



# **Digital Economy and Society Index (DESI) 2021**

## **Croatia**

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## About the DESI

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*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.*

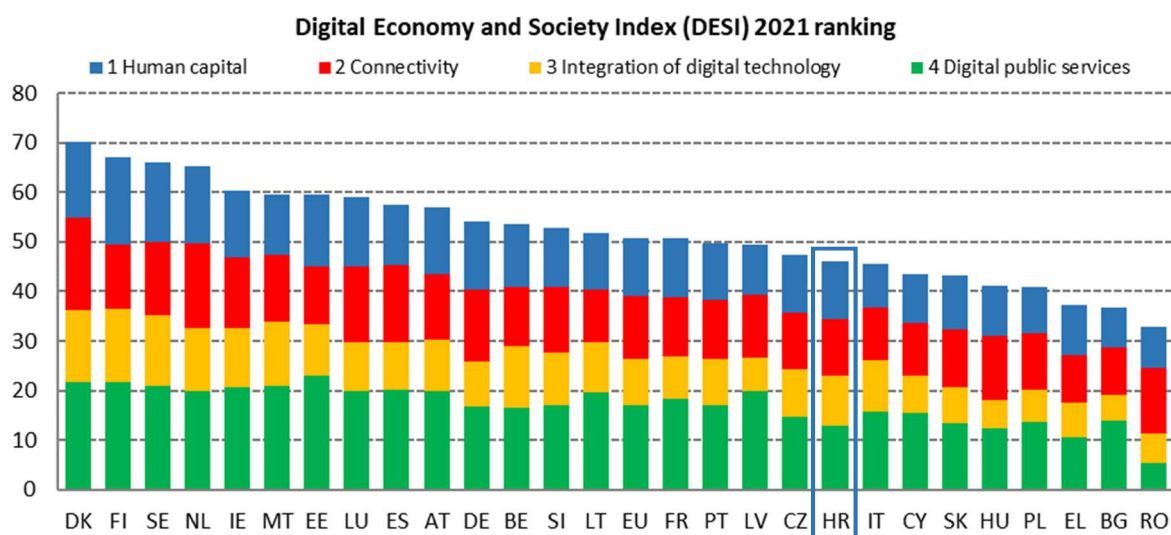
*In addition, DESI now includes an indicator measuring the level of support that adopted ICT technologies provided companies in taking more environmentally-friendly measures (ICT for environmental sustainability) and the take up of gigabit services, plus the percentage of companies offering ICT training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

	Croatia		EU
	rank	score	score
DESI 2021	19	46.0	50.7



Croatia ranks 19th of 27 EU Member States in the 2021 edition of the Digital Economy and Society Index (DESI). Croatia's score increased thanks to an improved performance in some of the DESI dimensions measured.

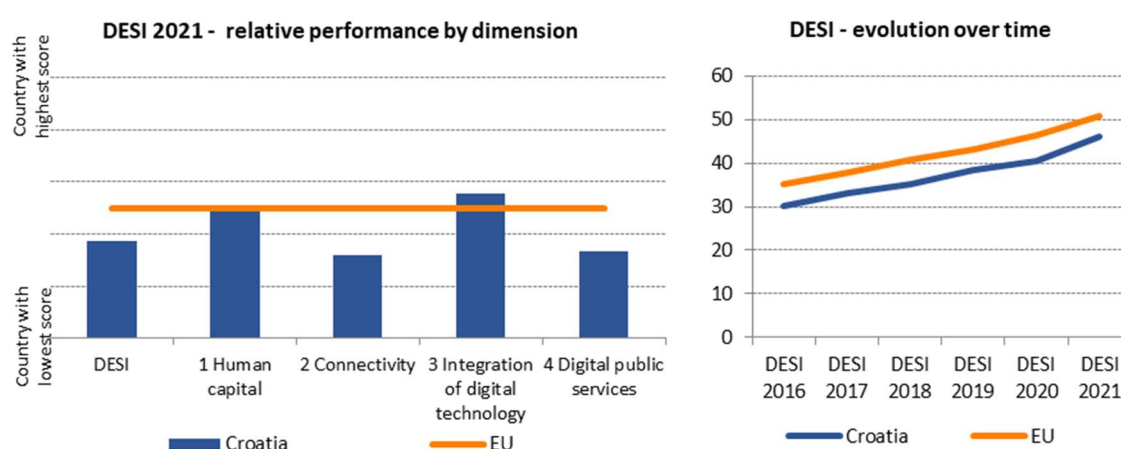
While Croatia has good fast broadband coverage (86% national and 39% rural), its overall fixed broadband take-up is slightly below the EU average. One of the positive developments in connectivity is the assignment of harmonised spectrum for 5G in August 2021. This is a stepping stone for further acceleration of the digital transformation and is bringing benefits to both businesses and individuals.

