



Digital Economy and Society Index (DESI) 2021

Czechia

About the DESI

The European Commission has monitored Member States' progress on digital and published annual Digital Economy and Society Index (DESI) reports since 2014. Each year, the reports include country profiles, which help Member States identify areas for priority action, and thematic chapters providing an EU-level analysis in the key digital policy areas.

In 2021, the Commission adjusted DESI to reflect the two major policy initiatives that will have an impact on digital transformation in the EU over the coming years: the Recovery and Resilience Facility and the Digital Decade Compass.

To align DESI with the four cardinal points and the targets under the Digital Compass, to improve the methodology and take account of the latest technological and policy developments, the Commission made a number of changes to the 2021 edition of the DESI. The indicators are now structured around the four main areas in the Digital Compass, replacing the previous five-dimension structure. 11 of the DESI 2021 indicators measure targets set in the Digital Compass. In future, the DESI will be aligned even more closely with the Digital Compass to ensure that all targets are discussed in the reports.

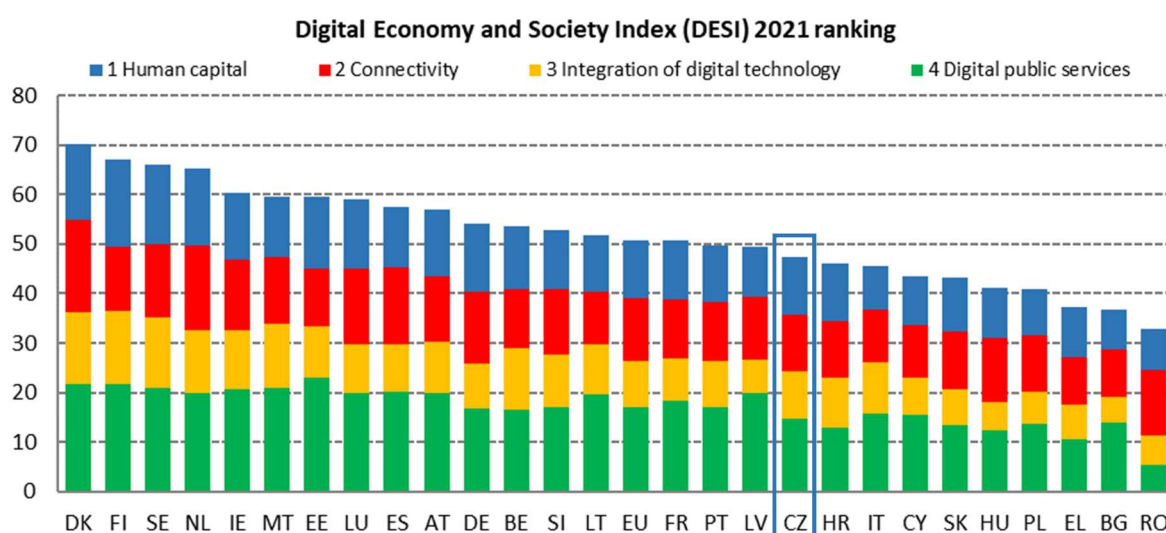
In addition, DESI now includes an indicator measuring the level of support that adopted ICT technologies provided companies in taking more environmentally-friendly measures (ICT for environmental sustainability) and the take up of gigabit services, plus the percentage of companies offering ICT training and using e-invoicing.

The DESI scores and rankings of previous years were re-calculated for all countries to reflect the changes in the choice of indicators and corrections made to the underlying data.

For further information, see the DESI website: <https://digital-strategy.ec.europa.eu/en/policies/desi>.

Overview

	Czechia		EU
	rank	score	score
DESI 2021	18	47.4	50.7



The Czechia ranks 18th of 27 EU Member States in the 2021 edition of the Digital Economy and Society Index (DESI), one place below the ranking in 2020. Czechia keeps performing best on Integration of digital technology, where it ranks 15th in the EU.

The share of Czechs with at least basic digital skills is above the EU average and a quarter of Czech enterprises offers ICT training to their staff. The new updated school curriculum that increases the focus on digital skills could be of further help for people to acquire basic digital skills and improve the country's score on Human capital in the future.

Czechia remains a leader in e-commerce with a growing proportion of SMEs selling online. The government supports the necessary infrastructure, such as the Digital Innovation Hubs, and directly stimulates digitalisation of enterprises. The country also significantly improved its 5G readiness and the overall broadband take-up rose above the EU average.

The main strategies that steer the digital transformation of the Czech economy and society are *Digitální Česko*¹ (Digital Czechia) and the innovation strategy – *The Country for the Future*². Since the 2020 DESI report, the main milestones achieved were the launch of the bank identity, which should increase the use of digital public services, the reform of the school curriculum and an active participation of Czech representatives in major European technological initiatives such as EuroHPC or the European Digital Media Observatory.

