</b>
Score (0 to 100)			2019	2019

With an overall connectivity score of 47.5, Slovakia ranks 21<sup>st</sup> among EU countries. Overall fixed broadband take-up has seen some progress with 72% of households subscribing to any kind of fixed internet offer (70% in 2018), and lies slightly below EU average. While the number of households subscribing to at least 100 Mbps fixed broadband has also seen some progress (15%), it ranks relatively low compared to other EU countries (22<sup>nd</sup>). Slovakia's fast broadband (NGA) coverage (covering 73% in year 2018) has reached 76%, but is still below the EU average of 86%. Nevertheless, Slovakia has good VHCN coverage, which has improved further to 47%. The number of households covered by 4G (average coverage) stands at 89%, but still lies below the EU average of 96%. Mobile broadband take-up (95 subscriptions per 100 people) has seen also a slight progress and is close to the EU average. The broadband prices in Slovakia are high compared to the EU average – the country scored 60 in the broadband price index compared to the EU average of 64, which puts it 20<sup>th</sup> among all the Member States.

While the 2011 national broadband strategy is still in place, the Deputy Prime Minister's Office for Investments and Informatisation is currently finalising the new national broadband plan for 2021-2025. The new plan is expected to align Slovakia's broadband strategy with the 2025 gigabit society targets. It will be based on the priorities of the European structural and investment fund (ESIF 2021-2027).

In 2020, a new broadband mapping project was launched at the household/address level, as a basis for preparing the national broadband plan. To replace the cancelled 'Atlas for passive infrastructure' project, the Ministry of Environment will start a new project with a different approach.

One of Slovakia's long-term connectivity issues is the provision of high-speed broadband coverage for 'white spots' (i.e. municipalities covered by speeds of less than 30 Mbps). Slovakia intends to address its remaining few dozen white spots by the end of 2020, thanks to private investment by market players who declared their intention to give the majority of people in each municipality access to speeds of at least 30 Mbit/s.

The Deputy Prime Minister's Office for Investments and Informatisation introduced a measure to enable free wi-fi coverage (under the *de minimis* rule) at municipal level. It is based on the WiFi4EU principles and financed under the 'Integrated Infrastructure' Operational Programme. It received €10 million allocation from the European Regional and Development Fund and the total amount of submitted applications currently stands at €3.9 million; the Prime Minister's Office has signed 375 contracts with successful cities and municipalities to date.

Slovakia scores 33% in the 5G readiness indicator<sup>(5)</sup>. To achieve its mobile connectivity ambitions, the Ministry of Transport and Construction is currently finalising a new document on "Support for the development of 5G networks in Slovakia for the years 2020-2025". In Slovakia, 46% of the spectrum harmonised at EU level for wireless broadband has been assigned. The Slovak national regulatory authority for electronic communications (Regulatory Authority for Electronic Communications and Postal Services, RÚ) published a call for tender in the form of a national consultation for the award of frequencies in the 700, 900, and 1800 MHz bands on 31 March 2020. However, there is one nationwide DTT network operator on the Slovak market holding the rights to use the 700 MHz spectrum beyond 2020; the Slovak authorities presume that the process of releasing the 700 MHz frequency band will be finalised by the end of May 2020. Slovakia plans to compensate the previous holder (the nationwide network operator).

The assignment of frequencies in the 3.4-3.6 GHz band was completed in 2016 and nationwide licences were assigned to four operators (O2 Slovakia, SWAN, Orange, Slovanet) until August 2025, with different frequency block sizes. However, for rights to using frequencies in the upper part of the 3.6-3.8 GHz band, the selection procedures took place in 2017 and rights were granted at local (district) level until the end of 2024. This could make it difficult to make it possible for all operators to use sufficiently large frequency blocks in the band by 31 December 2020, the target date for 5G deployment.