The level of at least basic digital skills remains slightly low compared with the EU average. In contrast, for above basic digital skills, Croatia comes in above the EU average. Croatia is progressing its successful implementation of the e-Schools programme, with all Croatian schools (1,320) included in the second phase of the programme. Education, science and research are reflected in the national Recovery and Resilience Plan (RRP), which is expected to give a further boost to the digital transformation of higher education, the digitalisation of research and innovation activities, and finally for further development of digital skills.

Croatian enterprises continued to take advantage of the opportunities offered by digital technologies. They actively participate in online commerce, with 30% of SMEs selling online and 10% selling across borders to other EU countries. The sharp rise in popularity in Croatia of e-invoices, with enterprises' usage up from 12% in 2018 to 43% in 2020, is linked to the amendment of the Law on public procurement which made e-invoices mandatory for enterprises. Croatia is also very committed to promoting and investing in digital technologies through various EU coordinated programmes. By mid-2022, the Ministry of Economy and Sustainable Development expects to finalise the 2021-2027 National Plan for the Digital Transformation of the Economy (2021-2027). The 2021-2029 Smart Specialisation Strategy and the National Plan for the Development of Artificial Intelligence are also under development.

Croatia's 2021-2030 Development Strategy recognises the green and digital transitions as key directions for development and sees the digital transition of society and the economy as a strategic objective. Croatia has taken several steps to provide more digital access to the public administration, for example through the eID notification platform for electronic payment of fees. Nevertheless, it is still underperforming on Digital public services, with only 52% of internet users interacting with public authorities in 2020 (EU average: 64%).

The national Recovery and Resilience Plan lays out an ambitious roadmap, with reforms and investments touching on all dimensions of the Digital Economy and Society Index. Closing the current gaps requires sustained efforts and an integrated approach to policies for human capital and public administration. Robust implementation of the measures under the Recovery and Resilience Plan can provide an important change of pace and opportunity to drive digitalisation across Croatia.



### Digital in Croatia's Recovery and Resilience Plan (RRP)

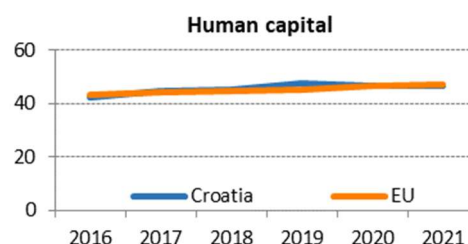
The Croatian plan, which involves a total investment of approx. EUR 6.3 billion, includes digital investments of a total of EUR 1,285 billion (20.4% of the plan's budget). It is structured around five priorities: (i) the economy; (ii) public administration, the judiciary and the State; (iii) education, science and research; (iv) labour market and social security; and (v) healthcare. It also contains a specific initiative on renovating buildings.

- **Economy component:** this includes several investments supporting the digital transition for a total of EUR 576 million, with the largest investments in the digitalisation of transport (EUR 281 million) and energy (EUR 155 million), and the digitalisation of culture and creative industries (EUR 40 million). Other investments in digitalisation are planned in tourism, agriculture, smart working, government services and public infrastructure, and there are plans for grants/vouchers for digitalisation.
- **Public administration, judiciary and state assets component:** total investment for this component is EUR 437 million, with EUR 158 million dedicated to connectivity.
- **Education, science and research component:** this includes digital investments of EUR 158 million, including substantial measures for the digital transformation of higher education (EUR 84 million) and the digitalisation of research and innovation activities in universities and research centres.

- Labour market and social protection component: a total digital investment of about EUR 57 million is planned, mostly for the development of digital skills to facilitate the digital transition of the labour market (EUR 44 million).
- Healthcare component: this includes a substantial investment (about EUR 44 million) in telemedicine, with the largest investment earmarked for the digitalisation of the National Oncology Network and a national oncology database, plus EUR 8 million on digitalisation of operating theatres. Other smaller measures focus on e-care, tele-transfusion, robotic surgery and digitalisation of diagnostic units.
- Buildings renovation initiative: this features a digital investment of EUR 13 million to strengthen capacity to monitor seismic phenomena, plus other smaller measures for the digitalisation of buildings restoration, the planning of future constructions and the setting up of an energy management system.

# 1 Human capital

1 Human capital	Croatia		EU
	rank	score	score
<b>DESI 2021</b>	<b>16</b>	<b>46.7</b>	<b>47.1</b>



	Croatia			EU
	DESI 2019	DESI 2020	DESI 2021	DESI 2021
<b>1a1 At least basic digital skills</b>	<b>NA</b>	<b>53%</b>	<b>53%</b>	<b>56%</b>
% individuals	2017	2019	2019	2019
<b>1a2 Above basic digital skills</b>	<b>NA</b>	<b>35%</b>	<b>35%</b>	<b>31%</b>
% individuals	2017	2019	2019	2019
<b>1a3 At least basic software skills</b>	<b>NA</b>	<b>56%</b>	<b>56%</b>	<b>58%</b>
% individuals	2017	2019	2019	2019
<b>1b1 ICT specialists</b>	<b>3.5%</b>	<b>3.2%</b>	<b>3.7%</b>	<b>4.3%</b>
% individuals in employment aged 15-74	2018	2019	2020	2020
<b>1b2 Female ICT specialists</b>	<b>18%</b>	<b>21%</b>	<b>18%</b>	<b>19%</b>
% ICT specialists	2018	2019	2020	2020
<b>1b3 Enterprises providing ICT training</b>	<b>24%</b>	<b>23%</b>	<b>23%</b>	<b>20%</b>
% enterprises	2018	2019	2020	2020
<b>1b4 ICT graduates</b>	<b>5.5%</b>	<b>4.0%</b>	<b>4.4%</b>	<b>3.9%</b>
% graduates	2017	2018	2019	2019