A significant share of Czech enterprises still face major difficulties in finding digitally skilled workers. Though the share of digital experts among graduates is rising, it still does not match demand and many enterprises lack sufficient know-how or support to train their own employees or candidates. This hampers the competitiveness of the whole economy and slows down the digitalisation of enterprises. Additional action to re-skill the labour force and increase the offer of university programmes in

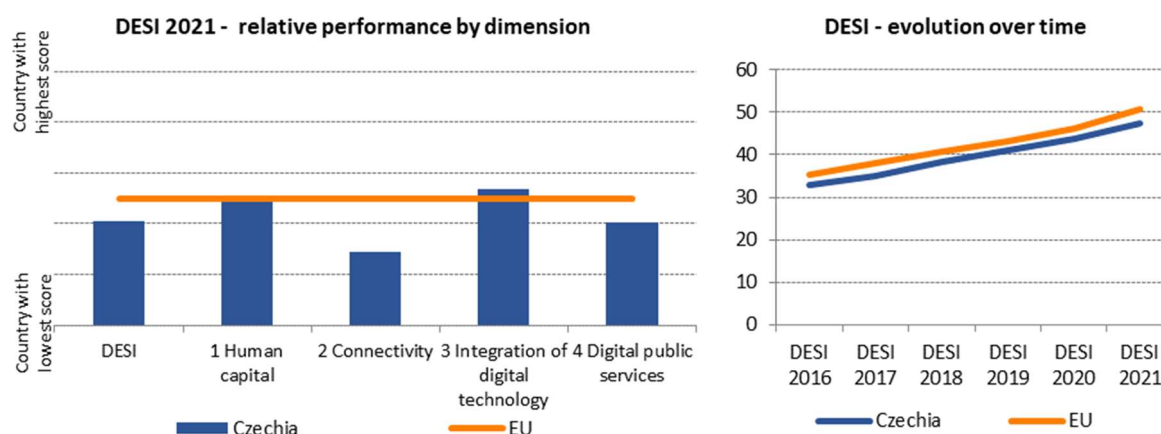
¹ <https://www.digitalnicesko.cz/>

² <https://www.countryforfuture.com/projekt/inovacni-strategie-ceske-republiky/>

advanced technologies could strengthen the impact of existing strategies and help the country tackle the lack of digital experts on the job market.

Digital public services are becoming more sophisticated but take-up remains low. Giving individuals and enterprises a clear purpose for using digital public services would help attract more users. This can be achieved by further improving service quality, enabling data sharing between institutions and by making the services interoperable, building up on the “once only” principle. The roll-out of very high-capacity networks remains slow. Not enough households and enterprises are able to access reliable super-fast internet. Broadband prices remain among the highest in the EU. Better targeted investments and a modernised regulatory framework (including the entry into force of the measures transposing the European Electronic Communications Code) could help address some of these issues.

The pandemic triggered a new dynamic in the digital transformation. Enterprises including SMEs started to consider a wider use of digital technologies, the education system moved completely online for several months and greater requirements were made on the digital infrastructure. The crisis also tested the resilience and reliability of digital public services. The government rolled out several new portals and IT systems to manage and coordinate vaccination, communication and data sharing (Tecka mobile app, open health data, central covid.gov.cz portal, etc.). Often, these services faced technical issues at the launch but over time they became more robust and became important tools to manage the pandemic.



Digital in the Czech Recovery and Resilience Plan (RRP)

Czechia's Recovery and Resilience Plan (RRP), with a total allocation of EUR 7.036 billion, puts a strong focus on digital transformation with a set of targeted reforms and investments. The plan allocates 22.1% of the total investment to digital policies (exceeding the 20% target) with relevant reforms and investments outlined in Components 1.1 to 1.6, 2.1, 3.1, 3.3, 4.5 and 5.2. The total measures in digital is EUR 1.56 billion.

Three main pillars of the plan are: digitalisation of enterprises (with a particular focus on SMEs), digital public services and human capital. In total, the plan contains 55 investments and reforms that will support Czechia's digital transformation.

On human capital, the plan is expected to boost digitalisation in the education system through curriculum reform, training for teachers and ICT equipment in schools. The plan will stimulate the creation of new university programmes and will roll out new re-skilling and up-skilling opportunities for job seekers and employees. These measures should contribute to the European Digital Decade strategy and will help the Czech population acquire relevant digital skills.

The plan is also expected to improve connectivity by updating the regulatory environment to roll out electronic communication networks and by investing in very high-capacity networks (VHCN). The plan puts a particular focus on remote regions. Czechia aims to stimulate the development of 5G infrastructure including along key transport corridors and to promote the use of 5G applications in cities or for industry.

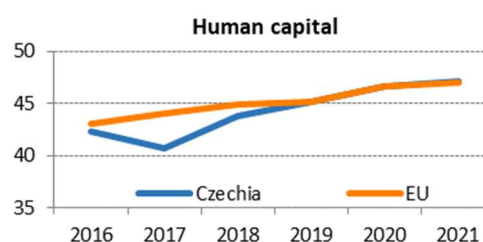
The RRP is expected to help enterprises, in particular SMEs, start or continue their digital transformation. It includes a reform of the governance of digital transformation and contains measures to foster digital innovation and boost research in advanced digital technologies such as Artificial Intelligence (AI) or blockchain. The plan also aims to support entrepreneurship and the Czech start-up scene.

Czechia plans to increase the take-up of digital public services and to build a robust back-end infrastructure to enable data sharing between public institutions. The plan is also expected to provide a broader and more integrated set of e-health services and to strengthen cybersecurity of the critical information systems.

Czechia aims to use RRP to participate in a multi-country projects (MCP) in digital policy, including the important project of common European interest (IPCEI) on microelectronics and communication technologies as well as other multi-country projects: 5G corridors; Digital Innovation Hubs; European Blockchain Services Infrastructure and EuroQCI (quantum computing and quantum information).

