Digital Decade
Country Report 2024:

Romania

Romania

Contents

Executive summary

Romania has scope to improve its performance to contribute to the European Union's (EU) Digital Decade objectives and targets, in view of a successful digitalisation that fosters competitiveness, resilience, sovereignty, European values and climate action.

In 2023, Romania made **notable progress in digitalising public services and in digitalising SMEs** and continued to have an outstanding performance on **FTTP coverage**. However, in spite of the ongoing efforts, important **challenges persist in improving basic digital skills** across the population and in rolling out **5G networks**.

Digital transformation has gained political importance in Romania over the last few years, and currently benefits from significant amounts of EU funding. Romania dedicates 21.8% of its total Recovery and Resilience Plan to digital (EUR 5.8 billion)[1]. Under Cohesion Policy, an additional EUR 3 billion (10% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation[2]. Some of the ongoing measures already start to generate improvements in key performance indicators (KPIs), but for now the large-scale benefits to citizens and businesses in terms of digital education and inclusion, competitive and innovative business or better and more transparent public services remain insufficient.

According to the Special Eurobarometer 'Digital Decade 2024'[3], **59% of Romania's population considers that the digitalisation of daily public and private services makes their life easier.** This is one of the lowest scores in the EU, much below the EU average of 73%.

Regarding participation in European Digital Infrastructure Consortia (EDICs), Romania is a member of the EUROPEUM EDIC (in the area of blockchain, already set up) and is participating in the Working Groups developing the Statues and other relevant documents of the possible future Genome and IMPACTS (Connected Public Administration) EDICs[4].

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[1] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

[2] This amount includes all investment specifically aimed at or substantially contributing to digital transformation in the 2021-2027 cohesion policy programming period. The source funds are the European Regional Development Fund, the Cohesion Fund, the European Social Fund Plus, and the Just Transition Fund.

[3] Special Eurobarometer 551 on 'the Digital Decade' 2024: https://digital-strategy.ec.europa.eu/en/news-redirect/833351

[4] Information last updated on 31 May 2024.

Romania

Digital Decade KPI [1]	Romania			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024	Annual progress	DESI 2024 (year 2023)	Annual progress	RO	EU
Fixed Very High-Capacity Network (VHCN)	95.6%	95.0%	-0.6%	78.8%	7.4%	99%	100%
Fibre to the Premises (FTTP) coverage	95.6%	95.0%	-0.6%	64.0%	13.5%	99%	-
Overall 5G coverage	26.8%	32.8%	22.4%	89.3%	9.8%	62%	100%
Semiconductors		NA					
Edge Nodes		5		1 186		113	10 000
SMEs with at least a basic level of digital intensity	22.2%	26.8%	9.9%	57.7%	2.6%	75%	90%
Cloud	11.3%	15.5%	17.1%	38.9%	7.0%	40%	75%
Artificial Intelligence	1.4%	1.5%	3.5%	8.0%	2.6%	10%	75%
Data analytics	NA	21.9%	NA	33.2%	NA	15%	75%
AI or Cloud or Data analytics	NA	28.7%	NA	54.6%	NA		75%
Unicorns		0		263		x	500
At least basic digital skills	27.8%	27.7%	-0.2%	55.6%	1.5%	50%	80%
ICT specialists	2.8%	2.6%	-7.1%	4.8%	4.3%	4%	~10%
e ID scheme notification		No					
Digital public services for citizens	47.6	52.2	9.7%	79.4	3.1%	100	100
Digital public services for businesses	44.6	50.0	12.1%	85.4	2.0%	100	100
Access to e-Health records	57.1	58.6	2.7%	79.1	10.6%	x	100

[1] See the methodological note for the description of the indicators and other descriptive metrics
[2] Last measure used is for 2021

National digital decade strategic roadmap

With respect to **Romania's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating a **high ambition** and, based on this document, intends to allocate **some effort** to achieve the Digital Decade objectives and targets, although the **formal adoption of the roadmap at the national level,** which is crucial for the country to fully commit towards these ambitions, **is still pending.**

Romania endorsed national targets corresponding to all Digital Decade 2030 targets, with the exception of e-Health, quantum, edge nodes and semiconductors. The targets for digital skills, the digitalisation of businesses, and 5G coverage are set significantly below the levels of the EU targets.

The 97 measures included in the roadmap largely build on the Romanian Recovery and Resilience Plan (RRP) and, to a more limited extent, on the relevant cohesion policy funding. Based on the budget information that is included in the plan, it appears that most funding efforts concentrate on the digitalisation of public services (11 measures worth over EUR 1 billion) and on improving digital skills (23 measures worth over EUR 1 billion), which are seen as key drivers of Romania's digitalisation. On the digitalisation of businesses, most measures included in the roadmap are taken at regional level via the European Digital Innovation Hubs, and as such they are not likely to address all the identified challenges. The roadmap acknowledges that further action is needed to support digital R&D, innovation, and the digital transformation of businesses. Interinstitutional processes have started to develop policies in areas such as semiconductors, quantum and, to a lesser extent, edge nodes, partly building on Romania's participation in multi-country projects. Overall, the roadmap could be further developed to reflect the general objectives of the programme.

> **Recommendations for the roadmap**
>
> Romania should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the DDPP Decision:
>
> - **TARGETS:** (i) propose targets and trajectories for edge nodes and eHealth; (ii) revise the unicorns target in line with the current KPI definition; (ii) Raise the level of ambition for 5G, basic digital skills, ICT specialists, digitalization of SMEs and the take up of advanced digital technologies.
> - **MEASURES:** (i) review the measures supporting the targets for the digitalisation of business and take up of advanced digital technologies, to ensure a more comprehensive overview, as well as the objectives of the programme; (ii) continue the institutional process to develop policies in the areas of semiconductors, edge, and quantum; (iii) review the budget description of the measures funded by national budget and cohesion policy; (iv) classify the measures according to the target and/or objective that they contribute to; (v) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including on contributing measures.
> - **CONSULTATION:** Ensure a consultation process for the revised roadmap, giving interested stakeholders sufficient time to react, and report on it in the roadmap.

Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' reveals key insights into Romanian perceptions of digital rights. 45% believe the EU protects their digital rights, just like the EU average. Confidence in digital privacy is at 48%, slightly below average. Concerns include online safety for children (48%) and control over personal data (41%), both showing a prominent increase. Positive trends include the importance attributed by Romanians to digital technologies for accessing public services (64%) and connecting with friends and family (71%). The monitoring of the Declaration on Digital Rights and Principles shows that increasing the profile of the Declaration at national level and fostering better stakeholder engagement could help improve outcomes in the years to come[5].

A competitive, sovereign, and resilient EU based on technological leadership

With 95% coverage of households (second highest in the EU), Romania is close to delivering almost full FTTP coverage to its citizens and businesses, including in rural areas, where coverage is 92.5% already and still progressing quickly. The country also has the highest take up of high-speed internet in the EU: 94% of internet connections are at speeds of 100Mbps or above. Following the recent spectrum allocation and various regulatory measures, **5G coverage is improving, but still severely lagging behind the EU average**. Performance on **the digitalisation of businesses remains much below the EU average**, although a positive dynamic has been observed for basic digital intensity and some other related indicators, in particular **e-Invoicing**. Despite efforts, a significant gap remains to achieve the digitalisation of business targets by 2030 and to implement the roadmap, including to **increase the level of R&D and innovation in the ICT sector**. **Significant developments in the field of cybersecurity**

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[5] See SWD 'Digital Decade in 2024: Implementation and perspective' with annexes, SWD(2024)260: https://digital-strategy.ec.europa.eu/en/news-redirect/833325, Annex 4.

were also observed in 2023, initiated by both private and public actors, including efforts to raise awareness and build relevant skills.

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Recommendations – Romania should:

- **CONNECTIVITY INFRASTRUCTURE**: (i) Undertake additional efforts to support a higher level of ambition for the 5G target, including possible support for use cases and pilots, in view of the importance for EU and Romania's future competitiveness and building on the current positive trend; (ii) Ensure sufficient access of new players to spectrum for innovative business-to-business (B2B) and business-to-consumer (B2C) applications and encourage operators to speed up the deployment of 5G stand-alone core networks.
- **SMEs:** Intensify action on digitalisation of business, starting with providing a comprehensive overview of the available support measures and identifying potential gaps in terms of meeting existing needs, as well as with ensuring the good functioning of the EDIHs.
- **CLOUD/EDGE:** (i) Stimulate the adoption of next generation cloud infrastructure and services by companies of all sizes, including by liaising with the Cloud IPCEI Exploitation office and/or the Member States participating in the IPCEI-CIS; (ii) Consider edge node deployment when creating investment programmes and strategies in these areas of AI, future network deployment, and the Internet of Things, as edge computing is an important component of those.
- **UNICORNS:** Extend the measures to support an innovative, R&D driven ICT sector, as part of the competitiveness and technological leadership objectives in the roadmap.
- **QUANTUM/SEMICONDUCTORS:** Develop a policy and further measures to support the semiconductors, quantum, and edge nodes targets, building on the growing national interest and existing assets, as well as multi-country cooperation.
- **CYBERSECURITY:** (i) Extend the roadmap to better reflect the growing interest in and activities related to cybersecurity, setting clear objectives in this respect; (ii) Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

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Protecting and empowering EU people and society

Romania is making massive efforts to raise the level of digital skills, in a context where **more than 72% of its population still lacks basic digital skills**. The focus is currently on integrating digital skills into all levels of formal education, including through curricula reforms, teacher trainings, infrastructure and learning resources. Some more limited measures target adults by transforming public libraries into hubs for digital skills, upskilling/reskilling working adults, and training young people. While **Romania continues to perform very well on training ICT specialists, the proportion of ICT specialists in its workforce is relatively low**, partly due to difficulties to retain them in the country.

The performance concerning the **digitalisation of public services remains low, but continuous action could lead to radical improvements in the coming years**, in terms of transparency, simplification, and quality. Important in this respect are the efforts to digitalise key national and regional services and to set up a governmental cloud and an interoperability portal and framework. **An e-ID solution, ROeID, is in the pre-notification process**. **Access to health records remains poor** but has the potential to

improve as a result of a wider RRF investment. Finally, Romania pays increasing attention to **protecting children online**, and to societal issues such as **disinformation and trust** in online services.

