EUROPEAN
COMMISSION

Brussels, 2.7.2024
COM(2024) 260 final

ANNEX 3 – PART 4/4

ANNEX

to the

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

State of the Digital Decade 2024

EN   EN

Annex 3: Short EU 27 Member States reports

State of the Digital Decade 2024

Portugal

1 Executive summary

Portugal has untapped potential 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, Portugal made notable progress in e-health and in rolling out 5G networks, including in the 3.4–3.8 GHz band. However, **important challenges persist** in improving basic and advanced skills across the population.

Digitalisation is a priority of the Portuguese authorities with the emphasis on reliable online public services, development of digital skills and unleashing the digital potential of enterprises. Portugal is seizing the opportunity to use EU funds to transform its economy and society and is devising its strategies on new technologies such as cybersecurity, AI, and advanced computing. Its work in this respect is facilitated by excellent digital infrastructure. However, despite the efforts, some metrics related to the general population and enterprises suggest the need for more intensive action.

According to the Special Eurobarometer 'Digital Decade 2024'[1], 74% of Portugal's population consider that the digitalisation of daily public and private services is making their lives easier (just above the EU average of 73%).

Portugal is a member of the already established Local Digital Twins towards CitiVERSE European Digital Infrastructure Consortium (LDT CitiVERSE EDIC) and of the EUROPEUM-EDIC. Portugal, together with other Member States is participating in the works for the possible future EDICs: Cybersecurity Skills Academy EDIC, the EUCAIM EDIC and the Genome EDIC[2].

The Portuguese Recovery and Resilience plan dedicates EUR 4.5 billion (21% of the total allocation)[3] to the digital transformation, with priorities given to digital qualification and skills and the digital transformation of businesses. Under Cohesion Policy, an additional EUR 2.4 billion (11% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation[4].

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

[2] Information last updated on 31 May 2024.

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

[4] 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.

Digital Decade KPI [1]	Portugal			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	PT	EU
Fixed Very High Capacity Network (VHCN) coverage	93.0%	94.2%	1.2%	78.8%	7.4%	x	100%
Fibre to the Premises (FTTP) coverage	90.8%	92.3%	1.7%	64.0%	13.5%	x	-
Overall 5G coverage	70.1%	98.1%	40.0%	89.3%	9.8%	x	100%
Semiconductors		NA					
Edge Nodes		19		1 186		x	10 000
SMEs with at least a basic level of digital intensity	48.6%	53.6%	5.0%	57.7%	2.6%	90%	90%
Cloud	28.1%	32.3%	7.2%	38.9%	7.0%	x	75%
Artificial Intelligence	7.2%	7.9%	4.7%	8.0%	2.6%	x	75%
Data analytics	NA	38.6%	NA	33.2%	NA	x	75%
AI or Cloud or Data analytics	NA	54.4%	NA	54.6%	NA	75%	75%
Unicorns		1		263		2	500
At least basic digital skills	55.3%	56.0%	0.6%	55.6%	1.5%	80%	80%
ICT specialists	4.3%	4.5%	4.7%	4.8%	4.3%	7%	~10%
eID scheme notification		Yes					
Digital public services for citizens	77.8	81.5	4.8%	79.4	3.1%	x	100
Digital public services for businesses	81.9	81.9	0.0%	85.4	2.0%	x	100
Access to e-Health records	62.7	86.0	37.2%	79.1	10.6%	x	100

[1] See the methodological note for the description of the indicators and other descriptive metrics

National Digital Decade strategic roadmap

With respect to **Portugal's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating **some ambition** however, based on this document, intends to allocate **limited effort** to achieve the Digital Decade objectives and targets. **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.**

Portugal's roadmap partly reflects the efforts needed in all dimensions of digitalisation. The roadmap **includes only some of the expected national targets**, i.e., those related to digital skills, at least a basic level of digital intensity of SMEs, unicorns, and a joint target for the take-up of AI, cloud or data analytics, leaving space for higher ambition. The roadmap **does not include any trajectories** making it difficult to assess the pace of implementation. The national targets set for 2030 reflect EU target levels of ambition except for ICT specialists. The total budget for the measures is **EUR 854 million** (0.3 % of GDP). While the measures presented tackle some of the most pressing issues, such as the insufficient level of basic digital skills, ICT specialists, and the digitalisation of businesses, more intensive efforts are needed to reach the national targets. For the sake of the cooperation foreseen by the programme, a comprehensive roadmap perspective remains crucial also in areas where the country performs well, e.g., connectivity.

