DIGITAL ECONOMY AND SOCIETY INDEX (DESI) IN ROMANIA AND AT THE EUROPEAN LEVEL

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Abstract: The European Commission publishes annual Digital Economy and Society Index (DESI) reports to monitor the state of digitalisation in Member States. Thus, each year the reports included country profiles, which helped Member States to identify priority areas for action, as well as thematic chapters providing an EU-wide analysis of key digital policy areas. The DESI ranks Member States according to their level of digitalisation and analyses their relative progress over the last five years, based on their starting point. In this paper we look at our country's position according to the latest report. We also found that digitalisation in the EU is uneven, although there are signs of convergence. While the leaders have remained unchanged, there is a substantial group of Member States that cluster around the EU average. Achieving the Digital Decade goals depends on a collective effort by all.

Keywords: *digitalisation, digital economy, digital policy.*
JEL Classification: *O2, O5.*

1. DESI – Romanian position

The European Commission publishes annual Digital Economy and Society Index (DESI) reports to monitor the state of digitisation in Member States. Thus, each year the reports included country profiles, which helped Member States to identify priority areas for action, as well as thematic chapters providing an EU-wide analysis of key digital policy areas.

The DESI ranks Member States according to their level of digitisation and analyses their relative progress over the last five years, based on their starting point. In this paper we look at our country's position according to the latest report. We also found that digitisation in the EU is uneven, although there are signs of convergence. While the leaders have remained unchanged, there is a substantial group of Member States that cluster around the EU average. Achieving the Digital Decade goals depends on a collective effort by all.

The Commission has adjusted the DESI to align it with the four cornerstones set out in the Commission's proposal for a decision "The Roadmap for the Digital Decade Policy Agenda", which is currently being negotiated by the European Parliament and the Council. The proposal sets EU-wide targets to be achieved by 2030 to achieve a comprehensive and sustainable digital transformation in all sectors of the economy. Of the DESI 2022 indicators, 11 measure the targets set under the Digital Decade. In the future, the DESI will be even more closely aligned with the Digital Decade to ensure that all targets are discussed in the reports.

It is important to note that most Member States that had a lower level of digitisation 5 years ago are progressing at a faster pace than the rest, indicating a general convergence in digital in the EU.

Achieving the Digital Decade goals depends on a collective effort by all. Each Member State will contribute to this ambitious goal from a different starting point, determined by resources, comparative advantages and other relevant factors such as population size, size of economy and areas of specialisation. For example, Member States with large economies or populations will need to perform well to enable Europe as a whole to reach the targets by 2030.

"Romania ranks 27th out of 27 EU Member States in the 2022 edition of the Digital Economy and Society Index (DESI). Importantly, its relative annual growth lags behind that of its peers, indicating that it is not converging with the rest of the Member States. Our country lags behind on several indicators in terms of the human capital dimension, with a very low level of basic digital skills compared to the EU average, but maintains its high rankings in terms of the proportion of female ICT specialists employed (2nd place) and ICT graduates (4th place)."