> **Recommendations – Romania should:**
>
> - **BASIC DIGITAL SKILLS:** (i) Intensify the measures related to upskilling and reskilling of the workforce; (ii) Continue to improve the quality and the relevance of courses, teaching digital skills not only as a separate subject but also integrating digital skills and digital education into all levels, while taking a cross curricular approach.
> - **ICT SPECIALISTS:** Consider additional measures targeting to retain ICT specialists in the country.
> - **DIGITAL PUBLIC SERVICES**: Maintain the efforts needed to implement the ambitious ongoing agenda for the digitalisation of public services, including by ensuring sufficient levels of funding, project management capacity and ICT specialists, and extensive/strong coordination across the various relevant authorities.
> - **E-HEALTH**: Expand the coverage of the online access service, make the data regarding medical devices/implants, laboratory tests, and medical images available to citizens through this online access service and onboard more categories of healthcare providers to it.

Leveraging digital transformation for a smart greening

Romania underlines that its major efforts to digitalise government services, in particular environmental services, will also bring significant benefits in terms of climate action. As of 2023, digital and green education are brought to school children as optional courses. Importantly, a dynamic clean-tech sector seems to be emerging and benefits from several support measures at national and regional levels.

> **Recommendations - Romania should:**
>
> - Develop a coherent approach to twinning the digital and green transitions. First, promote improvements in energy and material efficiency of digital infrastructures, in particular data centres. Second, support the development and deployment of digital solutions that reduce the carbon footprint in other sectors, such as energy, transport, buildings, and agriculture, including the uptake of such solutions by SMEs.
> - Monitor and quantify the emission reductions of the deployed digital solutions in line with the relevant EU guidance and with the support of the methodology developed by the European Green Digital Coalition, in view of future policy development, as well as of attracting relevant financing.
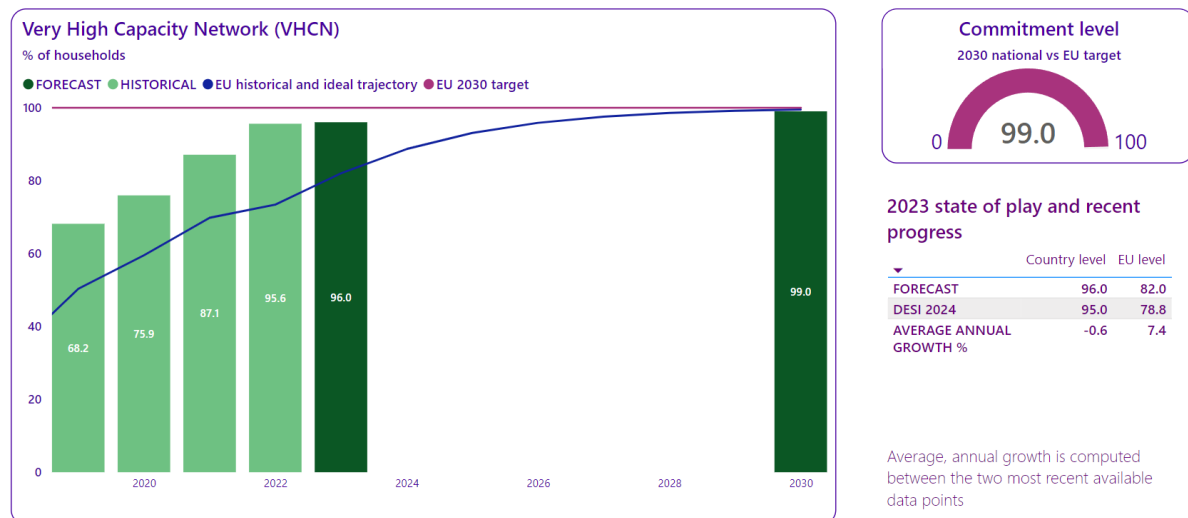
A competitive, sovereign and resilient EU based on technological leadership

With significant support from EU funds, Romania is paying increasing attention to digitalisation, which holds major untapped potential to increase the country's productivity, innovation and overall competitiveness. Romania's close to full Fibre to the Premises (FTTP) coverage, including in rural areas, coupled with the highest take-up of high-speed internet in the EU, a competitive telecoms sector, and a relatively strong and dynamic ICT sector, is a major asset. Nevertheless, Romania's performance on digitalising businesses remains to be improved, and the ICT sector, which is largely based on outsourcing by international companies, is still to become R&D- and innovation-driven. It is important for Romania to develop capabilities for all Digital Decade targets, including semiconductors, quantum, and edge nodes, as these areas will become increasingly important for competitiveness, capitalising on Romania's participation to multi-country projects and on emerging activities in its market.

Building technological leadership: digital infrastructure and technologies

Romania has an outstanding performance on gigabit coverage. On the other hand, it shows a low level of ambition and lags behind the EU average when it comes to 5G rollout.

Connectivity infrastructure (Gigabit)

Very High Capacity Network (VHCN)
% of households
● FORECAST ● HISTORICAL ● EU historical and ideal trajectory ● EU 2030 target

Bar values: 68.2, 75.9, 87.1, 95.6, 96.0, 99.0

Commitment level
2030 national vs EU target

0   99.0   100

2023 state of play and recent progress

	Country level	EU level
FORECAST	96.0	82.0
DESI 2024	95.0	78.8
AVERAGE ANNUAL GROWTH %	-0.6	7.4

Average, annual growth is computed between the two most recent available data points

Note: The source of national forecast values is the 2023 country roadmap

Fibre To The Premises (FTTP)

% of households

● FORECAST ● HISTORICAL ● EU historical and ideal trajectory

Year	Value
	54.7
2015	58.1
	58.2
	59.7
	61.0
	62.8
	68.2
2020	75.9
	87.1
	95.6
	96.0
2030	99.0

Commitment level

2030 national vs EU target

0 **99.0** 100

2023 state of play and recent progress

	Country level	EU level
FORECAST	96.0	70.3
DESI 2024	95.0	64.0
AVERAGE ANNUAL GROWTH %	-0.6	13.5

Average, annual growth is computed between the two most recent available data points

Note: The source of national forecast values is the 2023 country roadmap

With 95% coverage of households with very high-capacity networks (VHCN), which equals to Fibre-to-the-Premise (FTTP), Romania brings a very strong contribution to the Digital Decade Gigabit connectivity target. These values are significantly above the EU averages of 79% (for VHCN) and 64% (for FTTP), but their overall dynamic during 2023 was very limited[6]. However, it is worth noting that FTTP coverage of rural areas went up from 90% to 92.5% during 2023, continuing the strong growth observed during the previous 5 years and reaching the highest FTTP rural coverage in the EU.

While FTTP rollout may be slowing down as it has reached the last 5% to be covered, the take up of fast internet subscriptions developed positively in 2023. At the middle of 2023, over 94% of fixed internet connections were at speeds of 100Mbps or above, the highest percentage in the EU. Also, Romania had the third highest percentage of connections of 1Gbps or above. This performance is linked not only to high coverage, but also to positive market dynamics and to low prices. In 2023 one operator launched retail offers with speeds of 2.1 Gbps. More generally, competitive retail offers with speeds above 1 Gbps lead the competitive dynamics for customer acquisition and retention. End user prices are rising across all baskets, but remain well below the EU average.

In terms of measures to support further roll-out in the remaining white areas, steps were taken to use the budget available under the Recovery and Resilience Plan (RRP), which amounts to EUR 94 million. In particular, the Romanian National Regulatory Authority (ANCOM) has provided to the implementing authority, following a public consultation, the list of areas that could be covered and has approved the technical and economic conditions for access to the electronic communications infrastructures/networks that are to be financed. The call for projects was published in April 2024, with the evaluation foreseen for September.

In terms of regulatory developments, ANCOM started gathering geolocated data to update the inventory of electronic communications networks and related infrastructure, in order to obtain a
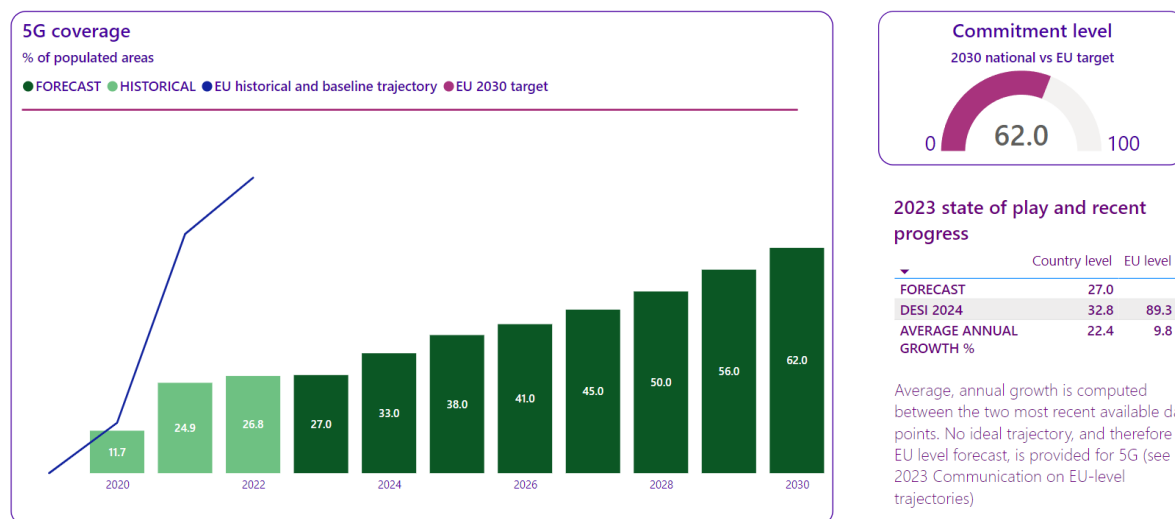
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[6] Compared to the previous DESI data, where operators used to report estimated figures for broadband coverage in terms of homes passed, in DESI 2024 the households' broadband coverage has been processed using data provided by operators at the address level. Due to the detailed geographical spatial resolution, the reporting became more robust and pertinent, leading also to minor differences compared to previous editions.

clearer view of the level of development of high-speed networks and services across the country's various regions and communities, and inform future policy decisions.