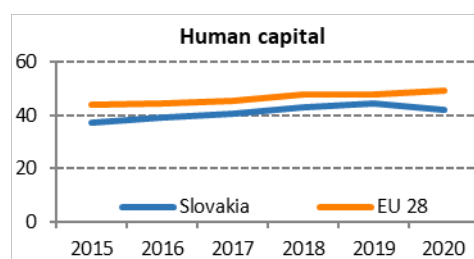
The finalisation of an update to the national broadband strategy will be a significant step towards delivering on the gigabit targets. The effective implementation of the integrated infrastructure operational programme, built on close coordination between public and private stakeholders, could help make efficient use of EU funds, also with a view to ensuring coverage in Slovakia's 'white spots'. Slovakia could improve its prospect of timely 5G deployment by finalising the process of releasing the 700 MHz frequency in time and allowing the use of sufficiently large frequency blocks in the 3.6 GHz for all operators by the end of 2020.

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<sup>(5)</sup> The 5G spectrum readiness indicator is based on the amount of spectrum already assigned and available for 5G use by 2020 within the 5G pioneer bands in each EU Member State. For the 3.4-3.8 GHz band, this means that only licences aligned with the technical conditions in the Annex to Commission Decision (EU)2019/235, are considered 5G-ready. For the 26 GHz band, only assignments aligned with the technical conditions in the Annex to Commission Implementing Decision (EU) 2019/784 are taken into account. By contrast, the percentage of harmonised spectrum takes into account all assignments in all harmonised bands for electronic communications services (including 5G pioneer bands), even if this does not meet the conditions of the 5G readiness indicator.

## 2 Human capital

2 Human capital	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>20</b>	<b>41.8</b>	<b>49.3</b>
DESI 2019	18	44.2	47.9
DESI 2018	18	42.9	47.6



	Slovakia			EU
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
	value	value	value	value
<b>2a1 At least basic digital skills</b>	<b>59%</b>	<b>59%</b>	<b>54%</b>	<b>58%</b>
% individuals	2017	2017	2019	2019
<b>2a2 Above basic digital skills</b>	<b>33%</b>	<b>33%</b>	<b>27%</b>	<b>33%</b>
% individuals	2017	2017	2019	2019
<b>2a3 At least basic software skills</b>	<b>63%</b>	<b>63%</b>	<b>56%</b>	<b>61%</b>
% individuals	2017	2017	2019	2019
<b>2b1 ICT specialists</b>	<b>2.9%</b>	<b>2.8%</b>	<b>3.2%</b>	<b>3.9%</b>
% total employment	2016	2017	2018	2018
<b>2b2 Female ICT specialists</b>	<b>0.6%</b>	<b>0.8%</b>	<b>0.9%</b>	<b>1.4%</b>
% female employment	2016	2017	2018	2018
<b>2b3 ICT graduates</b>	<b>2.9%</b>	<b>3.2%</b>	<b>3.3%</b>	<b>3.6%</b>
% graduates	2015	2016	2017	2017

Slovakia ranks 20<sup>th</sup> among EU countries on human capital. The score as the proportion of Slovaks who declare to have digital skills decreased. 27% of Slovaks have above basic digital skills, which is the best score in the Visegrad 4 region but it remains below the EU average (33%). The proportion of ICT specialists in total employment grew to 3.2% but remains below the EU average (3.9%). Slovakia still has one of EU's lowest proportions of female ICT specialists – only 0.9% compared to the EU average of 1.4%. The share of ICT graduates is slowly growing (3.3%) but remains below the EU average (3.6%). Improving digital skills is one of the priorities of the Slovak Digital Transformation strategy 2030<sup>(6)</sup> and the related action plan for 2019-2022<sup>(7)</sup>. The aim is to adapt the education system and focus on skills for jobs. The strategy also mentions the need to develop soft skills and competences for participating in digital society (digital citizenship). The strategy builds on relevant parts of the previous smart industry action plan<sup>(8)</sup> whose education-related measures were not fully delivered. In parallel, Slovak businesses are increasingly calling for a reform of the education system to reduce the mismatch between the skills graduates gain at school and those requested by employers.