Chart 1. Digital Economy and Society Index (DESI) ranking

Source: https://digital-strategy.ec.europa.eu/en/policies/desi
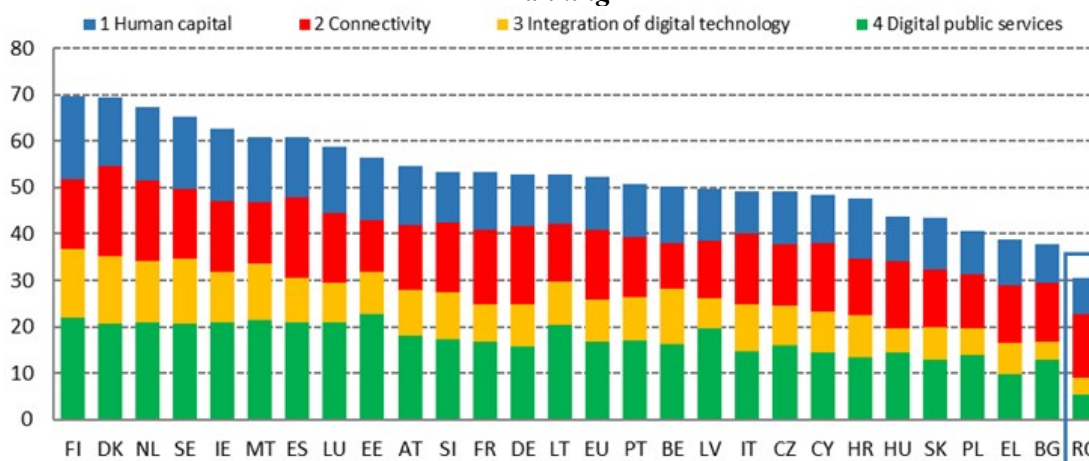
A significant step change in the pace of Romania's digital skills preparation is essential if the EU is to achieve the Digital Decade target on digital literacy and ICT skills.

Romania performs relatively well in connectivity, which is the dimension where it performs best. "Fixed broadband take-up of at least 100 Mbps (57%) and coverage of very high capacity fixed networks (87%) exceed the EU average. This is also important in light of the Digital Decade target of 100% gigabit network coverage of all households by 2030."

Chart 2

DESI evolution in Romania, 2017-2022

Digital Economy and Society Index, by Integration of Digital Technology
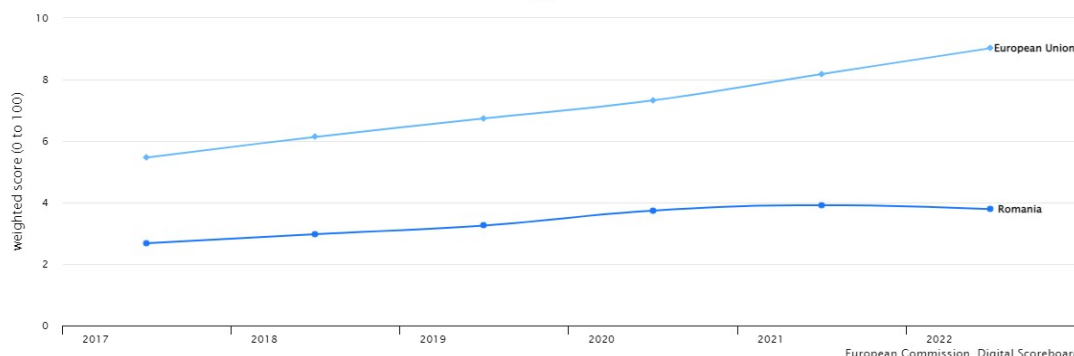
Source: https://digital-strategy.ec.europa.eu/en/policies/countries-digitisation-performance

"However, the country's performance in integrating digital technologies and digital public services is weak compared to other EU Member States. The share of SMEs with at least a basic level of digital intensity (22%) and the percentage of businesses exchanging information electronically (17%) is the lowest in the EU."

The low level of digitisation and relatively slow progress is preventing the Romanian economy from taking full advantage of the opportunities offered by digital technologies. This is aggravated by the very low level of digital public services for both citizens and businesses.

Among the causes that led to this situation we mention: the continuation of the COVID-19 pandemic in 2021, frequent changes of government (five governments in the last four years) but also the level of corruption that directly or indirectly affects. All of these and others represent particular challenges for our country.

Digitisation continues to be a key priority of the current government, along with simplifying legislation and creating a business-friendly regulatory environment. It is leading the digital transformation of the public sector through the Public eGovernment Policy 2021-2030 (adopted on 3 June 2021), a flagship project to establish a framework for eGovernment services and tools.

"With investment support of almost €6 billion (20.5% digital tagging), Romania's Recovery and Resilience Plan (RRP) includes extremely important measures to fully embrace digitisation across all dimensions of DESI, namely digital skills, connectivity, business support and digital public services."