Furthermore, the national Digital Decade roadmap includes two new measures to facilitate further network deployment: one setting indicative tariffs for access to road physical infrastructures, the other one laying down technical norms for the design and construction of physical infrastructure, including provisions for in-house wiring and underground networks, expected to produce effects from the second half of 2024 onwards.

The level of ambition for the Gigabit target set in the national roadmap is 99% for both VHCN and FTTP. This value is very close to the EU target of ensuring full coverage and takes into consideration Romania's good starting position. Nevertheless, the value observed in 2023 is lower than the one forecasted by the Romanian authorities for the same year and the country would need to see a return to a positive dynamic to achieve this goal.

Connectivity infrastructure (5G)

5G coverage
% of populated areas
● FORECAST ● HISTORICAL ● EU historical and baseline trajectory ● EU 2030 target

Year	Value
2020	11.7
	24.9
2022	26.8
	27.0
2024	33.0
	38.0
2026	41.0
	45.0
2028	50.0
	56.0
2030	62.0

Commitment level
2030 national vs EU target

0   **62.0**   100

2023 state of play and recent progress

	Country level	EU level
FORECAST	27.0	
DESI 2024	32.8	89.3
AVERAGE ANNUAL GROWTH %	22.4	9.8

Average, annual growth is computed between the two most recent available data points. No ideal trajectory, and therefore no EU level forecast, is provided for 5G (see 2023 Communication on EU-level trajectories)

Note: The source of national forecast values is the 2023 country roadmap

Romania has scope to improve its performance to contribute to the EU's 5G target: the current level of 5G coverage of 33% of populated areas remains significantly behind the EU average of 89.3%. However, a positive dynamic was noted in 2023, with a 22% growth. Moreover, 5G coverage of rural areas more than doubled since the last reporting exercise, but remains very low at 6.3%. It should also be noted that 5G coverage in the 3.4-3.8 GHz band stands at 29%, therefore most of the 5G roll-out in Romania is within this band.

At 89%, the overall mobile broadband take up (4G/5G) is significantly below the EU average. Nevertheless, some positive dynamics were noted by ANCOM in the first half of 2023, including a 9% increase in mobile internet traffic, up to 9.7 GB per month per inhabitant, and a doubling of the active 5G SIM cards, to 1 .5 million, representing 7% of all active SIM cards.

Licences for 30 MHz (2x15 MHz) in the 700 MHz FDD band and for 40 MHz in the 1500 MHz band (valid until December 2047), as well as licences for 40 MHz (2x20 MHz) in the 2600 MHz FDD band (valid until April 2029), entered into force on 1 January 2023, following the spectrum allocation procedure organised in 2022. This leads to 39% of the pioneer 5G bands being assigned, compared to an EU average of 73%.

This assignment, together with a significant reduction in spectrum usage fees, which entered into force in January 2023, is likely to lead to a speeding up of 5G deployment over the next year.

A list of authorised equipment manufacturers under the 5G Networks Security Law (Law 163/2021) was adopted and published during 2023. Telecom operators will have to eliminate, at their own cost, equipment from non-authorised producers by 2026 for core networks and by 2028 for radio access networks.

At 62%, the level of ambition for 5G coverage in 2030 remains significantly below the EU level target of 100%. The roadmap justifies this based on the limited demand (the 5G SIM cards share of population in Romania is at 7.9% compared to 24.6% EU average), the widespread availability of affordable FTTP networks, the replacement effect expected following the entry into force of the 5G Networks Security Law, and the relatively late assignment of the 700 MHz spectrum band. However, based on the current rate of progress, and to avoid missing opportunities linked to future industrial developments related to 5G services, a higher level of ambition for this national target can be envisaged, at it appears that, assuming current conditions do not change, the current national target will be reached before 2030.

Semiconductors

Currently no semiconductor production capacities exist in Romania. The roadmap acknowledges the situation. As a potential avenue for developing such capacities, it identifies participation in international cooperation projects including the Important Project of Common European Interest (IPCEI) on low-power processors and semiconductor chips, which benefits from EUR 400 million of funding under the RRP.

The objectives of the project include structuring and developing competencies in designing, manufacturing and applying microelectronic components and systems in a coherent national ecosystem, as well as coordination with the capabilities and needs at EU level.

An important step in the consolidation of the national ecosystem of semiconductors was the selection, during 2023, of three companies that would benefit from the RRP funding.

Furthermore, a National Platform of Technologies and Semiconductors is expected to be proposed for financing as a priority project under the 2021-2027 Operational Program Intelligent Growth, Digitization and Financial Instruments (POCIDIF). The project aims to bring together and consolidate the R&D capacities in the area of semiconductors.

Edge nodes

Romania is among the Member States adopting edge technology at a slower pace: it counted 5 of the estimated 1186 edge nodes deployed in the EU at the end of 2023, or 3 additional units compared to the end of the previous reporting period. According to the roadmap, the number of edge nodes is expected to reach 113 by 2030. However, no measures are in place yet to support this objective and therefore the target is not supported adequately.

The Romanian authorities are preparing to set up a working group with various ministries, regional development agencies, and the national regulatory authority to assess the current situation and identify and adopt a policy and concrete measures that could support this national target.

Quantum technologies

There is a growing interest in the field of quantum computing and quantum communication, across academia, business, and governmental stakeholders in Romania. The roadmap does not set a specific target for quantum, but describes the ongoing work to develop a policy in this area.

Romania

A national consortium led by the Babeș-Bolyai University (Cluj-Napoca), in partnership with the National Institute of Materials Physics, designed a draft strategy for the development of national capabilities in the field of quantum technologies, which was delivered in November 2023 (QTSTRAT, https://qtstrat.granturi.ubbcluj.ro/). The project includes a state of play of quantum technologies at national level, a plan for the development of quantum technologies in Romania, and a portfolio of potentially relevant projects.

In parallel, the government is taking steps to create an interministerial group to develop a policy to support the development of quantum technologies and to adopt a national strategic plan. Such plan would include measures for R&D, public-private partnerships and the development of the relevant education and training. Steps are also taken to include the quantum technologies as an area of strategic interest within the National Research, Development and Innovation Plan for 2022-2027.

Meanwhile, in March 2023 the Politehnica University of Bucharest launched the RoNaQCI (Romanian National Quantum Communication Infrastructure) project. With EUR 10 million of funding under the Digital Europe Programme, the project aims to develop a quantum communication infrastructure in Romania. By doing so, the Politehnica University of Bucharest became the first functional node of the European quantum communications network in Romania.

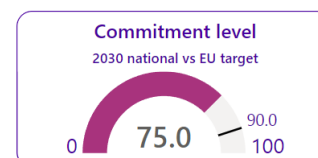## Supporting EU-wide digital ecosystems and scaling up innovative enterprises

The level of digitalisation of small and medium-sized enterprises (SMEs) in Romania remains very low. This represents an enormous potential for the Romanian economy to become more innovative, productive and competitive, including for the relatively strong and fast-growing ICT sector.

SMEs with at least basic digital intensity

SMEs with at least basic level of digital intensity (DII)
% of Small and Medium Enterprises (SMEs)
● FORECAST ● HISTORICAL ● EU historical and ideal trajectory ● EU 2030 target

Chart data points:
- 2020: 22.2
- 2022: 52.5
- 2022: 53.0
- 2030: 75.0

Commitment level
2030 national vs EU target
0 — 75.0 — 90.0 — 100

2023 state of play and recent progress

	Country level	EU level
FORECAST	53.0	71.6
DESI 2024	26.8	57.7
AVERAGE ANNUAL GROWTH %	9.9	2.6

In the case of DII, the average, annual growth is computed between 2023 and 2021 due to data comparability reasons.

Note 1: DII 2022 is version IV that is not comparable with DII 2021, that was version III. The EU-level ideal trajectory refers to DII version IV, as published in the 2023 Communication on EU-level trajectories

Note 2: The source of national forecast values is the 2023 country roadmap

Fewer than 27% of Romania's SMEs meet the criteria for basic digital intensity, i.e., using at least 4 of the 12 selected technologies in the Digital Intensity Index. This means that **Romania has scope to improve its performance to contribute to the EU's 2030 target for digitalisation of SMEs**. A **strong growth was observed compared to the last comparable reporting period (2021)**. However, the value

remains low compared to the EU average of 57.7% and very far from the EU 2030 target of 90%, and the national target of 75% set in the roadmap.

Other relevant indicators confirm the need to step up action. Only 22.6% of Romanian SMEs are using an enterprise resource planning software package to share information between different functional areas (e.g., accounting, planning, production, and marketing), compared to an EU average of 43%. 15.3% of the Romanian SMEs use social media, compared to an EU average of 31.5%. Just under 12% of the Romanian SMEs sell their products and goods online, compared to an EU average of 19.1%. It should be noted that while these figures are significantly below the EU average, have all grown over the last reporting period. The percentage of turnover from e-Commerce is an exception as it has remained constant at 7.6%, not too far from the EU average of 11.9%.

Notably, at 35%, **the percentage of enterprises using e-Invoices is close to the EU average of 39%, having made major progress since 2020 (17%)**. The growth coincided partly with the entry into force of a fiscal reform measure in 2022 that made e-Invoicing becomes compulsory in all business to government relations, via a unique national online platform. In 2024, this platform was extended to also cover invoicing between businesses.

Several measures are in place to support the digitalisation of enterprises, some financed from the national budget, some supported by cohesion policy (with a contribution of EUR 291 million, as estimated by the JRC) and some included in the RRP (an estimated contribution of EUR 363 million). Examples of ongoing measures include a EUR 347.5 million RRP measure for the take up of digital technologies by SMEs; various financial instruments and grants schemes under cohesion policy funds; the "Start-Up Nation" and the "The Entrepreneur Woman" programmes, which aim to stimulate entrepreneurship, innovation and digitalisation; and an online platform for information, education and training, and matchmaking for Romanian entrepreneurs (IMM Mentor).