Low levels of digital literacy among young people is also a challenge. According to the Slovak School Inspectorate, 45% of schools do not have a single qualified IT teacher<sup>(9)</sup>. The latest European survey on ICT in education<sup>(10)</sup> shows that only 17% of Slovak primary schools are highly digitally equipped and connected (EU average: 35%). While children intensively use digital tools and the internet for

<sup>(6)</sup> <https://www.vicpremier.gov.sk/wp-content/uploads/2019/06/Strategia-digitalnej-transformacie-Slovenska-2030.pdf>

<sup>(7)</sup> [https://www.vicpremier.gov.sk/wp-content/uploads/2019/07/Akcny-plan-DTS\\_2019-2022.pdf](https://www.vicpremier.gov.sk/wp-content/uploads/2019/07/Akcny-plan-DTS_2019-2022.pdf)

<sup>(8)</sup> <https://www.mhsr.sk/inovacie/strategie-a-politiky/akcny-plan-inteligentneho-priemyslu-sr>

<sup>(9)</sup> <https://www.minedu.sk/statna-skolska-inspekcia-informuje-o-vysledkoch-svojej-cinnosti/>

<sup>(10)</sup> <https://ec.europa.eu/digital-single-market/en/news/2nd-survey-schools-ict-education>

entertainment, a recent report<sup>(11)</sup> found that only 4 out of 10 are able to create presentations, charts or work with spreadsheets. The situation is particularly serious in families that are lower on the socio-economic scale.

Slovakia is home to several initiatives such as IT Fitness test<sup>(12)</sup> or IT Akademia<sup>(13)</sup> that aim to improve digital skills of students and teachers. To tackle the issues the country also follows the line of the National Education Programme<sup>(14)</sup> that highlights the need to increase the use of digital technologies in classrooms, and improve the digital skills of both students and teachers. However, the related implementation plan only has 1 action out of 106 that directly supports the digitisation objectives.

Slovakia has an active National Digital Coalition<sup>(15)</sup> that works closely with the government. Its 83 members have submitted 219 pledges that vary from bringing more IT classes to schools, to training teachers, to helping workers get their skill-sets ready for industry 4.0.

Slovakia regularly participates in EU Code Week. In 2019, the number of activities increased by 8% to 165 and the organisers reported over 9,100 participants.

Human capital is not any more Slovakia's best performing area. The score dropped and is far beyond the EU average. The country's strategy is to reform education, adapting it to technological developments, and to better equip students with skills and competences for living and working in a digital economy. The main challenge will be to translate the strategy into concrete actions, ensure proper funding and to use current successful initiatives such as the IT Fitness test to impact a larger share of population.

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<sup>(11)</sup> Endowment Fund Telekom at the Pontis Foundation: <https://www.nadacnyfondtelekom.sk/digitalna-gramotnost-deti-rozdeluje-slovensko/>

<sup>(12)</sup> <https://itfitness.sk/>

<sup>(13)</sup> <http://itakademia.sk/>

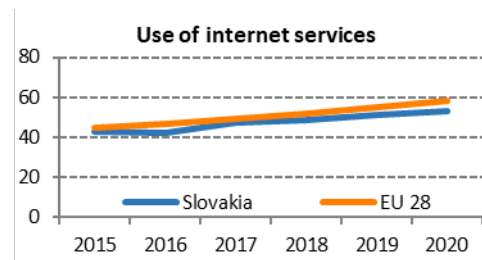
<sup>(14)</sup> <https://www.minedu.sk/data/att/13285.pdf>

<sup>(15)</sup> <https://digitalnakoalicia.sk/>



### 3 Use of internet services

3 Use of internet services	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>20</b>	<b>53.4</b>	<b>58.0</b>
DESI 2019	17	51.3	55.0
DESI 2018	18	48.7	51.8