Chart 3

Relative performance on DESI, 2022

Sursa: https://digital-strategy.ec.europa.eu/en/policies/desi
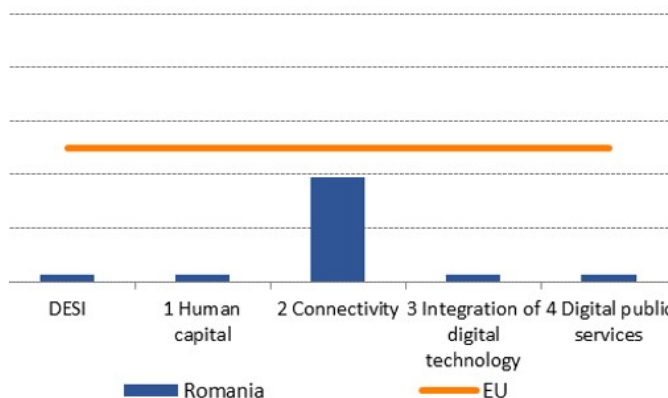
"With the refugee crisis triggered after Russia's invasion of Ukraine, Romanian operators have made free SIM cards with free calls and data available to Ukrainians. By March 2022, around 400,000 SIMs have been distributed. Moreover, operators announced a coordinated approach with the General Inspectorate for Emergency Situations to direct mobile operators to immigration points and to install Wi-Fi hotspots in camps."

These measures were implemented by the end of March and are now under review. According to ANCOM, agreements are in place with Ukrainian telecom counterparts not to charge roaming fees.

Taking into account the role of audiovisual media services in shaping public opinion and the right of the public to have access to reliable and up-to-date sources of information on Russia's aggression against Ukraine, the National Audiovisual Council (NAC) adopted a

recommendation to audiovisual media service providers on 24 February 2022, requiring them to comply with legal obligations to provide accurate information to the public.

The NAC is rapidly monitoring how issues related to the Russian Federation's aggression against Ukraine are covered in news broadcasts and debates, with the aim of correctly informing the public by verifying information, avoiding misleading information and respecting ethical rules.

In addition, "CNA recommended to Romanian citizens, through an information spot broadcast by broadcasters under a public service announcement, to inform themselves "exclusively from official sources" in the context of the war in Ukraine. The NAC organised a videoconference on 11 April 2022 to which broadcasting regulators from countries bordering Ukraine were invited."

The NAC seeks cooperation based on the exchange of best practices, so that authorities inform each other, avoiding manipulation and misinformation.

2. Status of the main areas of digitisation in Romania compared to EU Member States

2.1 Human capital

Romania ranks 27th in terms of the human capital dimension of DESI 2022. The country faces a lack of basic digital skills among the population. "Romania ranks well below the EU average for at least basic digital skills (28% vs. 54%) and higher basic digital skills (9% vs. 26%). 41% of people in Romania have at least basic digital content creation skills, below the EU average of 66%. Romania is also below average in terms of the proportion of ICT specialists employed, 2.6% compared to 4.5%, but the percentage is steadily increasing. In contrast, the level of female ICT specialists and ICT graduates remains high and has increased to 26% and 6.7% respectively, scoring among the best. The share of enterprises offering ICT training stagnates at 6%, significantly below the EU average."

Table 1. Developments in digital skills in Romania

	România			UE
	DESI 2020	**DESI 2021**	**DESI 2022**	**DESI 2022**
1a1 Cel puțin competențe digitale de bază	NA	NA	28%	54%
% persoane fizice			2021	2021
1a2 Competențe digitale de bază peste nivelul de bază	NA	NA	9%	26%
% persoane fizice			2021	2021
1a3 Cel puțin competențe de bază în crearea de conținut digital[3]	NA	NA	41%	66%
% persoane fizice			2021	2021
1b1 Specialiști TIC	2.3%	2.4%	2.6%	4.5%
% de persoane ocupate cu vârsta cuprinsă între 15 și 74 de ani	2019	2020	2021	2021
1b2 Femei specializate în TIC	23.5%	26.2%	26%	19.1%
% specialiști TIC	2019	2020	2021	2021
1b3 Întreprinderi care oferă formare în domeniul TIC	6%	6%	6%	20%
% întreprinderi	2019	2020	2020	2020
1b4 Absolvenți TIC	5.8%	6.3%	6.7%	3.9%
% absolvenți	2018	2019	2020	2020