On Human capital, Croatia ranks 16th of 27 EU countries. Levels of at least basic digital skills remain low compared to the EU average, with only 53% of people between 16 and 74 years having at least basic digital skills. In the 16-24 age group, however, basic and above-basic digital skills are the highest in Europe. In addition, for above-basic digital skills, Croatia comes in above the EU average (35%, against an EU average of 31%). As regards basic software skills, Croatia scores only 2 percentage points less (56%) than the EU average (58%). ICT specialists account for a lower percentage of the workforce in Croatia than the EU average (3.7%, EU average: 4.3%). The percentage of female ICT specialists is slightly below the EU average. Conversely, Croatian enterprises are investing in ICT training for employees, with 23% of enterprises offering specialised ICT training.

CARNET<sup>1</sup>, the main body responsible for the digitalisation of education, has fully supported a transition to online teaching and learning as a response to COVID-19. All Croatian schools (1,320) were included in the second phase of the e-Schools programme<sup>2</sup>. In 2020-2021, all teachers received personal devices and most schools were equipped with wireless local area networks.

The Croatian National Digital Skills and Jobs Coalition<sup>3</sup> was involved in establishing regional centres of excellence in vocational education, supporting quality assurance, job market information, employers' involvement in counselling schools, and curriculum enhancement. It also supported the new

<sup>1</sup> CARNET - Croatian Academic and Research Network –: <https://www.carnet.hr/en/>.

<sup>2</sup> The programme aims to digitally transform the teaching and educational processes in all schools in Croatia by 2022. It strengthens the digital competences of teachers, and then indirectly of students, to prepare them for the 21st century labour market, further education and lifelong learning: <https://pilot.e-skole.hr/en/>.

<sup>3</sup> <https://digitalnakoalicija.hup.hr/novosti/>.

Foreigners Act (adopted in 2021) which regulates the terms for entry, movement, stay and work of non-EU nationals in Croatia. The act opens the job market to ICT specialists, tech talents and digital nomads by facilitating visa processes and employment opportunities.

Croatia is investing actively to introduce Artificial Intelligence (AI) into education. The AI School Challenge competition, organised by the CroAI<sup>4</sup> association in cooperation with CARNET, encourages primary and secondary school students to learn the basics of AI through the course entitled 'Elements of AI'. Croatia was the first country in the region to translate the course and make it available. Since its launch in November 2020, the course has attracted 21,000 participants.

Raising the digital skills of the population from a young age is one of Croatia's priorities, for example by promoting coding and digital literacy during EU Code Week<sup>5</sup>. In 2020, it was among the top 10 countries in the number of activities organised (1,033), reaching almost 36,000 participants, 46% of whom were women. Croatia continues to award talented students with scholarships in Science, Technology, Engineering and Mathematics (STEM) studies (3,400 scholarships per school year). The Office for Gender Equality, in cooperation with the Central State Office for development of the Digital Society, is creating an Action Plan for Gender Equality and inclusion. The act aims to improve women's digital skills, advance their employability and encourage girls and young women to consider an ICT career and STEM studies.

Despite an increase in the supply of ICT specialists, 68% of enterprises recruiting or trying to recruit ICT professionals still report problems in finding suitable candidates. ICT specialists' shortcomings can directly limit enterprises' capacity of to innovate, provide new digital services and products. It is therefore vital to tackle the existing skills mismatches in the labour force by increasing the number of digitally skilled experts, by reskilling and upskilling workers and employees, and by promoting ICT careers and STEM studies among women.

#### Human Capital in Croatia's Recovery and Resilience Plan

The Recovery and Resilience Plan includes investments to support the development of digital skills. The plan includes the continuation of the reform of the education system to improve the basic skills of pupils through increased instruction time and strengthen the link between vocational and adult education and the labour market. The development of new curricula, which will include a focus on the digital transition, is also planned. Alongside, Croatia launches dedicated measures to boost employment, develop skills for the labour market and strengthen pension and welfare systems, with further efforts to combat poverty and social exclusion. The measures are expected to increase the employment rate, improve quality of life and strengthen social cohesion, especially for young people and the self-employed. Fostering lifelong learning and upskilling of workers through investments to adapt to labour market needs will contribute to the employability of all generations. A system or model for reskilling/upskilling will also be developed in line with the needs of the economy and through the proactive role of the Croatian Employment Service (CES).