1 Human capital

1 Human capital	Czechia		EU
	rank	score	score
DESI 2021	15	47.2	47.1



	Czechia			EU
	DESI 2019	DESI 2020	DESI 2021	DESI 2021
1a1 At least basic digital skills	60%	62%	62%	56%
% individuals	2017	2019	2019	2019
1a2 Above basic digital skills	24%	26%	26%	31%
% individuals	2017	2019	2019	2019
1a3 At least basic software skills	62%	64%	64%	58%
% individuals	2017	2019	2019	2019
1b1 ICT specialists	4.0%	4.0%	4.2%	4.3%
% individuals in employment aged 15-74	2018	2019	2020	2020
1b2 Female ICT specialists	10%	10%	10%	19%
% ICT specialists	2018	2019	2020	2020
1b3 Enterprises providing ICT training	25%	25%	25%	20%
% enterprises	2018	2019	2020	2020
1b4 ICT graduates	4.5%	4.9%	5.0%	3.9%
% graduates	2017	2018	2019	2019

Czechia ranks 15th on Human capital in the EU, one position lower than in 2020. 62% of Czechs have at least basic digital skills and 26% have advanced digital skills. The share of individuals employed as ICT specialists has risen to 4.2% but remains under the EU average (4.3%). The gender gap in technology remains the largest in the EU with only 10% of ICT specialists being women (EU average: 19%). 25% of enterprises provide ICT training to their employees, which is above the EU average of 20% and makes the Czechia a regional leader in this domain.

In October 2020, the Czechia adopted a new education strategy³ that contains measures to foster digital skills for students and teachers and to bring more digital technologies to schools. The main milestone is the updated curriculum for primary schools (completed in 2021). Other measures include the implementation of the *Framework of Digital Competences of Teachers* and innovation in the VET system. To mitigate the impact of the pandemic and to foster primary education in advanced technological disciplines such as cybersecurity or robotics, the National Pedagogical Institute helped teachers, schools and parents with guidance and support materials via a new portal: koronavirus.edu.cz.

More than 200 000 people work as ICT specialists, nearly a third of whom live in Prague. This geographic concentration of digital expertise is a barrier to digital transformation outside the capital, notably in remote areas. The Czech labour market still does not provide enough ICT specialists to meet the demand from organisations and enterprises despite rising wages for this profile⁴. 76% of

³ The Strategy for the Education Policy 2030+: <https://www.msmt.cz/vzdelavani/skolstvi-v-cr/strategie-2030>

⁴ <https://www.czso.cz/csu/czso/byt-ict-odbornikem-se-vyplaci>

enterprises that recruited or tried to recruit digital experts reported difficulties in filling these vacancies in 2020,⁵ which is the highest proportion in the EU.

Czechia lacks a stand-alone strategy and concrete action to address this trend and help enterprises acquire the expertise they need. People in smaller cities especially lack sufficient opportunities to re-focus their careers and retrain as digital experts. After the national Digital literacy strategy expired in 2020, the main documents that guide digital re- and up-skilling are the Strategic Framework of Employment Policy⁶ until 2030, the National Artificial Intelligence Strategy⁷ and the Digital Czechia strategy that remains too general in this domain. These documents provide general objectives, but lack specific action and a targeted effort to encourage a significant number of people (in particular employees) to re-skill and adapt to the transforming nature of work. Czechia uses EU and national funds to support projects to help people re-skill and upskill in preparation for the digital transformation. For example, DigiKatalog⁸ aims to create a tool to offer self-evaluation, competence mapping and to recommend relevant training programmes to users. However, the impact of these programmes remains limited.

The government continues to support a higher participation of women in technology. The non-profit organisation *Czechitas*, which helps equip girls and women with digital skills and encourage them to go for ICT careers, is expanding to regions and in 2020 put on over 370 workshops and educational events. Despite these initiatives, about 90% of ICT specialists are men (the highest share in the EU).

The Czech National Coalition for Digital Skills and Jobs (DigiKoalice⁹) coordinated by the National Pedagogical Institute stepped up its activities in 2021 and increased support for teachers and schools to provide targeted solutions for remote education. It also helped parents with distance learning, mainly via tips and guidance on its Facebook page¹⁰. In May 2021, DigiKoalice had 245 members including several ministries, leading ICT enterprises, start-ups, NGOs, universities, foundations and other private and public-sector actors. Thanks to its close links with the public administration, DigiKoalice plays an important role in promoting and implementing digital skills policies.

Czechia remained an active contributor to EU Code Week, but the number of registered activities dropped by 40% to 141. This was due to schools being closed during the autumn wave of the pandemic. The Ministry of Education, Youth and Sport continues to support the initiative. Many of the workshops and coding sessions took place in Prague and in regional capitals.

The insufficient number of digital experts on the job market continues to slow the pace of digitalisation in Czechia. Although supply is improving, enterprises still struggle to find specialists in advanced disciplines. The government addresses these needs by supporting new university programmes and by issuing the updated school curriculum. These steps are appropriate but it will take several years to yield tangible results. More action to support the re-skilling of the labour force and encourage people to go for careers in technology would help enterprises find qualified workers or provide training to their employees.

⁵ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=ICT_specialists_-_statistics_on_hard-to-fill_vacancies_in_enterprises

⁶ <https://www.msmt.cz/vzdelavani/skolstvi-v-cr/strategie-2030?lang=1>

⁷ https://www.vlada.cz/assets/evropske-zalezitosti/umela-inteligence/NAIS_kveten_2019.pdf

⁸ <https://digikatalog.cz/>

⁹ <https://digikoalice.cz/>

¹⁰ <https://www.facebook.com/DigiKoaliceSkolam>

Human Capital in the Czech Recovery and Resilience Plan

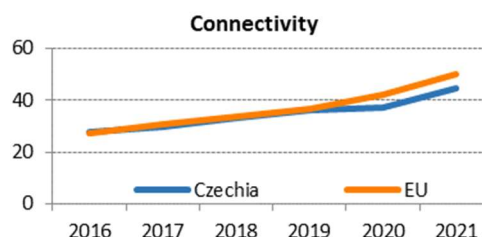
Czechia's plan allocates EUR 369 million to improving digital skills, digital expertise and to offering upskilling and reskilling opportunities in the digital domain. The measures focus on reforming education, providing schools with digital equipment and providing new training opportunities for job seekers and employees.