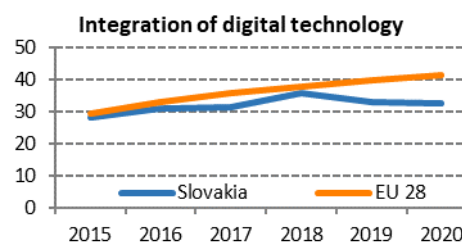


	Slovakia			EU
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
	value	value	value	value
<b>3a1 People who have never used the internet</b>	<b>14%</b>	<b>13%</b>	<b>12%</b>	<b>9%</b>
% individuals	2017	2018	2019	2019
<b>3a2 Internet users</b>	<b>79%</b>	<b>78%</b>	<b>82%</b>	<b>85%</b>
% individuals	2017	2018	2019	2019
<b>3b1 News</b>	<b>77%</b>	<b>77%</b>	<b>72%</b>	<b>72%</b>
% internet users	2017	2017	2019	2019
<b>3b2 Music, videos and games</b>	<b>69%</b>	<b>66%</b>	<b>66%</b>	<b>81%</b>
% internet users	2016	2018	2018	2018
<b>3b3 Video on demand</b>	<b>7%</b>	<b>17%</b>	<b>17%</b>	<b>31%</b>
% internet users	2016	2018	2018	2018
<b>3b4 Video calls</b>	<b>55%</b>	<b>51%</b>	<b>66%</b>	<b>60%</b>
% internet users	2017	2018	2019	2019
<b>3b5 Social networks</b>	<b>72%</b>	<b>74%</b>	<b>72%</b>	<b>65%</b>
% internet users	2017	2018	2019	2019
<b>3b6 Doing an online course</b>	<b>4%</b>	<b>4%</b>	<b>6%</b>	<b>11%</b>
% internet users	2017	2017	2019	2019
<b>3c1 Banking</b>	<b>63%</b>	<b>62%</b>	<b>66%</b>	<b>66%</b>
% internet users	2017	2018	2019	2019
<b>3c2 Shopping</b>	<b>70%</b>	<b>71%</b>	<b>71%</b>	<b>71%</b>
% internet users	2017	2018	2019	2019
<b>3c3 Selling online</b>	<b>14%</b>	<b>29%</b>	<b>27%</b>	<b>23%</b>
% internet users	2017	2018	2019	2019

While there is a steady increase in the use of internet services by people in Slovakia, the country is not keeping pace with other EU Member States. The country fell from 17<sup>th</sup> to 20<sup>th</sup> in the EU ranking, with scores for some indicators well below the EU average. The proportion of people who have never used the internet has decreased to 12% but remains above the EU average (9%). More Slovaks are using the internet (82%, up from 78% in 2018) and banking online (66%, up from 62% in 2018). Slovakia has also made significant progress in video calls, with 66% of people now using this service – a 15 p.p. increase compared to the previous year. Interest in online shopping remains stable. However, the share of internet users who sell online dropped to 27% and the share of internet users active on social networks also fell. Only 72% of internet users read news online (compared to 77% in 2017) and only 6% have followed an online course - one of the lowest scores in the EU.

## 4 Integration of digital technology

4 Integration of digital technology	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>21</b>	<b>32.6</b>	<b>41.4</b>
DESI 2019	21	33.1	39.8
DESI 2018	18	35.8	37.8