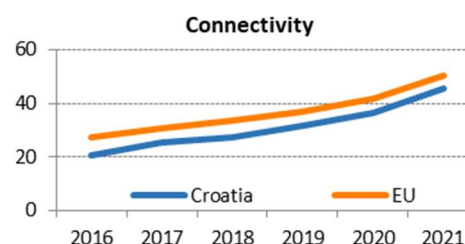
Skills acquisition is also partially addressed in other areas of the plan for example by implementing a voucher system for re- and up-skilling aimed at vulnerable groups, measures to educate students and unemployed persons to strengthen knowledge and skills in tourism, and by funding a voucher system that will cover training for improving digital skills.

<sup>4</sup> <https://www.croai.org/>

<sup>5</sup> <https://codeweek.eu/>

## 2 Connectivity

2 Connectivity	Croatia		EU
	rank	score	score
DESI 2021	20	45.4	50.2



	Croatia			EU
	DESI 2019	DESI 2020	DESI 2021	DESI 2021
<b>2a1 Overall fixed broadband take-up</b> % households	72% 2018	70% 2019	73% 2020	77% 2020
<b>2a2 At least 100 Mbps fixed broadband take-up</b> % households	5% 2018	6% 2019	9% 2020	34% 2020
<b>2a3 At least 1 Gbps take-up</b> % households	NA	<0.01% 2019	<0.01% 2020	1.3% 2020
<b>2b1 Fast broadband (NGA) coverage</b> % households	83% 2018	86% 2019	86% 2020	87% 2020
<b>2b2 Fixed Very High Capacity Network (VHCN) coverage</b> % households	23% 2018	43% 2019	47% 2020	59% 2020
<b>2c1 4G coverage</b> % populated areas	97.6% 2018	99.3% 2019	99.5% 2020	99.7% 2020
<b>2c2 5G readiness</b> Assigned spectrum as a % of total harmonised 5G spectrum	0% 2019	0% 2020	100% 2021	51% 2021
<b>2c3 5G coverage</b> % populated areas	NA	NA	0% 2020	14% 2020
<b>2c4 Mobile broadband take-up</b> % individuals	62% 2018	71% 2019	71% 2019	71% 2019
<b>2d1 Broadband price index</b> Score (0-100)	NA	61 2019	60 2020	69 2020

Croatia ranks only 20<sup>th</sup> in Connectivity. It features good fast broadband coverage (86% national and 39% rural). In contrast, the overall fixed broadband take-up is slightly below the EU average, standing at 73% in 2020. The prevailing technology remains xDSL. Fixed very high-capacity networks (VHCN) coverage (47% national and 11% rural) is below the EU average (59%) but steadily increasing. This is partly due to increasing coverage of fibre to the premises, standing at 36% in 2020 (7% rural) and the recent partial upgrade of cable networks to DOCSIS 3.1 (34%). Despite access to very high broadband speeds, the uptake of at least 100 Mbps broadband is low (9%), although it has increased by 3 pp. compared to 2019. There has not been any uptake of 1 Gbps services so far. Broadband prices are higher (price index of 60) than the EU average. On mobile, its strong point is the near-complete 4G coverage and the take-up of mobile broadband, which stands at the EU level (71%). Croatia has assigned all 5G spectrum in the pioneer bands (5G readiness reached 100%), but still lacks 5G coverage completely.

In March 2021, the Croatian Government adopted the National Plan for Broadband Development. The plan takes into account the EU 2030 objectives but mainly covers the components of the previous 2016-2020 strategy. Croatia took the necessary administrative steps to implement the previous strategy but did not achieve results in terms of infrastructure deployment. The National Framework Programme for the Development of Broadband Access Infrastructure, co-financed by the EU, is



expected to enable fibre coverage to 240,000 households by the end of 2023. The public funding is expected to complement private investment in fibre coverage for 210,000 additional households and businesses. Despite these public and private investments, the national regulatory authority, HAKOM, has identified a EUR 778 million investment gap for 740,000 households to achieve complete VHCN coverage. Most of these investments are needed in rural areas.

Croatia awarded spectrum for 5G use in a multiband auction concluded on 12 August 2021. The three largest operators all acquired frequencies in the 700 MHz, 3.6 GHz band and in the 26 GHz band. EOLO, a new entrant, also acquired a licence in the 26 GHz band<sup>6</sup>. Rights of use will be issued for 15 years, with a possible 5-year extension. One serious obstacle to national 5G developments is cross-border interference from Italy in the 700 MHz band affecting the Croatian coastline. Another impediment to the timely allocation of 5G spectrum is that, in two counties in the northern part of Croatia, 70 MHz in the 3.4–3.6 GHz band are unavailable due to existing use and are expected to be freed only by November 2023. The remaining part of the band is available countrywide. Despite the lack of allocation of harmonised 5G spectrum, Hrvatski Telekom (in November 2020) and A1 (in December 2020) launched commercial 5G offers using DSS technology in the 800 MHz, 900 MHz, 1,800 MHz, 2,100 MHz and 2,600 MHz frequency bands, which facilitates the use of 5G technology in the existing 4G networks. A positive development much welcomed by the mobile network operators is the 50% reduction in fees for rights of use of frequencies for all spectrum used for mobile communication.