On education, the plan is in line with the national education strategy and is expected to bring more IT, computer science and digital literacy classes into primary and secondary schools. It will also help teachers acquire digital skills to be able to explain digital technologies to pupils and use them as a tool across subjects. Most of the funds will be used to acquire ICT equipment for schools and pupils and to improve connectivity in schools, taking into account socioeconomic disparities and thus supporting implementation of the European Pillar of Social Rights. On tertiary education, the plan is expected to create better conditions for adaptation to digital learning and development of new university programmes (including in advanced digital technologies and industry 4.0) which could increase the share of ICT graduates and make more digital experts available to meet the needs of job market.

The RRP is expected to address other labour market needs by creating up-skilling and re-skilling opportunities for both employees and job seekers. By the end of 2025, 130 000 people are expected to benefit from training, upskilling and reskilling in digital and to acquire other skills needed in digital economy and industry 4.0. The plan aims to foster cooperation between the government and social partners to better react to the labour market's changing needs for digital skills.

2 Connectivity

2 Connectivity	Czechia		EU
	rank	score	score
DESI 2021	22	44.6	50.2



	DESI 2019	Czechia DESI 2020	DESI 2021	EU DESI 2021
2a1 Overall fixed broadband take-up % households	74% 2018	74% 2019	83% 2020	77% 2020
2a2 At least 100 Mbps fixed broadband take-up % households	18% 2018	20% 2019	24% 2020	34% 2020
2a3 At least 1 Gbps take-up % households	NA	<0.01% 2019	0.37% 2020	1.3% 2020
2b1 Fast broadband (NGA) coverage % households	90% 2018	92% 2019	97% 2020	87% 2020
2b2 Fixed Very High Capacity Network (VHCN) coverage % households	28% 2018	29% 2019	33% 2020	59% 2020
2c1 4G coverage % populated areas	99.4% 2018	99.8% 2019	99.8% 2020	99.7% 2020
2c2 5G readiness Assigned spectrum as a % of total harmonised 5G spectrum	17% 2019	17% 2020	67% 2021	51% 2021
2c3 5G coverage % populated areas	NA	NA	0% 2020	14% 2020
2c4 Mobile broadband take-up % individuals	64% 2018	71% 2019	71% 2019	71% 2019
2d1 Broadband price index Score (0-100)	NA	56 2019	59 2020	69 2020

In 2020, Czechia saw only a modest increase in the percentage of households covered by fixed very-high-capacity networks (provided through FTTP) – up 33.3% from 29.3% in 2019. This puts the country below the EU average (59.3%). However, in the second half of 2020, the country carried out a significant upgrade of cable networks to DOCSIS 3.1, which is not yet reflected in the DESI figures. FTTP coverage in rural areas remains at a much lower level – only 6.4% of rural households were covered by the technology in 2020. This is well below the EU average of 24.9%. In terms of take-up of at least 100 Mbps fixed broadband, 24% of households subscribed to this type of broadband connection in 2020, an insignificant increase from 20% of households in 2019. This indicator also places Czechia below the EU average (34%). Take-up of at least 1 Gbps broadband is practically non-existent, with fewer than 0.01% of households subscribing to such speeds. The overall fixed broadband take-up, however, is above the EU average (83% of households compared to 77% in the EU). This is despite the fact that its broadband price index is 59, below the EU average of 69. No Czech households had 5G coverage in 2020.

The Czech government approved the National Plan for the Development of Very High Capacity Networks on 1 March 2021. The plan focuses on building the infrastructure for socioeconomic drivers as well as on covering white spots. It aims to provide access to download speeds of at least 100 Mbps, with the option to upgrade to 1 Gbps for all households and access to minimum gigabit speeds (symmetrical) for enterprises, state administration, local self-governments and socioeconomic

entities. Its ambition is also to ensure an optimal development of 5G networks in all urban and rural areas and along the main transport corridors. As such, the National Broadband Plan is in line with the 2025 Gigabit Society targets.

The Czech authorities estimate that the investment gap to roll out fibre connectivity to all municipalities and address points in Czechia totals CZK 13.7 billion (about EUR 532 million). The investment needs are expected to be covered by support under multiple EU funds, including the Integrated Regional Operational Programme, Connecting Europe Facility, Digital Europe and Invest EU.

In its Roadmap for the Implementation of the Connectivity Toolbox¹¹, the country identifies as desirable a number of reforms, for example to bring in permit exemptions and fast-track procedures for network deployment, to promote the use of electronic permit application processes and of the parallel conciliation mechanism in the event of disputes over access to infrastructure.

Czechia has assigned 66.7% of the harmonised radio spectrum for the purposes of 5G deployment, which is above the EU average (52.7 %).