Sursa: DESI2022_Romania_eng_Y0CxsVwhe20hbiAE4OvH8lYJPg_88717pdf, pag.7

Although the country does not yet have a digital competence strategy, there are cross-cutting measures in the NRDP, such as the adoption of the legislative framework for the digitisation of education. The reform aims to provide the necessary legal framework for the

development of pupils' digital competences. This will involve defining the skills profile for teachers and revising the compulsory school curriculum and the framework plan for ICT subjects at all school levels. The reform will align the education system with the European DigComp framework for pupils' digital competences. The implementation of the reform is to be completed by 30 June 2024.

In addition, the NRDP investments under Component 7 - "Reform 4 "Increasing digital competence for public service and lifelong digital education for citizens" supports the digitisation of the economy and the transition to Industry 4.0 and aims to align the labour market with the latest developments in this sector". These investments will help implement this reform in four areas outlined below.

1. Advanced digital skills training programme for civil servants (€20 million): "by mid-2026, 30,000 civil servants will be trained in advanced digital skills and 2,500 senior civil servants will be trained in leadership and talent management".

2. Funding programmes for libraries to become digital competence centres (€37 million).

3. Enterprise employee upskilling/reskilling schemes (€36 million): this scheme supports the digital transformation of SMEs by increasing the digital skills of their employees, with a focus on emerging technologies, e.g. internet of things, big data, machine learning, artificial intelligence, robotic process automation, blockchain. By the end of 2025, the employees of 2 000 SMEs will have benefited from the support.

4. Building new cybersecurity skills for society and economy, aiming at "developing cybersecurity skills for both students and public and private actors (€25 million). Cybersecurity training courses will be organised for 5000 teachers (at pre-university and university level)", who will then be able to pass on their knowledge to students across Romania. These training sessions will be completed by mid-2026.

In addition, under NRRP Component 15 - Education, a continuous training programme will develop digital pedagogical skills for teachers in rural and other disadvantaged areas. The European DigComp framework for digital competences and internationally recognised standards (ECDL) will be used to design the programme, which is expected to involve around 100,000 teachers. A multimedia lesson collection platform will accompany the training to serve as a best practice model for each subject. Around 50 000 teachers will benefit from exchanges via the platform. A framework for evaluating the practical application of acquired skills and taking corrective action will ensure that the effects of the programme are long-lasting. The amount allocated is €80 million and the programme will be completed by the third quarter of 2025.

Upgrading more than 5 200 IT labs and developing 1 100 technology hubs as smart labs will provide digital infrastructure and equipment for more than 3 600 schools not covered by other funding programmes. The amount allocated under the NRRP is €478.50 million and implementation will run from 2021-2025.

The National Agency for Employment (ANOFM) provides vocational training courses for registered unemployed and jobseekers to help them find a job. The courses are funded from the unemployment insurance budget. In 2021, 673 people attended ANOFM's digital skills training courses.

In 2021, Romania participated in the EU Code Week. The country hosted 53407 participants in 1755 events. The participation of women reached 44%. The share of activities held in schools was 88%.

Very low levels of basic digital skills translate into low levels of fixed broadband take-up (66%), despite high availability of fast broadband (93%) and very high capacity network

(VHCN) coverage (87%) (see section on connectivity for more information). To boost broadband take-up, efforts should also focus on improving the skills of the general public.

2.2 Connectivity

In terms of connectivity, "Romania ranks 15th out of 27 EU countries, below the EU average".

Romania's biggest connectivity challenge is to improve its overall fixed broadband take-up, which is stagnating at 66% and significantly below the EU average (78%), despite low broadband costs and high coverage of very high capacity networks (VHCN). This stagnation is mainly due to the country's skewed demographic structure and low level of basic digital skills, leading to a delay in Romania's take-up.