The authorities have been active in addressing concerns over electromagnetic fields, in particular through information campaigns and an up-to-date platform providing relevant 5G-related information such as recent developments and test locations.

#### Main market & regulatory developments

The Croatian fixed and mobile markets remain stable, with the incumbent, Hrvatski Telekom holding almost 73% of the fixed broadband market and almost 46% of the mobile market. Its main competitor is A1, with market shares of almost 29% and 35% respectively. Tele2, which changed its brand name to Telemach in November 2020, holds 19.4% of the mobile market and has also announced its entry into the fixed market.

Since 2014, in the context of an insolvency procedure, the incumbent has had a time-limited right of control over Optima Telekom and had to initiate the sale of its shares in the company and the transfer of its control in January 2020. This was an opportunity for new entry in the Croatian market, which could contribute to increased competition and additional benefits for end users in terms of more options, better service and lower prices. However, even after extending the deadline for bids during 2020 there were not any valid offers. Optima therefore still remains with Hrvatski Telekom.

While dual play bundles dominated the market in previous years, these have considerably decreased in 2020. In contrast, triple play remained stable and quadruple play offers are increasing. On the mobile market, post-paid subscriptions are more popular and are slowly increasing (56.7% in 2020), while pre-paid subscriptions are decreasing (43.3% in 2020). TV service is one of the main drivers for subscribing to bundled offers and is included in 71% of all subscriptions. Consumption of over-the-top services is expected to increase, to the detriment of SMS traffic, in particular, decreased by 17% in 2020. On the other hand, traditional mobile voice

<sup>6</sup> Telemach, HT and A1 acquired 20 MHz each in the 700 MHz frequency band. Telemach and A1 acquired 100 MHz each in the 3.6 GHz band while HT acquired 120 MHz at national level, while several operators, including a new entrant, EOLO, acquired regional spectrum licences in the 3.6 GHz band.

traffic has increased by 17%, most likely as an effect of the COVID-19 pandemic and the increase in remote and home working.

The main developments in market regulation are the decisions on: (i) market analysis of the market for wholesale high-quality access provided at a fixed location (market 4 of the 2014 Recommendation<sup>7</sup>; and (ii) on the market for wholesale trunk segments of high-quality access provided at fixed location (previous market 14 of the 2003 Recommendation<sup>8</sup>), both notified in July 2020.

On 4 February 2021, the Commission sent a letter of formal notice to Croatia for failure to notify transposition measures for the European Electronic Communications Code. Subsequently, Croatia provided notification that the transposition is planned for Q3 2021.

In a country with over 550 local authorities, excessive right-of-way fees paid to the local municipalities remain a problem for private infrastructure owners. Furthermore, stringent local planning regimes remain another obstacle to efficient roll-out of both fixed and mobile infrastructure. In its roadmap to implement the Connectivity Toolbox<sup>9</sup>, Croatia announced plans to address the main obstacles to efficient VHCN deployment, such as planning restrictions, faster procedures to rights of way, and the need to establish a coordination body for permit handling and draw up guidelines for application of fees.

In 2020, consumer complaints remained stable (872 complaints) compared to the year before (879), with the bulk of complaints concerning bills, contractual terms and quality of service. Although there was a general increase in both fixed and mobile traffic, which were consistently monitored, no significant congestion issues occurred.

While Croatia is making modest progress to reach the Gigabit Society objectives, significant improvements are still needed. High right-of way fees are an impediment to VHCN deployment. Efficient VHCN deployment could be further facilitated by absorption of EU funds, implementation of the connectivity toolbox and addressing the lack of coordination in permit granting between central and local government, in particular on permit granting and fees. The recent assignment of harmonised spectrum suitable for 5G usage is an important step towards digital transformation, enabling Croatia to take full advantage of a digitalised economy and society, both for households and businesses.

#### **Connectivity in Croatia's Recovery and Resilience Plan**

The Croatian plan includes two main connectivity measures to strengthen connectivity as a cornerstone of the digital transition of society and the economy.

The first measure, worth around EUR 106 million, aims to provide VHCN connectivity services in line with the EU gigabit ambition objective by 2025:

- 100 Mbps services to 100,000 Croatian households (700,000 inhabitants) in 20 projects in as many local government units, to overcome in particular the connectivity barrier to teleworking and distance learning, especially in rural areas and among vulnerable groups such as students from disadvantaged families or those with disabilities;
- 1 Gbit services to all major socio-economic drivers such as schools, universities, research centres, transport hubs, hospitals, public administrative authorities and businesses.

<sup>7</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014H0710>.

<sup>8</sup> <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32003H0311>.