The Czech national regulatory authority, the Czech Telecommunication Office (CTU), announced the completion of the auction of the 700 MHz and 3.4-3.6 GHz frequency bands on 13 November 2020. Five operators won spectrum, paying a total of CZK 5.6 billion (EUR 211 million). The incumbent operators O2, T-Mobile and Vodafone obtained most of the available frequencies. In terms of the main obligations resulting from the auction, the operators that gained frequencies in the 700 MHz band will be required to satisfy a range of 5G coverage criteria phased over 10 years (such as coverage of 100% of TEN-T core and the comprehensive network within six years, coverage of 70% of the Czech population within five years and coverage of 99% of the population of each district and 90% of the area of each district within 10 years). The operators that obtained frequencies in the 3.6 GHz band will need to build 230 5G base stations in at least 30 districts as of five years following the auction. O2 will be obliged to provide national roaming access to its networks to the eligible entities by 30 June 2029. The Czech authorities decided not to use the peer review process under Article 35 of the European Electronic Communications Code before organising the auction.

For the 26 GHz band, a public consultation organised in 2019 demonstrated the lack of demand.

Main market & regulatory developments

In October 2020, PPF Group (the majority owner of Czech fixed infrastructure incumbent CETIN and the retail service provider O2 Czech Republic,) announced that it had completed the acquisition of Central European Media Enterprises Ltd (CME). CME owns TV content providers in the Czechia, Romania, Slovakia, Slovenia and Bulgaria. It is also one of the leading media and entertainment organisations in central and eastern Europe. As a result, the Czech market could be affected by the combination of telco services (CETIN, O2) and content services (CME).

Czechia did not transpose the provisions of the European Electronic Communications Code (EECC) by the deadline of 21 December 2020 – it is one of 24 Member States that are currently subject to an infringement procedure for failure to transpose the Directive. The legislative works on measures to transpose the EECC were close to being finalised at the time of drafting this report. However, the entry into force of the measures is not expected until 1 January 2022.

¹¹ Pursuant to Commission Recommendation (EU) 2020/1307 of 18 September 2020 on a common Union toolbox for reducing the cost of deploying very high-capacity networks and ensuring timely and investment-friendly access to 5G radio spectrum, to foster connectivity in support of economic recovery from the COVID-19 crisis in the Union, OJ L 305, 21.09.2020, p.33.

On 27 February 2020, the Commission registered a notification from the CTU concerning the Czech fixed and mobile termination markets¹². The draft measures concern the wholesale call termination on individual public telephone networks provided at a fixed location (market 1, case CZ/2020/2239), and wholesale voice call termination on individual mobile networks (market 2, case CZ/2020/2240). Based on its market analysis, the CTU found that all fixed and mobile operators have significant market power (SMP) on the termination markets. It therefore imposed price and non-price obligations on all operators. Regarding price regulation, in November 2020 the CTU imposed a maximum fixed termination rate (FTR) of CZK 0.033 /minute and a maximum mobile termination rate (MTR) of CZK 0.248 /minute for calls originated within the European Economic Area (EEA) and terminated in Czechia.

The European Commission communicated its comments to the CTU in March 2020. It noted that the regulated FTR and MTR had not been updated since the previous notification in October 2016. The Commission noted that, given the technological and economic changes on the European electronic communication markets, it was unlikely that the proposed rates correctly reflect the efficient cost of termination services. It also noted that the proposed FTR is the sixth highest and the proposed MTR is the third highest in the EU. The Commission encouraged the CTU to explore all options to update the termination rates with reasonable effort.

The market situation (including coverage data) may also be affected by the activities of entities other than telecommunication undertakings, such as non-profit organisations.

Regarding emergency communications, the Czech authorities still do not provide access to emergency communications via SMS for roaming end users, which is particularly important in light of the equivalency requirements for end users with a disability under EU law. The government was seeking a technical solution to provide this access at the time of drafting.

Though Czechia's performance on fixed and wireless connectivity remains below the EU average, the strategic direction of the government is focused on making ambitious connectivity investments. It is important that the government ensures that the regulatory landscape is favourable to the projected advances in connectivity. Swift entry into force of the measures transposing the European Electronic Communications Code is particularly urgent.

Connectivity in the Czech Recovery and Resilience Plan

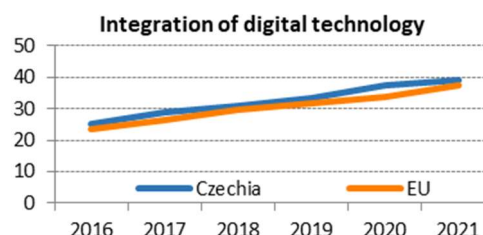
Component 1.3 of the plan outlines reforms and investments in connectivity, with a total budget of around EUR 227 million. Investments in VHCNs target remote areas where market-based solutions are not profitable. 23,000 new units should gain access to Gigabit connectivity by 2026. The measures planned are expected improve digital technical maps, connectivity quality monitoring and bring in legislation to facilitate broadband deployment. The reforms and investments are in line with the EU Gigabit objectives and with the Common EU Toolbox for Connectivity.

Component 1.3 aims to develop the 5G ecosystem for 5G technology on transport corridors, including cross-border sections. The RRP foresees equipping 350 railway wagons with repeaters or passive walls for 5G signals. The plan is expected to stimulate research in 5G applications, in particular for the automotive sector. 5G should also be rolled out to remote regions.

¹² Corresponding to market 1 and market 2 in Commission Recommendation 2014/710/EU of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with the Framework Directive (2014 Recommendation on Relevant Markets) (OJ L 295, 11.10.2014, p. 79).