	Slovakia			EU
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
	value	value	value	value
<b>4a1 Electronic information sharing</b>	<b>31%</b>	<b>31%</b>	<b>31%</b>	<b>34%</b>
% enterprises	2017	2017	2019	2019
<b>4a2 Social media</b>	<b>17%</b>	<b>17%</b>	<b>18%</b>	<b>25%</b>
% enterprises	2017	2017	2019	2019
<b>4a3 Big data</b>	<b>11%</b>	<b>9%</b>	<b>9%</b>	<b>12%</b>
% enterprises	2016	2018	2018	2018
<b>4a4 Cloud</b>	<b>15%</b>	<b>14%</b>	<b>14%</b>	<b>18%</b>
% enterprises	2017	2018	2018	2018
<b>4b1 SMEs selling online</b>	<b>15%</b>	<b>13%</b>	<b>11%</b>	<b>18%</b>
% SMEs	2017	2018	2019	2019
<b>4b2 e-Commerce turnover</b>	<b>12%</b>	<b>11%</b>	<b>11%</b>	<b>11%</b>
% SME turnover	2017	2018	2019	2019
<b>4b3 Selling online cross-border</b>	<b>8%</b>	<b>8%</b>	<b>7%</b>	<b>8%</b>
% SMEs	2017	2017	2019	2019

Slovakia ranks 21<sup>st</sup> in the EU on integration of digital technology. Its score decreased to 32.6, compared to 33.1 in 2019. The proportion of companies that share electronic information remained stable at 31% (EU average: 34%). Slovakia falls short of the EU average in the use of big data analysis by companies (9% vs 12%) and in the use of the cloud (14% vs 18%). The country's e-commerce scores have not improved. Only 11% of SMEs sell online (compared to 13% in previous year), the share of SME turnover from e-commerce remains stagnant at 11%, and the proportion of SMEs that sell online across borders has decreased to 7% (compared to 8% in 2017).

Slovakia has a national digitisation strategy that supports the integration of innovative technologies in companies. It aims to introduce legislation that will enable new business models, particularly ones built on digital platforms and AI. It also plans to develop infrastructure and create favourable conditions to test automated transport and enable new transport business models.

A growing number of industrial companies are taking steps towards digital transformation, mostly in order to increase their performance and make internal processes more efficient. However, only 18% of companies report a high or very high level of digital intensity (EU average: 26%). In general, businesses still lack digitalisation support from public institutions, as the regulatory framework is not yet fully adapted to this process<sup>(16)</sup>.

When adopting new digital solutions, companies often rely on help from the private sector. For example, Industry4UM<sup>(17)</sup> is a private initiative hosted by the Ministry of Economy that serves as a

<sup>(16)</sup> [https://ec.europa.eu/information\\_society/newsroom/image/document/2019-32/country\\_report\\_-\\_slovakia\\_-\\_final\\_2019\\_OD31C79C-EC95-A759-9A4EFF789FEB2FB2\\_61219.pdf](https://ec.europa.eu/information_society/newsroom/image/document/2019-32/country_report_-_slovakia_-_final_2019_OD31C79C-EC95-A759-9A4EFF789FEB2FB2_61219.pdf)

<sup>(17)</sup> <http://industry4um.sk/>

platform to help businesses in the digitising era. According to its annual survey<sup>(18)</sup>, 48% of industrial companies already have an internal team that deals with digital transformation.

Slovak businesses struggle to find qualified, talented workers to carry forward the digital transformation. Companies do not generally offer quality in-house training to properly upskill their employees. According to the national business environment index, companies consider bureaucracy, corruption and insufficient law enforcement to be the main barriers for doing business. The index is at its lowest level since 2001<sup>(19)</sup>. Slovakia does not yet have a digital innovation hub (DIH). However, the government aims to create and support a network of specialised centres for digital innovation that would have enough expertise and financial capability to qualify to become DIHs. Three companies are already receiving mentoring and coaching through an EU project.

Slovakia takes part in all relevant EU initiatives that aim to strengthen the digital single market and foster cooperation in strategic fields such as high performance computing, AI and cybersecurity. At the end of 2019, Slovakia joined other EU countries that work together to develop a quantum communication infrastructure in the EU<sup>(20)</sup>.