<sup>9</sup> <https://digital-strategy.ec.europa.eu/en/policies/connectivity-toolbox>.

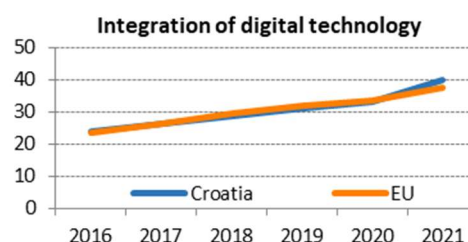
Other investments of about EUR 20 million will target: (i) building passive electronic communications infrastructure to provide access to VHCN and 5G services in rural and sparsely populated areas where there are no the market conditions to attract private investment'; and (ii) 5G coverage in urban areas and the main terrestrial transport routes (5G corridors). About 55% of the households covered by these measures are in rural areas, 26% are in suburban areas, and only 19% in urban areas.

About EUR 400,000 will be invested in four reform activities on:

- analysis and identification of administrative burdens on spatial planning and construction and permit granting
- developing guidelines for removing administrative burdens drawing on examples of good practice in EU countries
- developing guidelines for the development of spatial plans, focusing on the conditions and method of planning of electronic communications
- developing guidelines for the harmonisation of procedures for obtaining building documents based on good practice in EU countries.

### 3 Integration of digital technology

3 Integration of digital technology	Croatia		EU
	rank	score	score
DESI 2021	13	40.0	37.6



	Croatia			EU
	DESI 2019	DESI 2020	DESI 2021	DESI 2021
<b>3a1 SMEs with at least a basic level of digital intensity</b>	NA	NA	62%	60%
% SMEs			2020	2020
<b>3b1 Electronic information sharing</b>	26%	26%	26%	36%
% enterprises	2017	2019	2019	2019
<b>3b2 Social media</b>	16%	22%	22%	23%
% enterprises	2017	2019	2019	2019
<b>3b3 Big data</b>	10%	10%	14%	14%
% enterprises	2018	2018	2020	2020
<b>3b4 Cloud</b>	22%	22%	29%	26%
% enterprises	2018	2018	2020	2020
<b>3b5 AI</b>	NA	NA	21%	25%
% enterprises			2020	2020
<b>3b6 ICT for environmental sustainability</b>	NA	NA	75%	66%
% enterprises having medium/high intensity of green action through ICT			2021	2021
<b>3b7 e-Invoices</b>	12%	12%	43%	32%
% enterprises	2018	2018	2020	2020
<b>3c1 SMEs selling online</b>	18%	21%	30%	17%
% SMEs	2018	2019	2020	2020
<b>3c2 e-Commerce turnover</b>	11%	9%	14%	12%
% SME turnover	2018	2019	2020	2020
<b>3c3 Selling online cross-border</b>	8%	10%	10%	8%
% SMEs	2017	2019	2019	2019

On the Integration of digital technology, Croatia ranks 13th among EU countries. 62% of Croatian SMEs have at least a basic level of digital intensity, slightly above the EU average of 60%. As for the use of ICT for environmental sustainability, 75% of Croatian enterprises record medium/high intensity of green action through ICT, significantly higher than the EU average of 66%. Croatian enterprises are taking advantage of the opportunities offered by digital technologies. They actively participate in online commerce, with 30% of SMEs selling online and 10% selling across borders to other EU countries. Advanced technologies are becoming more popular among Croatian enterprises, with 29% using cloud solutions and 21% using AI solutions. Every fifth (22%) enterprise actively uses social media, while one in four (26%) share information electronically. Croatia has experienced a boom in e-invoices, with a record increase of enterprises using them, up from 12% in 2018 to 43% in 2020. The uptake of big data analysis is also increasing, reaching the EU average of 14% of enterprises.

By mid-2022, the Ministry of Economy and Sustainable Development expects to finalise the 2021-2027 National Plan for the Digital Transformation of the Economy. The plan will be a strategic planning act supporting the overall implementation of the digital measures under Croatia's 2021-2030 National

Development Strategy<sup>10</sup>. The 2021-2029 Smart Specialisation Strategy and the National Plan for the Development of Artificial Intelligence are also under development. Both programmes aim to support the repositioning of Croatian enterprises in global value chains via the development of digital business models and digital skills to adapt their organisational structures to the new global challenges. The Cybersecurity Act is expected to be in force by the end of 2021, and it is a response to European initiative establishing the Network of National Coordination Centres (NCCs) guided by the European Cybersecurity Competence Centre (ECCC). Croatia's 2020 National Reform Programme<sup>11</sup> includes support from the European Regional Development Fund (ERDF) to set up a European Centre for Innovation, Advanced Technologies and Skills Development (ECINTV). ECINTV will be a one-stop shop providing support for the digital transformation of the economy, by promoting lifelong learning for the development of digital and entrepreneurial skills and access to the latest knowledge and resources for testing and experimenting with advanced technologies. It will also facilitate access to digital solutions and provide networking to strengthen the national innovation ecosystem.