3 Integration of digital technology

3 Integration of digital technology	Czechia		EU
DESI 2021	rank	score	score
	15	39.1	37.6



	DESI 2019	Czechia DESI 2020	DESI 2021	EU DESI 2021
3a1 SMEs with at least a basic level of digital intensity % SMEs	NA	NA	59% 2020	60% 2020
3b1 Electronic information sharing % enterprises	NA 2017	38% 2019	38% 2019	36% 2019
3b2 Social media % enterprises	13% 2017	20% 2019	20% 2019	23% 2019
3b3 Big data % enterprises	8% 2018	8% 2018	9% 2020	14% 2020
3b4 Cloud % enterprises	16% 2018	16% 2018	20% 2020	26% 2020
3b5 AI % enterprises	NA	NA	40% 2020	25% 2020
3b6 ICT for environmental sustainability % enterprises having medium/high intensity of green action through ICT	NA	NA	56% 2021	66% 2021
3b7 e-Invoices % enterprises	14% 2018	14% 2018	12% 2020	32% 2020
3c1 SMEs selling online % SMEs	23% 2018	28% 2019	29% 2020	17% 2020
3c2 e-Commerce turnover % SME turnover	18% 2018	21% 2019	18% 2020	12% 2020
3c3 Selling online cross-border % SMEs	12% 2017	15% 2019	15% 2019	8% 2019

The Czechia ranks 15th in the EU on integration of digital technology in enterprises' activities. Digital transformation of enterprises is slowly progressing. 59% of Czech SMEs have achieved a level of at least basic digital intensity, slightly below the EU average (60%). The country remains among the European leaders on e-commerce. 29% of SMEs sell online and 15% sell across borders. The share of e-commerce in the turnover of SMEs has fallen to 18% but remains well above the EU average (12%). The use of big data analysis (9% of enterprises) and cloud services (20%) remains below the EU average (14%, 26%). The use of e-invoicing (12% of enterprises) is the second lowest in the EU. By contrast Czechia has the highest share of enterprises in the EU that use AI (40%, EU average: 25%). According to the World Robot Federation, Czechia is the world's 15th largest market for industrial robots¹³.

Czechia follows several strategies that steer digital transformation of the economy and society. The main ones are Digital Czechia¹⁴ (adopted in 2018), the innovation strategy Czech Republic: The Country

¹³ <https://ifr.org/ifr-press-releases/news/record-2.7-million-robots-work-in-factories-around-the-globe>

¹⁴ <https://www.digitalnicesko.cz/>

for the Future¹⁵ (adopted in 2019) and the National AI strategy¹⁶ (2019). Digital Innovation Hubs (DIH) play an important role in the digital transformation of enterprises. They offer resources and capacities to SMEs to develop and test products before large-scale production and introduction to the market, they provide services and advice related to the use of available digital infrastructure and support regional innovation ecosystems. Czechia has eight fully operational DIHs and an additional four are in preparation. Six of the existing hubs have been appointed to join the European DIH network.

Czechia is an active member of most of the key European digital initiatives. The country contributes to the EuroHPC through the National Centre IT4Innovations in Ostrava, which has upgraded its laboratories, offers new programmes for SMEs and will invest nearly EUR 15 million in a new supercomputer with the performance of 15,2 petaFLOPS. Czechia is also involved in the European Blockchain Service Infrastructure, Quantum Communication infrastructure and Czech authorities support the development of an AI excellence centre in Prague focused on security for society.

According to a study¹⁷ by CERGE-EI¹⁸ and the Confederation of Industry, the share of Czech enterprises with a digital strategy has risen from 36.9% in 2019 to 41.9% in 2020. The Czech enterprises that invest in automation, robotics and AI are gaining a tangible competitive advantage in productivity and are offering services and products with a higher added value. The study also warns of the slow pace of adoption of digital technologies by small and medium enterprises compared to large enterprises.

The Industry Barometer¹⁹ confirms that the pandemic significantly boosted interest in digital technologies among enterprises and organisations – 27% of enterprises plan to increase investments compared to 2020. A survey by the Ministry of Industry and Trade²⁰ shows that the priority investment fields for SMEs are data and cybersecurity in the next year and automation in the longer term. According to this survey, the lack of information on funding, insufficient expertise and reluctance of managers are the main barriers preventing more enterprises, in particular SMEs, to undergo digital transformation. The government is preparing additional support to overcome these obstacles.

The *Start-up Report 2019-2020*²¹ shows that 54% of Czech start-ups focus on B2B (business-to-business) solutions. The most popular fields are e-commerce (22% of start-ups), web services (19%) and big data and analytics (15%). 30% offer products and services also in another country. The government supports start-ups through a network of 15 innovation centres and incubators endorsed by CzechInvest. However, considerable bureaucracy remains the main issue for young innovative enterprises. In 2021, Czechia joined other 23 EU Member States and signed the declaration for the Start-up Nation Standard²² to implement good practices to support the start-up scene. The Czech video gaming industry continues to grow with 118 active studios and overall sales of 5.32 billion CZK (nearly EUR 210 million) in 2020, which is 17% more than in 2019²³.

Czech enterprises responded to the pandemic by taking it an opportunity to accelerate their digital transformation. The government provided the necessary infrastructure, such as DIHs or offered direct

¹⁵ <https://www.countryforfuture.com/>

¹⁶ https://www.vlada.cz/assets/evropske-zalezitosti/umela-inteligence/NAIS_kveten_2019.pdf

¹⁷ <https://www.spcr.cz/pro-media/tiskove-zpravy/14125-firmy-ktere-zavedly-technologie-prumysl-4-0-jsou-produktivnejsi>

¹⁸ Center for Economic Research and Graduate Education – Economics Institute based in Prague.