Romania's roadmap thoroughly describes the **challenges faced by the SME sector towards achieving a higher degree of digitalisation and competitiveness**. These include a low level of digital skills and entrepreneurial skills (including budgeting, financial analysis, and financial literacy), a poor match between the educational system and the demands in the job market, as well as poor access to finance.

Moreover, while various support schemes exist, SMEs often lack an overall picture of the existing options, which makes it difficult to choose the most suitable option. Some of the available support schemes are also considered to be too far from the current business needs of the SMEs, with entrepreneurs finding it difficult to translate the adoption of digital technologies into benefits such as increased productivity, profits or competitiveness.

In this respect, **the 7 European Digital Innovation Hubs (EDIHs) that are now operational ensure regional presence and were also granted co-funding from the European Regional Development Funds (ERDF) in 2023**. The recent National Strategy for the development and support of Digital Innovation Hubs in Romania (2024-2027) which aims to strengthen, coordinate, and optimize action on digital transformation, recognises the EDIHs as key instruments in this process. Furthermore, the document provides a strategic framework for supporting and developing the quality of these hubs to enable them to overcome barriers that currently position Romania at the lower end of European rankings in the areas of innovation and digitisation.

Each of the EDIHs has its own specific objectives, areas of focus, and targets, but they are all expected to make a key positive contribution to digitalising the private and public sectors across Romanian regions. Their most common activities relate to digital skills training, facilitating access to funding,
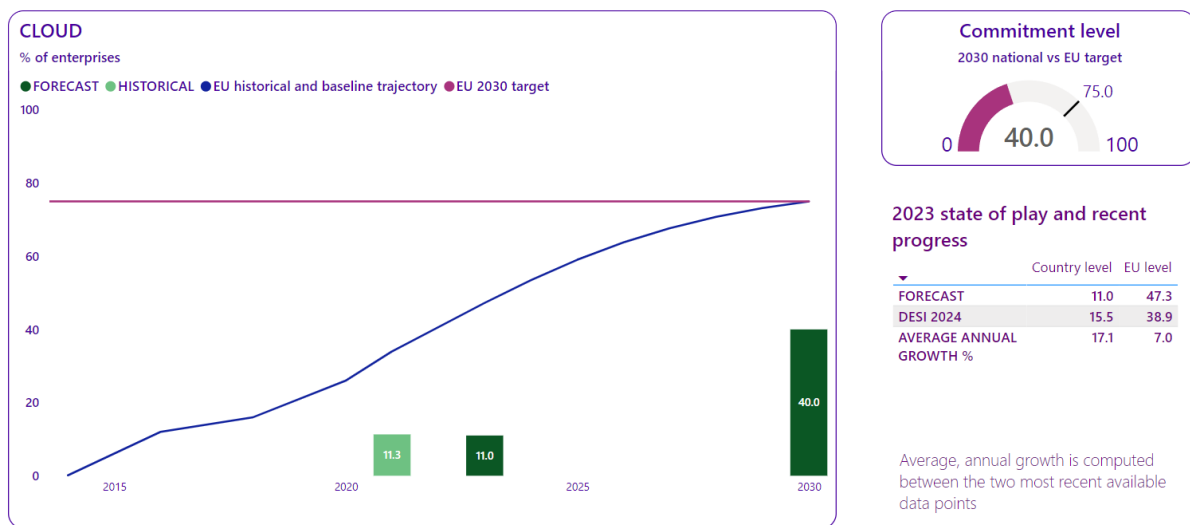
- **Artificial Intelligence**

Artificial Intelligence (AI)
% of enterprises
● FORECAST ● HISTORICAL ● EU historical and ideal trajectory ● EU 2030 target

Commitment level
2030 national vs EU target

75.0

0 ◢ **10.0** 100

2023 state of play and recent progress

	Country level	EU level
FORECAST	1.0	19.9
DESI 2024	1.5	8.0
AVERAGE ANNUAL GROWTH %	3.5	2.6

Average, annual growth is computed between the two most recent available data points.

Note 1: at the end of 2023 ESTAT revised backward the values of AI. The revised value for 2021 at the EU level is 7.6 % (from 7.9 %).

Note 2: The source of national forecast values is the 2023 country roadmap
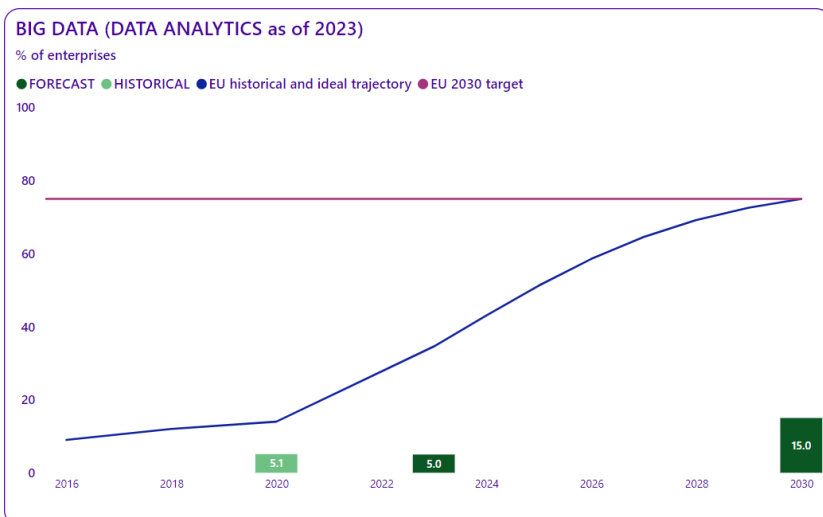
By contrast, **only 1.5% of Romanian businesses use Artificial Intelligence (AI), compared with an EU average of 8%.** Although over the last reporting period the growth has been higher than the EU average growth, and although the observed 2023 value is higher than the value forecasted in the Romanian roadmap for 2023, the **dynamic of the indicator is rather limited**. While the **national target set in the roadmap of 10% is very low compared to the EU level target of 75%, it is not likely that it will be reached by 2030 with the current growth rate**.

- **Data analytics (Big Data)**

BIG DATA (DATA ANALYTICS as of 2023)
% of enterprises
● FORECAST ● HISTORICAL ● EU historical and ideal trajectory ● EU 2030 target

Commitment level
2030 national vs EU target

75.0

0 ◢ **15.0** 100
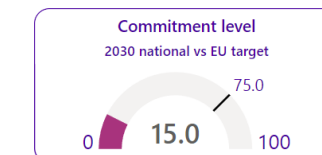
2023 state of play and recent progress

	Country level	EU level
FORECAST	5.0	34.6
DESI 2024	21.9	33.2
AVERAGE ANNUAL GROWTH %		

Annual growth cannot be computed in this case because Big Data was replaced by Data Analytics in 2023. The two indicators are not comparable.

Note: The source of national forecast values is the 2023 country roadmap

Finally, the take up of big data, measured as of 2023 using a Eurostat **data analytics indicator, stands at 21.9%, compared to an EU average of 33.2%**. Due to the change of indicator, which now covers a broader range of technologies including Big Data, it is not possible to analyse the trend in this indicator nor to compare it to the values forecasted in the roadmap, including the national target value. The RRP

measure supporting the digitalisation of SMEs, described above, can be considered relevant to these targets, as it includes funding for integrating advanced digital technologies.

With regard to AI in particular, Romania is developing a **National Strategy in the field of Artificial Intelligence 2024-2028**, aimed to stimulate the development and adoption of AI technologies in Romania, in alignment with the European vision. The strategy is in the process of being formally approved.

- **Take-up by enterprises of AI or Data analytics or Cloud**

Romania has room to improve its performance to contribute to EU's 2030 targets on the use of advanced digital technologies by businesses, as only 28.7% of Romanian enterprises make use of cloud services, AI or data analytics, a very low percentage compared to the EU average of 54.6%.

Unicorns/scale-ups/start-ups

As regards the unicorns Digital Decade target, Romania is among the 6 EU Member States without any unicorn, according to Dealroom portal. However, in recent years, Romania has seen the emergence of several successful startups in areas such as robotics and process automation, cybersecurity, fintech and e-commerce.

More generally, the Romanian ICT sector is one of the five most important sectors of the economy in terms of employment. In 2020 it accounted for 4.25% of GDP (compared to an EU average of 5.2%), having grown much faster than the rest of the economy over the previous five years and contributing to Romania's GDP growth more than its share in the economy. According to the Romanian roadmap, the ICT sector is increasingly specialised in areas such as cybersecurity and process automation, and more and more considered as an engine of business growth in Romania.

Some of the key drivers behind these positive trends are the competitive cost structure of the sector and a good pool of ICT graduates, leading to many international companies outsourcing their ICT activity to Romania. However, the existing tax cuts for ICT specialists are being phased out, as part of a larger effort to increase tax collection. Moreover, the sector still has significant untapped potential in terms of R&D intensity, which remains lower than EU averages. Access to capital, and in particular to risk capital, also remains significantly below the EU average.

The 2030 targets set in the Romanian roadmap in relation to the unicorns', scale-ups and start-ups include 5000 innovative digital SMEs, a 2% contribution to GDP of all innovations realised in Romania and 4 unicorns founded in Romania and active globally, with either headquarters or secondary offices in Romania[7].

Achieving these targets will require an intensification of the measures to support the startup ecosystem in Romania, in particular the support for R&D and technology transfers, the framework conditions for and ease of doing business, and the access to capital for startups and scale ups. In all these areas, ongoing measures exist, but they need to be extended for the targets to be reached.

Strengthening Cybersecurity & Resilience

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[7] Commission Implementing Decision 2023/1353 setting out key performance indicators to measure the progress towards the digital targets established by Article 4(1) of the Digital Decade Policy Programme Decision (Decision 2022/2481) as well as Decision 2022/2481 itself refer to the doubling of the number of unicorns within the European Union, implying headquarters in the European Union, avoiding the risk of double counting for unicorns registered in several Member States.

Romania

As companies rely increasingly on digital technologies, and as digital technologies become ubiquitous in people's everyday lives, the risk of exposure to cybersecurity incidents is also increasing. In Romania, in 2023, 86.5% of enterprises with 10 or more employees reported using ICT security measures. Only 7% reported being insured against ICT security incidents.