Table 2. Evolution of the Connectivity Index in Romania

	România			UE
	DESI 2020	**DESI 2021**	**DESI 2022**	**DESI 2022**
2a1 Adoptarea globală a benzii largi fixe % gospodării	66% (2019)	67% (2020)	66% (2021)	78% (2021)
2a2 Cel puțin 100 Mbps în bandă largă fixă % gospodării	49% (2019)	51% (2020)	57% (2021)	41% (2021)
2a3 Cel puțin 1 Gbps absorbție % gospodării	<0.01% (2019)	<0.01% (2020)	8.98% (2021)	7.58% (2021)
2b1 Acoperire rapidă în bandă largă (NGA) % gospodării	82% (2019)	87% (2020)	93% (2021)	90% (2021)
2b2 Acoperirea rețelei fixe de foarte mare capacitate (VHCN) % gospodării	68% (2019)	76% (2020)	87% (2021)	70% (2021)
2b3 Acoperirea FTTP (Fibre to the Premises) % gospodării	68% (2019)	76% (2020)	87% (2021)	50% (2021)
2c1 Spectrul 5G Spectrul alocat ca procent din totalul spectrului 5G armonizat	21% (04/2020)	21% (09/2021)	22% (04/2022)	56% (04/2022)
Acoperire 2c2 5G[5] % zone populate	NA	12% (2020)	25% (2021)	66% (2021)
2c3 Adoptarea benzii largi mobile % persoane fizice	65% (2018)	65% (2018)	82% (2021)	87% (2021)
2d1 Indicele prețurilor în bandă largă Punctaj (0-100)	92 (2019)	97 (2020)	97 (2021)	73 (2021)

Source: DESI2022_Romania_eng_Y0CxsVwhe20hbiAE4OvH8lYJPg_88717pdf, pag.8

"However, Romania continues to be a strong player in the field of Next Generation Access (NGA) and VHCN. Fixed broadband coverage increased to 94.1% for all households, slightly below the EU average of 97.9%. In addition, fast broadband coverage increased by 6 percentage points to 93%, above the EU average of 90%. Urban areas boast 90% VHCN coverage, well above the EU average of 76%. The urban-rural digital divide in VHCN coverage continued to narrow after a 20 percentage point increase, reaching 75.7% coverage in rural areas (double the EU average of 37.1%)".

However, operators pointed to difficulties in deploying fibre, particularly in terms of access near roads and buildings. In response, the draft law transposing the European Electronic Communications Code (EECC), in addition to transposing this directive, will reform the granting of authorisations, dividing civil works into three categories: the first does not require authorisation, the second is a simplified procedure, while the third is the normal procedure.

As regards mobile connectivity, 5G deployment is facing obstacles from several sides, due to the delay in the transposition of the EECC and the burden imposed by the 5G Security

Act, adopted following the entry into force of the Memorandum of Understanding between the US and Romania.

Despite high 4G/LTE coverage (97.1%) and an increase in 5G coverage (25% in 2021, 13% more than the previous year), Romania lags behind the EU average in 5G coverage and faces delays in harmonised 5G spectrum allocation, which remains low (22% compared to the EU average of 56%).

Despite good progress in 2021 in increasing fixed broadband coverage, Romania still faces relatively slow take-up and low 5G coverage. However, Romania is on track to reach the gigabit society and Digital Decade 2030 targets, thanks to its relatively high VHCN coverage, while the investments envisaged through the NRRP will push the country to align with EU averages in the coming years.

2.3 Mainstreaming digital technology

Romania performs poorly in terms of digital technology integration, ranking 27th in this dimension. Almost all indicators remain well below the EU average and have either stagnated or even decreased in the last year. The share of SMEs with at least a basic level of digital intensity was 22% (EU average: 55%).