¹⁹ <https://www.ncp40.cz/files/barometr-ceskeho-prumyslu.pdf>

²⁰ <https://www.mpo.cz/assets/cz/podnikani/male-a-stredni-podnikani/studie-a-strategicke-dokumenty/2021/3/Strategie-podpory-MSP-v-CR-pro-obdobi-2021-2027.pdf> – Page 56, Chart 11

²¹ <https://www.startupreport.cz/>

²² <https://digital-strategy.ec.europa.eu/en/news/24-eu-member-states-commit-digital-day-take-action-support-growth-eu-startups>

²³ <https://www.lupa.cz/aktuality/ceske-hry-loni-utrzily-5-3-miliardy-pomohl-covid-cesi-vydali-58-titulu-182-sejich-chysta>

support, also thanks to EU funds, e.g. the Operational Programme Entrepreneurship and Innovation²⁴. But the main problems persist: enterprises do not have access to sufficiently skilled workers and digital experts, they need advice on how to digitally transform and the legal framework has not yet been adapted to reduce the administrative burden and foster innovation. Removing these barriers would stimulate the digital transformation of the Czech economy and society.

Integration of digital technologies in the Czech Recovery and Resilience Plan

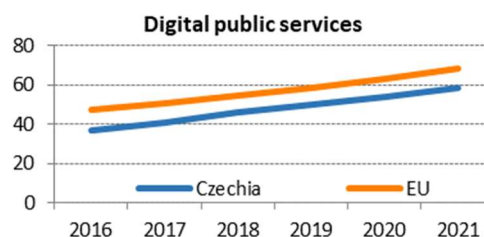
Components 1.4 and 1.5 contain the majority of measures to support the digitalisation of enterprises and further integrate digital technologies in the economy and society. The measures are mutually re-enforcing and are likely to trigger long-term structural change. The allocation to digital arises to nearly EUR 53 million for Digital-Related investments in R&D, EUR 403 million for Digitalisation of businesses and EUR 170 for Investment in digital capacities and deployment of advanced technologies.

1. Digital infrastructure and management. The plan anticipates investment in quantum communication infrastructure, a new AI excellence centre and the European Blockchain Service Infrastructure. SME owners and managers are expected to get access to training on digital transformation, a new digital media observatory hub aims to help tackle disinformation and Czechia plans to create an institute to analyse and monitor the digitalisation of the economy. The plan also includes measures to improve the certification of new digital technologies and strengthen cybersecurity (Component 1.2), in particular of critical infrastructure such as healthcare.
2. Support for innovative enterprises and the start-up scene. The RRP is expected to foster entrepreneurship and stimulate digital innovation. It aims to pilot co-investment funds to support university spin-offs and pre-seed investments. The plan is expected to create regulatory sandboxes and to help Czech start-ups expand across borders. The Rise-up Programme aims to support technological enterprises to develop medical and non-medical solutions for the post-COVID era. The plan is also expected to support research and innovation in the aviation industry with potential spill-over effects in other sectors. The plan also aims to support the creative economy through digitalisation of cultural institutions and creative voucher scheme.
3. Digital innovation hubs and SMEs. Czechia plan to use the RRP to complement funding for the DIHs from the DIGITAL Europe programme. These centres are expected to provide support and infrastructure to enterprises allowing them to test new technologies and better manage the digital transformation. Czechia also aims to set up the European Reference Testing and Experimentation facility. Under the plan, the country is expected support digital transformation of 377 enterprises, mostly SMEs.

²⁴ <https://dotaceeu.cz/cs/fondy-eu/kohezni-politika-eu/operacni-programy/op-podnikani-a-inovace-pro-konkurenceschopnost>

4 Digital public services

4 Digital public services	rank	Czechia score	EU score
DESI 2021	20	58.6	68.1



	DESI 2019	Czechia DESI 2020	DESI 2021	EU DESI 2021
4a1 e-Government users % internet users	61%	61%	64%	64%
4a2 Pre-filled forms Score (0 to 100)	NA	NA	45	63
4a3 Digital public services for citizens Score (0 to 100)	NA	NA	71	75
4a4 Digital public services for businesses Score (0 to 100)	NA	NA	76	84
4a5 Open data % maximum score	NA	NA	72%	78%

Czechia ranks 20th in the EU on Digital public services. The country climbed 2 places to the 20th position in the EU ranking compared to 2020. The share of e-government users amongst internet users reached 64% and is now in line with the EU average. However, other indicators remain below the EU average. In particular the score on pre-filled forms is 18 points below the EU average.

Following the national digitalisation strategy *Digital Czechia*²⁵, the government is adopting new legislation to offer higher quality and more secure digital public services. The new National Cybersecurity strategy (2020)²⁶ builds additional, more advanced state capabilities and mechanisms to provide cybersecurity services, especially for public administration and for critical infrastructure. The new law on the digitalisation of healthcare²⁷ should create three core data registers and secure applications that will enable access and work with the health data.

An important milestone to achieve user-friendlier access to digital public services was the launch of the bank identity as an authentication mechanism. Over five million Czechs who use internet or mobile banking will be able to access e-government services using their bank log-in.

As of 2020, approximately half of all 7 000 public information systems were linked with an interconnected data pool that allows public authorities to exchange data and enable the 'once-only' principle. To comply with the law introducing the right for digital services²⁸, the government developed the Catalogue of e-government services. Existing e-government portals, such as the central public administration portal²⁹ with its transactional Citizen's portal³⁰, the tax portal³¹, the social

²⁵ <https://www.digitalnicesko.cz/>

²⁶ https://nukib.cz/download/publikace/strategie_akcni_plany/narodni_strategie_kb_2020-2025_%20cr.pdf

²⁷ In June 2021, the law was adopted by the government and discussed in the Parliament.