The Croatian Association for Artificial Intelligence (CroAI)<sup>12</sup>, founded in 2019, gathers more than 170 members consisting of Croatian AI enterprises, start-ups, scale-ups, universities and AI enthusiasts with a view to connecting leading enterprises and start-ups in the field of artificial intelligence in Croatia.

The Centre for Artificial Intelligence and Cybersecurity (AIRI) at the University of Rijeka<sup>13</sup> connects scientists from various fields working on interdisciplinary research projects. The Regional Centre of Excellence for Robotics (CRTA)<sup>14</sup> works as a reference centre for research, development and educational activities on robotics and AI<sup>15</sup>. CRTA focuses on the research and development of advanced robot applications, especially in industry and medicine, and where traditional automation and human work can be replaced with adaptive and intelligent systems.

To continue boosting the digital transformation of the Croatian economy, it is important to support SMEs in raising the uptake of advanced technologies, paying particular attention to start-up ecosystems, businesses in disadvantaged regions and female digital entrepreneurs. This will require a coordinated and comprehensive approach combining incentives, investments, and simultaneously building strong links with the relevant investments in human capital. Ensuring that employees are well equipped with relevant advanced digital skills will enhance the innovation capacity of SMEs. The development of a comprehensive digital strategy for the collection, analysis and exploitation of data across several public and private domains would help to address weaknesses and reinforce strengths in the fields of security, privacy, products and services innovation, both in the private and public domains, and contribute to relevant EU initiatives (for example the 1 Million Genomes Declaration<sup>16</sup>).

#### **Integration of digital technology in Croatia's Recovery and Resilience Plan**

Croatia's plan features a number of measures to support the integration of advanced technologies into the public and private domains. These measures include support to strengthen capacities for digital transformation through the European Centre for Innovation, Advanced

<sup>10</sup> [https://narodne-novine.nn.hr/clanci/sluzbeni/2021\\_02\\_13\\_230.html](https://narodne-novine.nn.hr/clanci/sluzbeni/2021_02_13_230.html).

<sup>11</sup> <https://vlada.gov.hr/UserDocsImages/Europski%20semestar%202020/National%20reform%20programme%202020.pdf>.

<sup>12</sup> <https://www.croai.org/>.

<sup>13</sup> <https://airi.uniri.hr/>.

<sup>14</sup> <https://www.tehnozavod.hr/regional-center-of-excellence-for-robotic-technologies-at-the-fsb/>.

<sup>15</sup> <https://100.fsb.hr/en/118/Regional+Center+of+Excellence+for+Robotic+Technology/>.

<sup>16</sup> Croatia became the 17th EU Member State to sign the Declaration *Towards access to at least 1 million sequenced genomes in the European Union by 2022*.

Technologies and Skills Development (ECINTV) as a one-stop shop for the coordination and implementation of the relevant activities. Such activities include: (i) the digital transformation of the economy; (ii) lifelong learning and development of digital and entrepreneurial skills; (iii) access to the latest knowledge and resources for testing and experimenting with digital solutions needed to develop new products, processes and business models for users; and (iv) networking and strengthening national ecosystems for digitally focused stakeholder innovation and entrepreneurship at national and European levels.

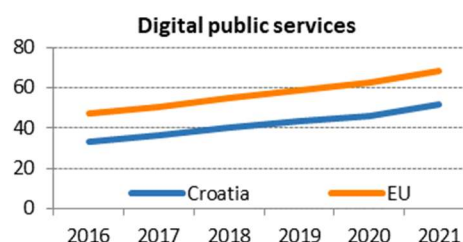
The objective of this investment is to put in place the framework to establish and monitor Digital Innovation Hubs (DIHs) in Croatia. The investment has a budget of about EUR 7.5 million.

The measure also includes co-financing of up to four DIHs under the Digital Europe 2021-2027 programme. The plan will support the EDIHs so that they can provide four types of services to SMEs:

- testing before investing,
- skills development and training,
- access to finance; and
- support for networking and development of innovation ecosystems.

## 4 Digital public services

4 Digital public services	Croatia		EU
	rank	score	score
DESI 2021	24	52.0	68.1



	DESI 2019	Croatia DESI 2020	DESI 2021	EU DESI 2021
<b>4a1 e-Government users</b> % internet users	48%	41%	52%	64%
	2018	2019	2020	2020
<b>4a2 Pre-filled forms</b> Score (0 to 100)	NA	NA	43	63
			2020	2020
<b>4a3 Digital public services for citizens</b> Score (0 to 100)	NA	NA	60	75
			2020	2020
<b>4a4 Digital public services for businesses</b> Score (0 to 100)	NA	NA	73	84
			2020	2020
<b>4a5 Open data</b> % maximum score	NA	NA	82%	78%
			2020	2020

On Digital public services, Croatia ranks 24th among EU countries and is still underperforming in this dimension of the Digital Economy and Society Index. It has a below-average level of online interaction between public authorities and members of the public, with 52% of internet users using e-government services (EU average: 64%). For the indicator measuring the amount of data pre-filled in public service online forms, Croatia scores far below the EU average (score of 43; EU average: 63). Croatia is also below the EU average on the availability of digital online services, both on digital services for citizens (score of 60; EU average: 75) and for businesses (score of 73; EU average: 84). In contrast, on open data Croatia performs well.