Slovakia is one of the 20 biggest car producers in the world, making it also an EU leader in robotic intensity. With 165 industrial robots per 10,000 employees, the country is 16<sup>th</sup> in the global ranking<sup>(21)</sup>. This is mainly thanks to the robotisation of the car industry, but a rapid growth in robotic automation has also been observed in logistics and in the service robots sector.

Slovak businesses are not yet fully benefiting from the digital transformation. The use of digital technologies is stagnating as companies lack the right expertise. E-commerce is a missed opportunity, in particular for SMEs. A rapid introduction of the measures set out in the national digitisation strategy could help to improve this trend. As a first step, businesses will need more support, advice and enough talented people on the job market.

#### Highlight 2020: Slovak.AI<sup>(22)</sup>

This non-profit platform was set up in 2019 and connects students, researchers, universities, businesses, associations and investors who want to turn Slovakia into an artificial intelligence centre. Due to the structure of the country's industry and economy, future technological disruptions, including automation, are likely to impact Slovakia's economy more than they will other countries. Slovak.AI shows how an active involvement of academia, and the private and public sector can help the country address the challenges.

The Slovak.AI partnership has three objectives:

- Attract and keep talented people in Slovakia
- Help to understand, use and improve AI
- Turn Slovakia into a digital country.

One of the first outputs is 'Slovak Academia for AI' - a mapping of the AI research landscape<sup>(23)</sup>. It has identified 3 main scientific centres in Bratislava, 2 in Kosice and 1 in Zilina, and more than 200 researchers and over 40 companies active in AI. These companies are involved in several ongoing Horizon 2020 projects and focus on computer vision, data analysis and machine learning, computational biology, language processing, knowledge representation, and AI in robotics.

<sup>(18)</sup> [https://industry4um.sk/wp-content/uploads/2019/10/vyhodnotenie\\_prieskum\\_2019\\_odpovede.pdf](https://industry4um.sk/wp-content/uploads/2019/10/vyhodnotenie_prieskum_2019_odpovede.pdf)

<sup>(19)</sup> <https://www.alianciapas.sk/2019/07/30/podnikatelia-su-nespokojni-so-stavom-podnikatelskeho-prostredia/>

<sup>(20)</sup> <https://ec.europa.eu/digital-single-market/en/news/nine-more-countries-join-initiative-explore-quantum-communication-europe>

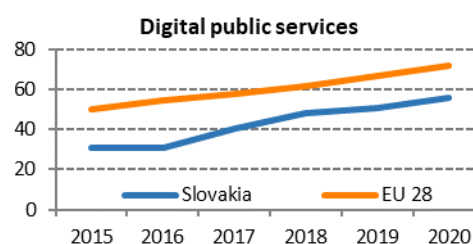
<sup>(21)</sup> <https://ifr.org/downloads/press2018/IFR%20World%20Robotics%20Presentation%20-%202018%20Sept%202019.pdf>

<sup>(22)</sup> <https://slovak.ai/>

<sup>(23)</sup> [https://slovak.ai/wp-content/uploads/2020/02/bro%C5%BE%C3%BAra\\_SK-Academia-AI.pdf](https://slovak.ai/wp-content/uploads/2020/02/bro%C5%BE%C3%BAra_SK-Academia-AI.pdf)

## 5 Digital public services

5 Digital public services	Slovakia		EU
	rank	score	score
<b>DESI 2020</b>	<b>26</b>	<b>55.6</b>	<b>72.0</b>
DESI 2019	25	50.7	67.0
DESI 2018	24	48.0	61.8