Efforts therefore need to be stepped up to reach the Digital Decade target of 90% of SMEs reaching a basic level of digital intensity by 2030. With 12% of SMEs selling online and 4% selling cross-border online, Romania lags behind most EU Member States.

Table 3. Evolution of the Digital Inclusion Index in Romania

	România			UE
	DESI 2020	**DESI 2021**	**DESI 2022**	**DESI 2022**
3a1 IMM-uri cu cel puțin un nivel de bază de intensitate digitală	NA	NA	22%	55%
% IMM-uri			2021	2021
3b1 Schimbul electronic de informații	23%	23%	17%	38%
% întreprinderi	2019	2019	2021	2021
3b2 Social media	8%	8%	12%	29%
% întreprinderi	2019	2019	2021	2021
3b3 Date mari	11%	5%	5%	14%
% întreprinderi	2018	2020	2020	2020
3b4 Cloud	NA	NA	11%	34%
% întreprinderi			2021	2021
3b5 AI	NA	NA	1%	8%
% întreprinderi			2021	2021
3b6 TIC pentru durabilitatea mediului	NA	68%	68%	66%
% de întreprinderi care au o intensitate medie/înaltă a acțiunilor ecologice prin TIC		2021	2021	2021
3b7 e-Facturi	20%	17%	17%	32%
% întreprinderi	2018	2020	2020	2020
3c1 IMM-urile care vând online	11%	17%	12%	18%
% IMM-uri	2019	2020	2021	2021
Cifra de afaceri 3c2 e-Commerce	5%	8%	7%	12%
% cifra de afaceri a IMM-urilor	2019	2020	2021	2021
3c3 Vânzarea online transfrontalieră	6%	6%	4%	9%
% IMM-uri	2019	2019	2021	2021

Source: DESI2022_Romania_eng_Y0CxsVwhe20hbiAE4OvH8lYJPg_88717pdf, pag.12

Adoption of advanced technologies, such as the cloud, reached only 11%, compared to the EU average of 34%. As for artificial intelligence, only 1% of businesses have adopted such technologies (EU average: 8%). Big data also remains at a comparatively low level, at 5% compared to the EU average of 14%. There is a significant gap to be closed by 2030 to reach the Digital Decade target of 75% for cloud, big data and artificial intelligence. Only the 68% share of businesses with medium/high intensity of green action through ICT is slightly above the EU average of 66%.

The 2021-2027 government strategy to develop the SME sector and improve the Romanian business environment towards the digital and data economy includes cross-cutting measures such as: Developing the network of Digital Innovation Hubs (DIHs); providing opportunities for SMEs to acquire the necessary skills to benefit from new technologies; helping SMEs to easily switch digital service providers and take advantage of data portability as foreseen in the Regulation on the free movement of non-personal data; and increasing SMEs' awareness of security threats and boosting investment in cyber security.

In the area of microelectronics, Romania has signed the Joint Declaration on the European initiative for processors and semiconductors. The investment in the multinational project on low power semiconductor chips and processors will stimulate the development of microelectronics in Romania, thus addressing one of the EU's challenges. Romanian industry has shown strong interest in this topic, responding to the request from the Ministry of Economy and Entrepreneurship to submit project proposals.

Regarding blockchain, the 2 nodes of the European blockchain services infrastructure in Romania have been set up in 2021 by the National Institute for Research and Development in Computer Science (ICI Bucharest) and the higher education and research funding body UEFISCDI, together with the Polytechnic University of Timisoara. They are in a mature phase of development.

The Authority for the Digitisation of Romania is implementing the project "Strategic Framework for the Adoption and Use of Innovative Technologies in Public Administration 2021-2027" together with the Technical University of Cluj-Napoca. The main objectives are the following: to develop a national framework in the field of blockchain technologies for public administration; to develop the national strategy for artificial intelligence; to define the concept of digital innovation hubs; to define the framework and funding for Romania's participation in European initiatives and networks and to set up a Digital Policy Lab for the development of infrastructures, processes, tools and networks.