Romania has a **National Cybersecurity Strategy** in place, as well as an accompanying Action Plan covering the 2022-2027 period. The strategy mainly aims to strengthen the security and resilience of ICT networks and systems, to strengthen the regulatory and institutional framework for cybersecurity, including international cooperation, and to build public-private partnerships. The strategy is coordinated and implemented by various governmental bodies including the National Cybersecurity Directorate, set up in 2021 under the responsibility of the Prime Minister, CERT-RO (Computer Emergency Response Team of Romania), and ANCOM.

Various legislative and regulatory activities were observed in 2023, including capacity building following the entry into force of **Law 58/2023 on Cybersecurity and Cyberdefense** and preparations for the transposition of the NIS2 Directive. ANCOM updated its **regulation regarding the security of electronic communications networks and services**, to strengthen the resilience and the continuity of provision of public communications, in line with the European Electronic Communications Code and the EU Toolbox for 5G Security. These changes are expected to support the further development of both the digital services and the related new services in areas like IoT, Smart Cities/Communities, eHealth, in both rural and urban areas.

Furthermore, an important RRP project (EUR 100 million) is being implemented, with the aim to ensure the **cyber protection of key public and private ICT infrastructure and entities,** preventing cyber-attacks against institutions whose activity is essential for the proper functioning of the Romanian state from happening. EUR 60 million of ERDF funding has been allocated to supporting the implementation of cybersecurity solutions for public administration.

Other notable activities concern **awareness raising campaigns and support measures for cybersecurity skills**: the first edition of the Cyber Security Olympiad, leading to a bootcamp that prepares the national team for the European Cybersecurity Challenge; targeted measures envisaged by various EDIHs; several new university programmes on cyber skills; an annual Cyber Security Conference; and a Cyber Citizen Initiative consisting of workshops and public debates.

It is also relevant to mention that Romania has a **growing cybersecurity industry, with both domestic companies and international firms operating in the country. Romania is also hosting the European Cybersecurity Competence Centre, launched in May 2023**. All these developments raise Romania's interest in and commitment to helping achieve the EU's cybersecurity objectives. Nevertheless, this interest and commitment are not very much reflected in the national roadmap, where the relevant parts could be further developed.

# Protecting and empowering EU people and society

Empowering people and bringing the digital transformation closer to their needs

More than two thirds of Romania's population still lack basic digital skills and massive efforts are ongoing to address this issue, as part of wider action to improve formal education, reduce school abandonment especially in rural areas and achieve a higher rate of post-secondary education. Better digital skills acquisition in pre-university education and a larger pool of post-secondary education graduates would have a positive impact on the overall number of ICT specialists in employment, whereas Romania already performs very well on training ICT specialists. Supplementing its action on digital skills, Romania pays increasing attention to protecting children online, and to societal issues such as disinformation and trust in online services. The country's performance concerning the digitalisation of public services remains low, but if the current levels of effort are maintained and supported appropriately, there is potential for radical improvements in terms of transparency, simplification and quality in the coming years.

Equipping people with digital skills

Romania is making massive efforts to improve digital skills and achieve a higher number of ICT specialists, but these still need to translate into a better performance on key performance indicators

Basic Digital Skills
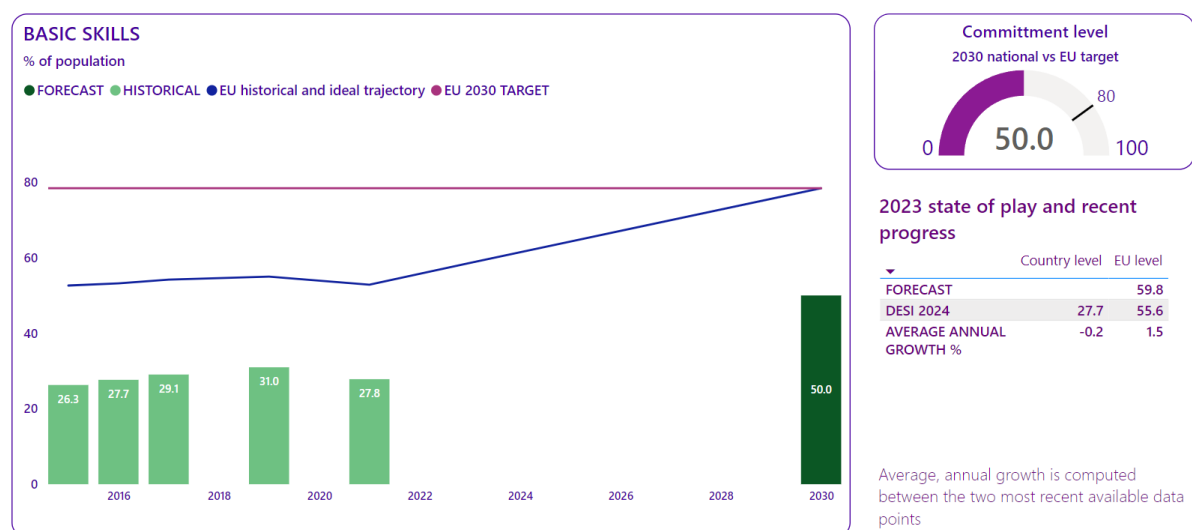
Note 1: Data break-in-series in 2020

Note 2: The source of national forecast values is the 2023 country roadmap

Romania has scope to improve its performance and contribute to the EU's digital decade target for basic digital skills. In 2023, only 27.7% of the population had at least basic digital skills, compared to an EU average of 55.6%. Moreover, the KPI's development during the last reporting period has shown a limited dynamic. However, great discrepancies exist among age groups, with only 6.2% of the population over 65 having at least basic digital skills, while 47.2% of the population between 16 and 24 has such skills. No major discrepancies exist between genders.

A similar situation is observed for other indicators related to skills, where for example Romania, with 40.9% of its population having at least basic digital content creation skills, is significantly below the EU average of 68.3%. Moreover, only 9.0% of the Romanian population has above basic digital skills, compared to an EU average of 27.3%. Both indicators have shown very limited growth over the last reporting period. By contrast, the use of internet by individuals aged 16 to 74 is growing relatively fast and has reached 88%, closing the gap with the EU average of 90.3%.

The target set in the national digital decade roadmap is 50% of the population having reached a level of at least basic digital skills by 2030. This value is significantly below the EU target of 80%, but takes into account Romania's difficult starting position and the naturally slow development expected for this indicator. However, **it should be noted that the current level of growth is insufficient to reach the national target by 2030.**

A new law on pre-university education (Law no. 198/2023) entered into force in September 2023, introducing mandatory modules to promote digital skills and digital education in primary, secondary and high school education, taking a cross-curricular approach. The law envisages measures for teacher training, piloting of a new curriculum for developing digital competences, and the creation of a monitoring mechanism for specific action to improve the digital competences of both teachers and students.

In parallel, several relevant projects were delivered in 2023 including 21 new optional courses in the school curricula, starting with the 2023-2024 academic year, such as 'EduGaming', which aims to develop responsible and safe online gaming behaviour, and 'Digital Culture', which aims to stimulate digital cultural expression. The projects also included a successful large scale piloting of the digitised evaluation of the written tests that are part of the national assessment of 8th grade graduates and of the national baccalaureate exam.

In 2023, the RRF budget of EUR 338 million allocated to the development of regional consortia and to 29 dual training campuses in the eight regions of Romania was increased with national funds to over EUR 588 million, because of the high number of applications received. The project is expected to deliver, among other things, smart labs for teaching and learning and for developing new professional qualifications.

Romania is also implementing other important RRF funded projects are being implemented, most of which are in the phase of selecting beneficiaries and partners. In particular, these projects aim to: (i) turn libraries into hubs for developing digital skills in local communities, by providing technical equipment to 1 030 libraries, training 1 100 librarians and serving 100 000 community members and (ii) provide digital equipment and technological resources to educational institutions and create at least 1 100 Smart Labs, to support inter alia the development of advanced digital skills. The Education and Employment Programme 2021-2027 co-funded by the European Social Fund Plus (ESF+) envisages several measures to improve the accessibility and quality of vocational and technical training.

In the medium and long term, such measures are expected to have a major impact on the level of digital skills of the Romanian population. In the shorter term however, it is essential to also target the upskilling and reskilling of workers, in line with the recommendations of the 2023 State of the Digital Decade report. Such measures are particularly necessary given the specificity of the Romanian economy: according to the roadmap, the vast majority of Romanian companies (91%) are microenterprises, a very small number of which offer ICT training to their employees.

Some relevant measures are in place. An example concerns the RRP measure to upskill employees of at least 2000 SMEs by increasing their skills levels in 9 advanced digital technology areas (AI, robotics, machine learning, automation, etc.), for which tendering of the learning platform and selection of the SMEs and of the implementation partners are ongoing. Also very relevant are measures supporting young job seekers (aged under 30), long term unemployed people and people from disadvantaged groups in accessing the job market, including by developing their basic digital skills, and measures to stimulate the employees' participation in lifelong learning processes. Both type of measures receive funding under the 2021-2027 Education and Employment Programme. Digital skills trainings delivered to SMEs via EDIHs is also expected to help bring about progress in this specific area.
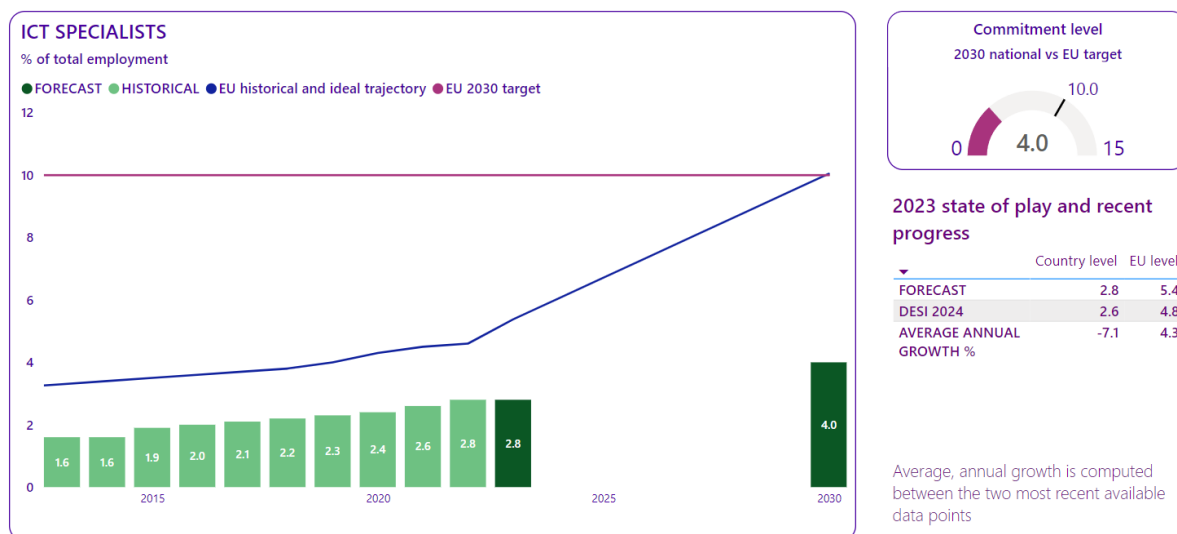
The roadmap describes further measures specifically targeting the level of digital skills of public sector employees: horizontal trainings, including via EDIHs, a platform for e-Learning, as well as specific trainings accompanying the digitalisation of specific sectors (e-Health, environment, and social protection). An in-depth evaluation delivered via the Technical Support Instrument in 2023 confirmed the continued stringent need for digital upskilling in the public administration and emphasised the need to have a long-term strategy in this field.