Croatia is progressing with the START platform<sup>17</sup> that enables members of the public to start a business remotely and without intermediaries, via one single electronic procedure at a single digital location. In parallel, the Financial Agency (Fina) is preparing to introduce 20 physical locations in its branches to assist users who are not electronically literate in using the platform. By April 2021, 1,283 companies had started operations using the platform.

During 2020, 24 new e-services were integrated in the e-Citizens system, which is currently used by over 1.2 million users. It was redesigned in April 2021 and offers a total of 89 e-services<sup>18</sup>. In addition to the visual and interface changes, the system was adapted for use by mobile devices. It is following a recently published 'Standard for the Development of Public e-Services' (April 2021), which includes guidelines for developing intuitive user interface in e-services.

New services launched in 2020-2021 include the 'e-children' card, e-wedding registration, industrial property registration, and e-renovation. 2020-2021 also saw the establishment of the platform for electronic payment of fees and/or charges. The system also enables card payment of administrative

<sup>17</sup> <https://start.gov.hr/st/broj-osnivanja.html>.

<sup>18</sup> As of end of May 2021.



fees or charges. It lays the ground for further development of more complex electronic services in both the 'e-citizens' and 'e-business' systems.

Croatia launched several activities in the area of e-accessibility. Among the most prominent was a dedicated course for public service officials in charge of public service websites. In 2020, the programme was completed by 646 participants with more training planned for 2021.

Croatia has been working on the next comprehensive and medium-term strategic framework for public services e-health development (the Croatian e-Health Strategic Development Plan) and its corresponding Action Plan. The plan incorporates the most recent developments in e-health and actions planned for 2021-2027. Croatia continues to invest in e-health and telemedicine services, which have proven especially important during the global pandemic (for more on advancements in e-health solutions, see the highlight 2020-2021 box below).

Croatia could see even more improvements in digital public administration if it were to make e-services for the public and businesses more user-friendly and easier to access. Additional measures to promote the use of e-government services could boost take-up of these e-services. Concentrating on reskilling and upskilling of healthcare professionals and bridging the shortfall in qualified ICT experts in health will be even more important if Croatia is to tap the full potential offered by the digital economy. Important complementary actions to promote and strengthen digitalisation of public administration and public services include further simplification efforts, as well as measures to ensure interoperability between governmental services and data.

#### Highlight 2020-2021: e-Health in Croatia

Croatia was an early adopter of e-prescriptions; currently less than 2% of all prescriptions are issued on paper. It also pioneered cross-border e-prescriptions. All four services with 12 cross-border exchange routes are currently available between Croatia, Estonia, Portugal and Finland. Croatia and Portugal are the only EU countries participating in the eHealth Digital Service Infrastructure (eHDSI) with all four services and Croatian doctors can receive patient summaries from other EU countries. By 2022, it is expected that the interoperability of Patient Summary exchange will be established with 15 EU countries.

As a part of joint EU digital response to the COVID-19 pandemic, Croatia has implemented the 'Stop COVID-19' app for exposure notification. It was launched nationwide in July 2020, and successfully connected to European Federation Gateway Service (EFGS) on 16 November 2020. Additionally, as part of public-private cooperation, a chatbot application for Messenger (Facebook) was created and linked to the Facebook page of the Croatian Institute of Public Health<sup>19</sup> to further assist the general public and provide crucial health information and guidance.

Croatia is also presenting very ambitious investments in the national Recovery and Resilience Plan, notably in telemedicine, with the largest investment in digitalisation of the National Oncology Network and a national oncology database, alongside measures in e-care, tele-transfusion and robotic surgery.

<sup>19</sup> <https://www.hzjz.hr/priopcenja-mediji/omogucena-chatbot-komunikacija-korisnika-i-hrvatskog-zavoda-za-javno-zdravstvo/>.



**Digital Public Services in Croatia's Recovery and Resilience Plan**

The Plan includes significant investments for the digitalisation of public administration, supporting the modernization of the digital infrastructure and the improvement of digital public services for citizens and businesses.

The plan includes a number of consistent measures to improve the interoperability of information systems used by the Croatia's government, which will materialize with the establishment of a central register for public authorities and support data driven decision-making at all levels of the administration. It is reinforced by significant investment to expand the capacity of the State cloud and integrating it into the Common European Data Spaces. The plan includes an investment to create a one-stop-shop harmonising and centralising the helpdesk system of all public administrations' online services to strengthen the interactions between citizens, business and public services. The plan also includes an investment to enable citizens to easily use online public services, by creating a mobile e-service platform, promoting the use of electronic signatures in citizens' interaction with the public administration and investments for development of digital identity card.