The main obstacles to the digital transformation of Romania's SME sector and most of its economy are of a structural nature. They require comprehensive measures aimed at increasing the level of digital education and managers' understanding of the role of digital tools in business. The underdevelopment of digital public services hinders SMEs' adoption of digital management of processes such as accounting.

2.4 Public services

Digital public services continue to be a challenge for Romania. The country scores significantly below the EU average on all indicators, including on the availability of digital public services for citizens (a score of 44 compared to the EU average of 75) and for businesses (a score of 42 compared to the EU average of 82). Digital interaction between public authorities and the general public is also low, with only 17% of internet users using e-government services.

Table 4. Evolution of the Public Services Index in Romania

	România			UE
	DESI 2020	**DESI 2021**	**DESI 2022**	**DESI 2022**
4a1 Utilizatori de e-Guvernare % utilizatori de internet	15% 2019	16% 2020	17% 2021	65% 2021
4a2 Formulare precompletate Punctaj (de la 0 la 100)	NA	NA	19 2021	64 2021
4a3 Servicii publice digitale pentru cetățeni Punctaj (de la 0 la 100)	NA	NA	44 2021	75 2021
4a4 Servicii publice digitale pentru întreprinderi Punctaj (de la 0 la 100)	NA	NA	42 2021	82 2021
4a5 Date deschise % punctaj maxim	NA	NA	76% 2021	81% 2021

Source: DESI2022_Romania_eng_Y0CxsVwhe20hbiAE4OvH8lYJPg_88717pdf, pag.16

The high share of digital investments and reforms dedicated to this dimension in Romania's Recovery and Resilience Plan (NRRP) represents an opportunity to improve these results. Timely implementation of these measures will contribute to achieving the Digital Decade target of 100% online delivery of essential public services for European citizens and businesses by 2030.

Currently, Romania does not have an e-ID system. The implementation of e-ID cards and digital signatures for Romanians is essential to enable interactions between public and private bodies and the public.

In the future, measures are planned to deliver 8.5 million electronic identity cards, with €200 million allocated for this purpose. The eID card will store two digital certificates allowing: authentication for the use of online public services and qualified electronic signatures.

The investments to be made are aimed at modernising public administration through advanced technologies and focusing on the needs of citizens and businesses. This should go hand in hand with ensuring the preconditions for data-driven policy making and increasing the interoperability of existing digital technologies. In addition, the reforms support the development of an integrated digital public service architecture.

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On e-health, investments include a telemedicine system and the new health insurance information platform (PIA), which aims to promote integration of health institutions through digital infrastructure, facilitate access to data for the Ministry of Health and other stakeholders, reduce fragmentation and improve the quality of health data.

Ultimately the aim is to increase access to specialised consultations for rural and small urban areas and vulnerable groups, while reducing waiting times through the use of telemedicine.

In addition, the National Health Insurance House, in partnership with the Special Telecommunications Service (STS) and the Authority for the Digitisation of Romania, is implementing an IT system called eDES. This IT system will connect the DES, the electronic health record, providers of paraclinical, clinical, physical and rehabilitation services, home health care, palliative home care, dentistry, medical devices, assistive devices and technologies, and emergency home consultations and unassisted health transport activities. This will contribute to achieving the objective of access to health records for 100% of EU citizens.

Although it does not measure the user-centricity of digital public services, the draft Action Plan for the National Inclusion and Poverty Reduction Strategy 2021-2027 includes a specific action aimed at facilitating access to public information for all citizens. The information will be published on the websites of municipalities and public institutions in an easy-to-read format, together with a set of supporting information for vulnerable people.

At the end of 2020, in order to monitor progress in the digital transformation of public administration in Romania and to support the Government's strategic decisions, the Authority for the Digitisation of Romania (ADR) launched the Catalogue of Public Services, which will be updated annually. It will be the tool for programming the digitisation of public services, planning interventions and piloting digital public services.

Romania has identified the lack of combined IT and business process expertise within institutions as one of the major structural challenges in its efforts to digitise the public services sector.

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