Overall, the part dedicated to digital skills is among the most developed ones in the Romanian roadmap. It includes 14 measures, taking various forms, but mostly with a focus on reforms and investments in formal education. While the roadmap does not include exact budgets, this target appears to benefit from the second largest budget share, following the budget supporting the digitalisation of public services. This support comes from various sources, with the RRF as main contributor, followed by cohesion policy funds. According to an estimation by the Joint Research Centre (JRC)[8]: Romania's RRP contribution to raising basic digital skills levels is estimated at EUR 752 million, while the contribution from cohesion funds at EUR 14.5 million.

In view of Romania's current performance and dynamic, and in view of the national target included in the roadmap, the efforts to upskill and reskill workers, and to stimulate lifelong learning seem insufficient. **Moreover, despite the massive action and good progress made in the area of formal education, stakeholders indicate that further efforts are needed to increase the quality and relevance of trainings for teachers and students in pre-university education, across various fields**.

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[8] JRC report "Mapping EU level funding instruments 2020-2027 to Digital Decade targets - 2024 update" (Signorelli et al., 2024)".

ICT specialists

ICT SPECIALISTS
% of total employment
● FORECAST ● HISTORICAL ● EU historical and ideal trajectory ● EU 2030 target

Values (historical bars): 1.6, 1.6, 1.9, 2.0, 2.1, 2.2, 2.3, 2.4, 2.6, 2.8, 2.8 (forecast), 4.0 (2030)

Commitment level
2030 national vs EU target
10.0
0   4.0   15

2023 state of play and recent progress

	Country level	EU level
FORECAST	2.8	5.4
DESI 2024	2.6	4.8
AVERAGE ANNUAL GROWTH %	-7.1	4.3

Average, annual growth is computed between the two most recent available data points

Note: The source of national forecast values is the 2023 country roadmap

There is scope for Romania to improve its performance and contribute to EU's target of having 20 million ICT specialists in employment by 2030, representing an estimated 10% of its population. **With 196 000 ICT specialists in employment, representing 2.6% of total employment, Romania is below the EU average (4.8%) and displays a very limited dynamic for this indicator.**

By contrast, **6.9% of all post-secondary education graduates are ICT specialists, putting Romania among the EU's leaders**. The discrepancy between the share of ICT graduates and employed specialists is explained to a large extent by the difficulty in retaining talent in Romania, but also by other aspects of the wider context, such as the low rate of post-secondary education graduates among the entire population.

Romania's performance as regards women in the digital sector stands out as well and continues to improve: female ICT specialists represent 26% of ICT specialists, against an EU average of 19.4%.

In 2023, Romania continued to take new, specific measures to increase the number of ICT specialists. An important amendment to the Higher Education Law (Law 199/2023) includes, among other things, a national programme to support learning in the fields of Science, Engineering, and Mathematics, new strategies for the digitalisation of higher education institutions and the inclusion of digital skills in university curricula and adult training programmes, and further investments in advanced digital infrastructure and research. An example of specific support is the fact scholarships for STEM students are higher than scholarships for other studies.

It is also worth noting that in 2023 several new academic programmes were created in the most important university centres in Romania, targeting specific advanced ICT skills, for example various cybersecurity related programmes.

In accordance with its roadmap, **Romania's ambition is to have 400 000 ICT specialists in employment by 2030,** compared to approximately 256 000 expected under a business-as-usual scenario. This would be equivalent to 4% of the workforce. **The current progress rate suggests that the target can be reached before 2030 and thus that a higher level of ambition can be envisaged**.

The roadmap does not distinguish between measures supporting basic digital skills and measures supporting the ICT target, but 9 measures are considered more closely linked to the ICT target, including programmes for advanced digital skills for civil servants, efforts to digitalise universities and prepare future digital professions, as well as various targeted measures planned by EDIHs. Most of the budget attributed to ICT specialists comes from the RRF, with a contribution estimated by the JRC at EUR 507 million, and cohesion policy funds, with a contribution estimated at EUR 9.7 million.

Romania's performance in terms of ICT graduates has positive implications for the EU's collective efforts to reach the Digital Decade target of 20 million ICT specialists, with an increased gender convergence. The ongoing efforts to reduce school abandonment and achieve a higher overall rate of post-secondary education graduates, together with continued measures to improve the level of basic digital skills in pre-university education will translate in even higher absolute numbers of ICT graduates. However, additional measures to retain ICT specialists seem needed to drive a better performance of Romania in increasing the number of ICT specialists in employment in the country.

Key digital public services and solutions – trusted, user-friendly, and accessible to all

While Romania's performance on digital public services remains below the EU average, major projects and reforms are being implemented, supporting an ambitious vision of transforming government services to render them more efficient, more transparent and more consumer and environmental friendly.

e-ID

Romania has pre-notified one e-ID scheme with a high level of assurance, ROeID. In May 2023, a beta version of the ROeID application, a centralized software platform for digital identification was launched for public use. The platform enables the centralised management of citizens' electronic identities and credentials, as well as the provision of identity information to target systems that provide electronic services, so that citizens can use a single account to connect to any e-government service. The notification is planned for 2024, followed by the progressive integration of the ROeID system with the digital public services.

In the meantime, the use of the ROeID platform is growing, with 128.000 users in the past 12 months. However, according to Eurostat data, the percentage of individuals in Romania who have used their eID to access services provided by public authorities or public services of their country in the previous 12 months is 1.6%, compared to an EU average of 35.8%.

Various ongoing projects are relevant to the e-ID target and are described thoroughly in the roadmap. The construction of Romania's eIDAS node and its interconnection with the eIDAS nodes of the other Member States, in accordance with the eIDAS Regulation, is being carried out through the SITUE project, benefiting from approximatively EUR 2 million of ERDF funding. The construction of the node was completed in 2023 and its interconnection with the rest of the European nodes is expected to be completed by December 2024.

The Romanian RRP includes a EUR 150 000 investment supporting the e-ID target. The project aims to provide 5 million citizens with electronic identity cards and digital signatures by 2026. While the target number was reduced during the 2023 RRP revision due to implementation difficulties, the objective of this investment is to support the transition towards electronic identity cards, and to facilitate the digital interaction between public or private entities and individuals.
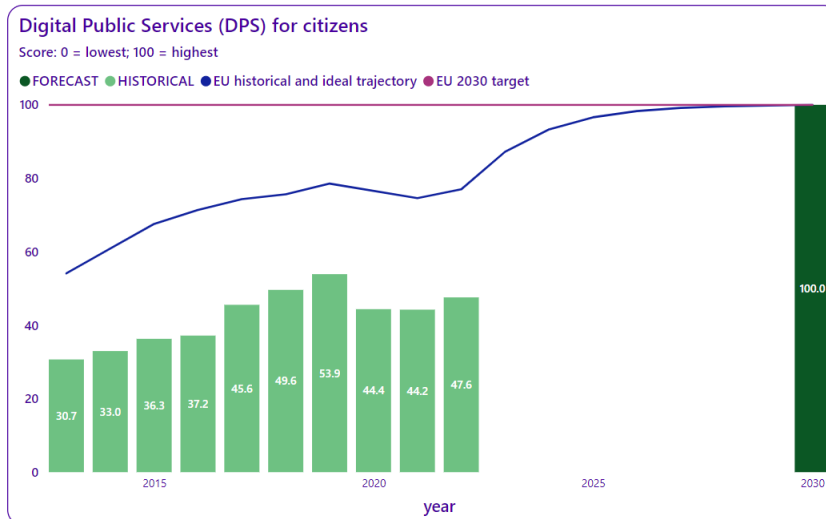
Furthermore, in preparation for the implementation of the revised eIDAS Regulation, **Romania is actively participating in two large-scale pilot projects testing the European Digital Identity Wallet**

across various real-life scenarios: (i) EWC, which is piloting use-cases for digital travel credentials, payments, and organisational digital identities; and (ii) DC4EU, which is testing education/professional qualifications and social security documents.

Romania also participates in the blockchain EDIC, with the objective to increase the level of confidence in governmental transactions, in particular in a cross-border context.