	Slovakia			EU
	DESI 2018	DESI 2019	DESI 2020	DESI 2020
	value	value	value	value
<b>5a1 e-Government users</b>	<b>55%</b>	<b>54%</b>	<b>52%</b>	<b>67%</b>
% internet users needing to submit forms	2017	2018	2019	2019
<b>5a2 Pre-filled forms</b>	<b>34</b>	<b>35</b>	<b>38</b>	<b>59</b>
Score (0 to 100)	2017	2018	2019	2019
<b>5a3 Online service completion</b>	<b>78</b>	<b>79</b>	<b>85</b>	<b>90</b>
Score (0 to 100)	2017	2018	2019	2019
<b>5a4 Digital public services for businesses</b>	<b>73</b>	<b>78</b>	<b>84</b>	<b>88</b>
Score (0 to 100) - including domestic and cross-border	2017	2018	2019	2019
<b>5a5 Open data</b>	<b>NA</b>	<b>NA</b>	<b>33%</b>	<b>66%</b>
% of maximum score			2019	2019

Even with a higher score than in 2019, Slovakia has dropped to 26<sup>th</sup> position on digital public services. Only 52% of Slovak internet users who need to submit forms to public institutions do so online. This is less than in previous years, and significantly below the EU average (67%). Despite some improvement, Slovakia scores 21 percentage points less on pre-filled forms than the EU average. Improvement in the other monitored indicators is modest and overall the scores remain below the EU average.

According to the Supreme Audit Office, the use of national and EU funds to invest in digital public services has not led to a greater take-up by the public<sup>(24)</sup>. This could be due to low trust in e-government services, as 19% of Slovaks, compared to an EU average of 8%, are concerned about the security of digital public services and limit or avoid electronic communication with public authorities<sup>(25)</sup>.

However, the government maintains its ambition and continues to roll out new features to make e-government more attractive. The national digitisation strategy entails the introduction of a 'data-driven state' concept to improve the public administration's use of data for analytical purposes. Other positive measures include the 'once-only' principle introduced by the law against bureaucracy, the planned mobile eID and the API<sup>(26)</sup> gateway. To make the services more user-centric and attractive the government set up a unit of behavioural innovation. The unit trains public servants and has developed principles of user-friendly and quality electronic public services which should be applied across whole public administration.

However, stakeholders and NGOs are often critical about the digitisation of public services and administration. Despite the government's effort to improve the quality of public sector ICT and involve

<sup>(24)</sup> <https://www.nku.gov.sk/documents/10157/9cdf145b-56e1-40b9-97db-dcf4d87f3e04>

<sup>(25)</sup> <https://ec.europa.eu/eurostat/documents/2995521/10335072/9-16012020-BP-EN.pdf/30431c3f-cbce-6d2d-e9d1-4cf6b084b6af>

<sup>(26)</sup> Application programming interface

external specialists, the experts grouped in Slovensko.digital<sup>(27)</sup> point out that digitisation projects in public administration often lack thorough analysis, are not properly prepared, are too costly or do not reflect future technological developments.

The digitisation of healthcare and the rollout of e-health services are also objectives of the national digitisation strategy. Since its launch in 2018, the national e-health system has already registered over 100 million e-prescriptions<sup>(28)</sup> and 75% of healthcare providers are connected. In 2020, the system will start rolling out a new e-lab service that will help doctors and laboratories exchange laboratory analyses. The Supreme Audit Office confirmed<sup>(29)</sup> that the system has made good progress in recent years and - even though it does not yet offer all features - it is saving resources. However, the costs of the system remain high. By April 2019, the Ministry of Health has spent over €123 million on it and by 2021, the additional features will cost other €57 million.

The government's ambition is to offer new digital public services that will help both people and businesses. However, the take-up remains low and the quality of the services already in place is not consistent. Involving a broader group of stakeholders, in particular consumers, in designing new services and making them more user friendly could help to tackle these persisting issues and increase trust. The national e-health system can serve as a good example.

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<sup>(27)</sup> <https://slovensko.digital/>

<sup>(28)</sup> <https://www.ezdravotnictvo.sk/sk/-/v-systeme-ezdravie-je-uz-100-milionov-ereceptov>

<sup>(29)</sup> Kontrola funkčnosti a využívania elektronického zdravotníctva (záverečná správa): <http://shorturl.at/oHIR9>