²⁸ <https://www.zakonyprolidi.cz/cs/2020-12>

²⁹ <https://portal.gov.cz/>

³⁰ <https://obcan.portal.gov.cz/>

³¹ <https://adisspr.mfcr.cz/pmd/home>

security services portal³², and portals for the regions and municipalities³³ are constantly being improved. In March 2021, the number of registered users on the Citizen's portal rose to 114 900 (up from 45 500 in January 2020) with 542 000 accesses to digital services using electronic identification.

However, the non-governmental initiative *Reconstruction of the State* (Rekonstrukce státu)³⁴ points out that measures such as the catalogue of services or the Citizen's portal remain incomplete. The organisation also stresses that public procurement of IT has not yet been reformed, the Office of the Chief Architect of e-government³⁵ does not yet have clearly defined competences and public institutions do not have the necessary expertise to manage major IT tenders. As a result, state IT systems often end up in a state of 'vendor lock-in', tend to be expensive and do not always achieve the highest level of quality.

The e-Government Benchmark 2020³⁶ places Czechia in the category of 'unexploited e-government', signalling that the administration offers a range of digital public services, but only few individuals and enterprises use them. The report also underlines a significant gap in the quality of digital public services provided at national and regional level. The consistency of information about digital public services provided by the authorities is an issue. In 2019, when the government claimed to offer 100 services on the Citizen's portal, monitoring by the Supreme Audit Office³⁷ found that only 29 public services that could be used by any citizen were actually available and interest in using them was limited.

During the pandemic, the government in cooperation with several members of Parliament launched a central user-friendly portal³⁸ that explained the restrictions and measures in an understandable way, based on real-life situations. The open data portal³⁹ launched by the Ministry of Health to inform the public about the pandemic, vaccination, hospital capacity and testing helped healthcare professionals and journalists track the spread of the disease and progress with vaccination. The e-Rouška mobile application contributed to tracking infections and 1.6 million people registered on it. After few technical problems around the launch, the vaccination registrations portal⁴⁰ also proved useful. However, experts and organisations criticised the government's slow roll-out of these online tools.

Digital public services in Czechia are improving and people and enterprises have new channels to access and use them. In 2020-2021, the government rolled out several useful online tools to help manage the pandemic. However, people and enterprises are only slowly starting to use these digital public services and their quality often varies. The government is aware of the low take-up and the main issues. By focusing on improving the current portals, simplifying user environment, maintaining common structure, increasing data sharing and interoperability, making IT procurement more efficient and implementing modern architectural designs to enable the once-only principle, Czechia will improve the use and popularity of its e-government solutions.

³² <https://eportal.cssz.cz/>

³³ <https://mesta.obce.cz/>

³⁴ https://www.rekonstrukcestatu.cz/download/3nQolg/nedigitalni_cesko.pdf

³⁵ <https://archi.gov.cz/>

³⁶ <https://digital-strategy.ec.europa.eu/en/library/egovernment-benchmark-2020-egovernment-works-people>

³⁷ <https://nku.cz/assets/kon-zavery/k19014.pdf>

³⁸ <http://covid.gov.cz>

³⁹ <https://koronavirus.mzcr.cz/>

⁴⁰ <https://registrace.mzcr.cz/>

Highlight: Bank ID – simpler access to digital public services

For many years, Czechia has faced the issue of low digital public service take-up. At the same time, the share of population using online or mobile banking has been among the highest in the EU. The banks and their client-centric approach have earned a high level of public trust. The government has worked together with the Czech Bank Association to enable people to log in by using their Bank ID⁴¹ when accessing e-government systems and portals. The objective was to increase trust in digital public services and bring them closer to people. Nordic countries such as Sweden and Estonia were the inspiration for this approach.

Czechia adopted legislation allowing the use of Bank ID in early 2020 and most of the main banks joined in Q1 2021. In June 2021, already 3.5 million users (third of population) had registered in the system. Bank ID provides a simple way to access e-government services such as the Citizen's portal or tax declaration. It also enables users to e-sign documents or send pre-filled forms. Enterprises can use the system to communicate with public administration. In the future, Bank ID could also be used to access utility (electricity, gas and telecommunication) systems and other service providers such as e-shops. The use of Bank ID is free of charge, secure and user-friendly. The Czech legal community awarded the legislation introducing Bank ID as the best and most inspirational law from 2020.

Digital public services in the Czech Recovery and Resilience Plan

Czechia plans to invest EUR 334 million from the RRF in digital public services. The main measures are described in Components 1.1, 1.2 and 1.6 of the plan.

The plan envisages building a robust back-end infrastructure to link multiple public administration IT systems. The upgraded core registers are expected to facilitate data exchange between institutions and strengthen the 'once-only' principle. Czechia will focus on e-health solutions with improved data sharing between healthcare providers and stronger cybersecurity. The RRP also plans to support digitalisation of and new technologies for railway infrastructure.

The plan also outlines action to upgrade or create new front-end portals (for individuals, for justice matters, healthcare and for entrepreneurs) that are expected to make digital public services more user-friendly and interoperable. Single log-in interfaces and more pre-filled forms are expected to increase the number of e-government users. The number of digital public services for individuals and enterprises should also increase. Czechia plans to set up specialised competency centres to guide and advise in the process of public sector digitalisation. The plan also contains measures to aid publication and a wider use of open data. It is expected to lead to a significant increase (from 23 to 100 by 2024) in the volume of publically available datasets.

Czechia aims to use the RRF to digitise the construction permitting procedure and thus contribute to the general reform that should shorten the whole process, which has been an obstacle both for individuals and for organisations.

⁴¹ <https://bankovni-identita.cz/>