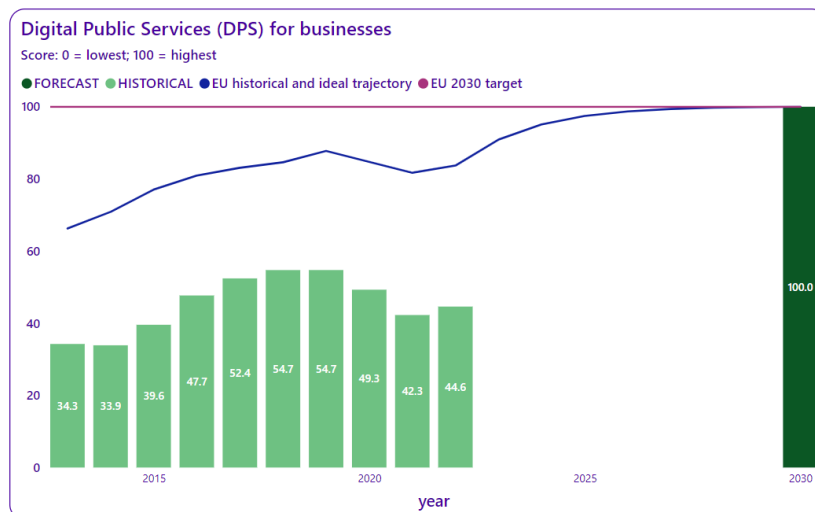*Digitalisation of public services for citizens and businesses*

Note 1: Data break-in-series in 2020

Note 2: The source of national forecast values is the 2023 country roadmap

Commitment level
2030 national vs EU target

100.0

0   100

2023 state of play and recent progress

	Country level	EU level
FORECAST		87.2
DESI 2024	52.2	79.4
AVERAGE ANNUAL GROWTH %	9.7	3.1

Average, annual growth is computed between the two most recent available data points

Note 1: Data break-in-series in 2020

Note 2: The source of national forecast values is the 2023 country roadmap

Commitment level
2030 national vs EU target

100.0

0   100

2023 state of play and recent progress

	Country level	EU level
FORECAST		90.9
DESI 2024	50.0	85.4
AVERAGE ANNUAL GROWTH %	12.1	2.0

Average, annual growth is computed between the two most recent available data points

Romania has scope to improve its performance to contribute to EU's 2030 targets of full availability of digital public services for citizens and for businesses. With aggregate scores of 52.2 and 50 respectively, the gap with the EU averages of 79.4 and 85.4 respectively is still quite significant. **Yet, growth rates in the range of 10-12% indicate a very strong dynamic compared to that of the EU averages** and therefore a tendency of convergence.

Various support indicators nuance this picture. On transparency of service delivery, design and personal data, Romania scores 42.6 compared to an EU average of 67, while on pre-filled forms, Romania stands at 39.6 compared to an EU average of 70.8, both indicators displaying a very limited dynamic. The score for user support has increased to 71.2 but remains low compared to the EU average of 86.4. Finally, with the proportion of the population using e-Government services being only 24.6%, Romania is much below the EU average of 75%.

In the national roadmap, the Romanian authorities commit themselves to target scores of 100 for both digital services for citizens and for businesses, aligning the national targets to the EU level of ambition. While these targets are ambitious given Romania's starting point, **if the current level of progress is maintained, the values will be reached either before or just around 2030.** A significant number of reforms and measures have been carried out in recent years and are still ongoing. The roadmap estimates that these will start showing impact on the ground, and implicitly on the KPI performance of Romania, as of 2026.

Several new measures were taken in 2023 and other important projects have continued throughout the year. **Law No 9 of January 2024 is expected to reduce bureaucracy, improve transparency, and further drive the digitalisation of public services**. Among others, public institutions are mandated to publish updated information and application forms for all public services they provide in electronic format. Furthermore, they must accept electronic copies of identity cards, eliminate the requirement to submit legalised copies of documents, and not request any paper item.

Meanwhile, work to digitalise specific public services continues. Significant ERDF funding, estimated at over EUR 860 million, is dedicated to supporting this digital transformation of the administration and the way it delivers services, both at national level and through the various regional programmes. Several important projects are ongoing with the aim of digitally transforming specific national services, including the digitalisation of the medical system (see below), of environmental services, of labour and social protection services, etc.

For example, the Romanian National 112 Emergency Communication System is in the process of migrating from circuit-switched to all-IP technologies, aiming for a high level of connectivity and an increased accessibility for all citizens, including people with a disability. Another ongoing initiative concerns the digitisation of more than 10 000 000 civil status documents currently available in physical format. These documents are expected to be made available electronically through a service portal in 2024.

> **Best practice: hub.mai.gov.ro**
>
> The Hub of Services of the Ministry of Interior Affairs was launched in February 2023 to simplify citizens' and businesses' access to the Ministry's services. 8 new digital services were launched on the platform: access to criminal records, history of traffic penalties, building permits, etc. The user base and the total number of visits has grown steadily, reaching over 5.9 million visits during the first year of operation.

Furthermore, two RRF-funded projects, worth over EUR 560 million, aim to deliver a cloud government infrastructure, with at least 30 public institutions connected to and using the government cloud by the end of 2024 and 4 data centres, cloud hardware and software by the end of 2025 and at least 40 governmental applications developed for cloud or migrated to cloud by 2026.

A national interoperability nodal point (platform) will be set up over the coming 6 years to support the implementation of the Interoperability Law adopted in 2022, by facilitating the exchange of data between institutions, eliminating the need to duplicate databases and the obligation for citizens to provide – during administrative procedures - information and documents that are already available to at least one institution or public authority.

Finally, the RRP also envisages the creation of a **Single Digital Portal (PDUro) aiming to help citizens and businesses access information on administrative procedures online**, with the important administrative procedures for cross-border users being available online.

The Inter-ministerial Committee for e-Governance and Red Tape (CERB), chaired by the prime minister and consisting of representatives from 27 public institutions, oversees the implementation of the e-Government policy in Romania, ensures coherence and coordination and creates a compliance framework for technical standards. Moreover, the Observatory for Digital Transformation, funded with EUR 100 000 from the Technical Support Instrument has been set up to monitor actual progress.

Major work is ongoing and has the potential to radically transform the delivery of public services in Romania, but this work will need to be sustained over time. Delivering these ambitious projects in a timely manner will require **maintaining sufficient levels of funding, continuously investing in administrative capacity, including project management and ICT specialists in the public administration, and ensuring effective coordination across the relevant authorities.**
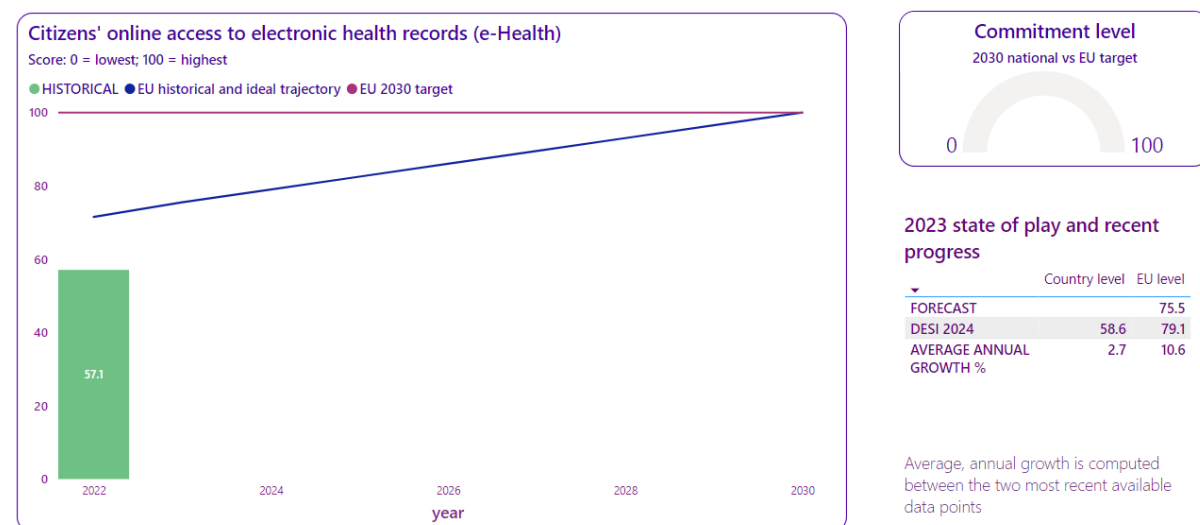
e-Health

Note: The source of national forecast values is the 2023 country roadmap

With an overall e-Health maturity score of 59, compared to an EU average of 79, Romania has scope to improve its performance to contribute to the digital decade target for access to e-Health records. No target is included in the national roadmap, but the state of play and the ongoing projects that are relevant for this target are explained. A centralised, nationwide service to access e-Health records is available in Romania, but only an estimated 40-59% of the population is technically able to access it and the online access service does not follow guidelines on web accessibility. Moreover, Romania scores 38 on categories of health data, compared to an EU average of 74: all data categories investigated in this framework, except medical devices/implants, laboratory tests, and medical images are made available to citizens, although generally not in a timely manner. Across all sub-indicators, the country's lowest-score is for electronic results and reports, with a maturity score of 13. On a positive note, in 2023, more categories of healthcare providers have started to supply data, with both public

and private secondary and tertiary hospitals and clinics now connected to the access service. However, rehabilitation centres, geriatric nursing homes, and mental health facilities are not yet connected and supplying data.

The Romanian roadmap announces **a first national strategy for the digitalisation of the health system**, which is expected to be delivered in 2024. The strategy takes into account certain shortcomings and bottlenecks, including the fragmentation of data management and underuse of data, the lack of interoperability, the poor functioning of the national information platform for health insurance (PIAS), and the electronic health records, which are uploaded on this platform in a non-systematic manner.

Meanwhile, **important projects benefitting from EU funding are ongoing**. A EUR 400 million RRF project aims to improve the Health Insurance Information Platform (PIAS), to digitalise certain institutions with healthcare responsibilities and certain public healthcare units, and to deliver telemedicine solutions in remote areas.

Moreover, the ERDF funded Operational Programme for Health includes investments of EUR 143.4 million to create a National Observatory for Health Data as well as to deliver various e-Health solutions. Romania is also participating in the Working Group establishing the Statute and other relevant documents for the Genome EDIC, with the objective to improve access to health data throughout the EU.

When implementing these projects, it is important to take into account the open issues concerning access to e-Health records, in particular the coverage of the access services, the availability of data types, the data supply by healthcare providers, and the various considerations on ease of access.

Building a safe and human centric digital environment and preserving our democracy

According to the Digital Decade Eurobarometer, 59% of Romania's population considers that the digitalisation of daily public and private services is making their life easier. This score is below the EU average (73%), confirming the existence of a significant untapped potential and of major bottlenecks to be tackled for accompanying people through the digital transition. The aspects that the Romanian population identifies as most important in facilitating the daily use of digital services and technologies are connectivity (68%), products and services that are better adapted to personal needs (67%), safety and security (66%) and human support (60%).

According to the same Eurobarometer results, the Romanian population has identified the following issues as most worrying/impactful in relation to the behaviour and use of online platforms: fake news and disinformation (43%), misuse of personal data (32%), untrustworthy online sellers (28%), insufficient protection of minors (25%). Moreover, Eurostat data indicates that 20.8% of individuals in Romania have reported encountering messages online that were considered to be hostile or degrading towards groups of people or individuals in the last 3 months, which is the lowest rate in the EU.

Developments relevant to building a transparent, open and safe digital environment took place in 2023. The Telecom National Regulatory Authority for telecommunications, ANCOM, was designated as Digital Services Coordinator, in accordance with the Digital Services Act. ANCOM also performs the function of single contact point, in charge of reporting and sharing data with the European Commission and the other Digital Services Coordinators across the EU.

Romania

Furthermore, the Audiovisual Law (Law 504/2002), was amended in 2022 to transpose the provisions of the Audiovisual Media Services Directive, requiring video-sharing platform providers (VSPs) under Romania's jurisdiction to take measures to protect minors from audiovisual content that may impair their physical, mental or moral development, in particular programmes containing pornography or unjustified violence, and also to protect the general public from content that contains incitement to violence or hatred directed against specific groups of people, or other forms of illegal content. The National Audiovisual Council is in the process of creating, through secondary legislation, mechanisms to assess the appropriateness of the measures taken by VSPs.

By monitoring audiovisual programmes and sanctioning service providers, the National Audiovisual Council also helps fight the spread of disinformation and misinformation, implementing relevant provisions of the same Law 504/2002.

According to the Romanian roadmap, particular attention is paid to the protection of minors online. In 2023, **the government approved the new National Strategy for the Protection and Promotion of the Rights of the Child 'Protected Children, Safe Romania' for 2022-2027 and its operational plan. The** general objective of these documents is the safe use of the online space by children.

Public education activities on how to recognize and critically evaluate information sources are key components in the fight against disinformation and misinformation. **Media literacy campaigns are run by both public authorities and non-governmental organisations**. In particular, Save the Children Romania runs the '*Ora de Net'* programme which promotes online safety and safe internet use by children. Furthermore, a series of events took place as part of the Global Week of Media Education and Information Education, organised annually under the auspices of UNESCO.

Still, according to research conducted by Save the Children Romania, 77% of children interviewed declared spending more than 3 hours a day on the internet and 40% of them declared having been victim of cyberbullying. The same research suggests that most parents believe that their kids spend less than 3 hours a day online and that only about 10% of kids have been victim of cyberbullying. Such findings illustrate the need to strengthen media literacy training at all levels of education.

The Romanian roadmap also underlines the action taken to support digital inclusion, for example the measures to support accessibility for people with a disability and the measures to combat illegal content and hate speech, reflecting a growing concern for these issues.

Leveraging digital transformation for a smart greening

Of all the Romanian enterprises of 10 employees of more, 52.7% consider the environmental impact of ICT solutions and devices when choosing them and apply some measures to reduce paper or energy consumption of ICT devices, compared to an EU average of 48.7%. By contrast, recycling rates are lower than in other EU countries, with only 8% of individuals recycling their mobile phones, 7% recycling their desktop computers, and 5% recycling their laptops or tablets.

An important development observed in 2023 in relation to the twinning of the green and digital transitions is **the adoption of the first national strategy of Romania on education and climate change for 2023 - 2030**, which includes the development of a digital ecosystem for education and climate change (Government Decision No. 59 of 18 January 2023).

An example of a specific initiative is the development of the national digital platform www.saptamanaverde.edu.ro (Green Week) which provides useful interactive information on protected natural areas and educational routes, teaching materials, as well as a library of open educational resources. The platform accompanies the 'Green Week' national programme in schools, which aims to implement environmental education and climate resilience activities in schools. Furthermore, a new optional course 'Education and Climate Change' has been introduced into the secondary school curriculum (7th-8th grades) from the 2023/2024 school year. It aims to promote a healthy lifestyle and develop resilience to climate change using digital resources.

Furthermore, the Romanian roadmap underlines that the major digitalisation efforts in the areas of public services, including the digitalisation of environmental services, have strong synergies with climate action. For example, the RRP funds an integrated IT system to support sustainable development, improve infrastructure and environmental quality, protect nature and preserve biodiversity. This includes infrastructure for the supervision, control and assurance of forest integrity and the transport of wood and the digitalisation of at least 32 environment-related public services, related to emission inventories, Natura 2000 reporting, waste management services, etc.

Importantly, the Romanian RRP includes 165 measures that are tagged as both green and digital, covering areas such as the digitalisation of energy grids, energy efficiency and renewables, smart mobility, etc.

Finally, **specific measures targeting innovation in cleantech exist, supporting an emerging cleantech start up ecosystem**, either through national programmes (with a significant percentage of public funding sources dedicated to renewable and energy efficiency, energy storage, green mobility, etc) or via EDIHs.

Annex I – National roadmap analysis

Romania's national Digital Decade strategic roadmap

Romania **submitted** its draft national strategic roadmap in December 2023, in accordance with Article 7 of the Digital Decade Policy Programme Decision. The roadmap was published[9] for public **consultation in March 2024**, ahead of its formal **approval by the government.**

Romania's roadmap is well developed and ambitious in some aspects, although not complete, nor always very specific in terms of conformity with the aspects required by the Commission's Guidance.

The roadmap includes national target values for all targets except quantum, semiconductors, edge, and eHealth. For unicorns, the definition of the EU KPI is not followed. Moreover, in some cases (e.g. digitalisation of business, 5G coverage, digital skills) the values are set significantly below the corresponding EU targets. Justification for these levels is provided, but based on the current performance, there is scope to raise the level of ambition, in particular for the 5G, ICT specialists and cloud adoption targets. For edge nodes e-Health, and unicorns', trajectories are also missing.

Furthermore, the measures included seem to support the targets and objectives of the Digital Decade Policy Programme, although they are not clearly attributed to these, nor is the information provided on timing and budgets sufficiently detailed. However, it is clear that most measures are funded under the Romanian RRP, followed by measures funded by the European Regional Development Fund. It is also clear that the timing is aligned with these programmes.

The following table reflects a best effort attempt to estimate and categorise the number of measures and their relative budgets contributing to the targets, made by the Commission:

Digital Decade target	Budget in the roadmap (EUR million)	Number of measures in the roadmap
Connectivity gigabit	0,0	3
Connectivity 5G	0,0	2
Semiconductors	0,0	1
Edge nodes	-	-
Quantum computing	10,0	2
SME take up	65,4	15
Cloud/AI/Big data uptake	60,0	8
Cloud only uptake	-	-
AI only uptake	-	-
Big data uptake	-	-
Unicorns	444,5	16
Basic digital skills	808,0	16
ICT specialists	253,0	7
e-ID	220,0	2
Key public services	1 078,0	11
e-Health	559,0	3
Objectives	69,3	11
Total	**3 567,2**	**97**

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[9] Plan-national-de-actiune-roadmap-pentru-publicare.pdf (gov.ro)

Romania

The overall vision is consistent with Romania's strengths and weaknesses, with a solid analysis of the factors influencing digitalisation in Romania. The measures set out in the roadmap address, to various extents, the main challenges that Romania deals with in its digital transition, in line with previous Digital Decade and country specific recommendations. Most efforts, in terms of overall budget, concentrate on the digitalisation of public services and digital skills, considered at this point the most pressing issues. Significant funding is dedicated also to the digitalisation of businesses, although most measures included in the roadmap are taken at regional level via the European Digital Innovation Hubs and as such they are not likely to address all the identified challenges. Indeed, the roadmap acknowledges that further action is needed to support digital R&D, innovation, and the digital transformation of business. Finally, the Romanian authorities have kick-started discussions and/or institutional processes to develop support policies in areas where less activity exists (e.g. edge nodes, quantum, twinning the green and digital transitions). Overall, the roadmap could be further developed when it comes to the general objectives of the programme, including to better reflect ongoing activities.

Annex II – Factsheet on multi-country projects (MCPs) and funding

MCP and EDICs

Romania participates, using a EUR 400 million contribution from the RRF in the important project of common European interest (IPCEI) on semiconductors and low power processors. Romania also participates in the multi-country project setting up and linking European Digital Innovation Hubs. It is expected that this participation will be beneficial in terms of capacity and performance in the respective areas.

Concerning European Digital Infrastructure Consortia (EDICs), out of the currently established ones, Romania participates in 3 of them: EUROPEUM (Blockchain), where Romania is already a member, as well as Genomics and Public Administration, where Romania is part of the Working Groups developing the Statutes and other relevant documents. Romania's main interests lie with enabling a cross-border exchange of information in a reliable, secure and verifiable way, making the Romanian language more available via advanced European translation solutions, and contributing with data to personalized medicine and advanced clinical information.

EU funding for digital policies in Romania

EU funds support Romania's digitalisation efforts. In accordance with an analysis by the Joint Research Centre[10], most of the funding that directly supports the Digital Decade targets comes from the RRF, with a contribution estimated at EUR 4792 million (out of a total of 5772 million dedicated to digital from the Romanian RRP), followed by cohesion policy funds, with a contribution estimated at EUR 1873 million.

In total, measures under Romania's Recovery and Resilience Plan contribute approximately EUR 5.8 billion (i.e., 21.8% of Romania's total allocation) to the country's digital transformation. As a result of the 2023 revision of the plan, the percentage dedicated to digital increased, in spite of an overall downward revision of Romania's RRF grants allocation of EUR 2 billion. Most of this funding focuses on the digital transformation of the public sector, digital education, digitalisation of transport, cybersecurity and connectivity, digitalisation of businesses and digital innovation.

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[10] JRC report "Mapping EU level funding instruments 2020-2027 to Digital Decade targets - 2024 update" (Signorelli et al., 2024)".