Recommendations for the roadmap

Portugal should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the DDPP Decision:

- **TARGETS:** (i) Propose targets and trajectories concerning VHCN, FTTP, 5G coverage, edge nodes, cloud, AI and data analytics separately, accessibility of key public services for citizens and businesses, access to e-health records and set trajectories for basic digital skills, ICT specialists, digital intensity of SMEs, unicorns using correct baseline value. (ii) Align the level of ambition of the target for ICT specialists with the EU target. (iii) Consider establishing national ambitions for technological leadership, competitiveness, and resilience to support EU-wide targets regarding semiconductors and quantum.
- **MEASURES:** (i) Supplement the roadmap with measures related to connectivity. (ii) Review the measures contributing to targets on skills and digitalisation of enterprises, consider setting up additional measures for ICT specialists and basic digital intensity of enterprises. (iii) Review the budget description of all presented measures, highlighting both national and EU sources. (iv) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including what national measures contribute to it. (v) Incorporate, where appropriate, measures reported through other channels in the roadmap.
- **CONSULTATION**: Consult key stakeholders, as outlined in the DDPP, before proposing the adjustment to the national roadmap.

Digital rights and principles

The Digital Decade Eurobarometer reveals that 43% of Portuguese respondents believe the EU protects their digital rights, slightly below the EU average of 45%. Confidence in digital privacy stands at 48%, also lower than the EU average. Concerns have risen significantly, with 60% worried about children's online safety, up 20 points since 2023, and 52% about control over personal data, up 15 points since 2023. Despite these concerns, 78% consider digital technologies important for accessing public services and 83% for connecting with friends and family, aligning with the EU average. 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

To underpin its technological leadership and competitiveness, Portugal is equipped with excellent infrastructures, with a positive deployment dynamic, but it can still boost the digitalisation of its businesses. On infrastructures, Portugal is on track to reach 100% coverage for Gigabit connectivity (VHCN 94.2%, and 92.3% for FTTP) and 5G (98.1%) much earlier than 2030, the timing set for the EU target. 65.2% of Portuguese households are covered by 5G in the 3.4-3.8 GHz band, essential for enabling advanced applications requiring large spectrum bandwidth. However, the figure for fixed broadband subscriptions with download speeds of 1 Gbps or more is 9.1%, below the EU average of 18.5%. Portugal's overall good starting point is due to public initiatives, such as the recent 5G auction and the ongoing Gigabit tender, combined with the dynamism of private operators. On the other hand, the indicators on the digitalisation of enterprises (basic digital intensity of SMEs and take-up of data analytics, AI and cloud) point to a performance below or equal to the EU average. SMEs are underperforming in the adoption of digital technologies, despite ample funding support offered by the Portuguese recovery and resilience plan and other sources of EU funding, and the vision established in the COMPETE 2030 programme. However, a strong agenda is in place to foster the growth of the start-up ecosystem. Portugal aims to step up its contribution to the EU's technological resilience and sovereignty with the recent strategy on semiconductors, and the revision of its strategies and actions on

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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.

advanced computing and AI. A whole-of-society approach to cybersecurity skills and capabilities is also contributing to this objective.

Recommendations – Portugal should:

- **CONNECTIVITY INFRASTRUCTURE:** 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.
- **SEMICONDUCTORS:** Continue efforts in the area of semiconductors including by proposing concrete actions and exploring synergies between the national strategy and the EU-level cooperation.
- **DIGITALISATION OF SMEs and UNICORNS:** (i) Intensify the existing measures in view of the ambitious target on the basic digital intensity of enterprises and the need to ensure continuity of support until 2030; (ii) Continue reinforcing the country's start-up and scale-up ecosystem, in particular by ensuring availability and effectiveness of adopted measures.
- **AI/CLOUD/DATA ANALYTICS:** (i) Envisage specific measures for the take up of cloud, AI and data analytics, such as reinforced collaboration between public and private sector and with academia to better match the potential of these technologies with the business needs; (ii) 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 coordinators and the Member States participating in the IPCEI-CIS.
- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Protecting and empowering EU people and society

Portugal is well equipped to deliver an inclusive digital transition, but sustained efforts will be required to continuously increase the population's level of digital skills and train ICT specialists. The population's level of at least basic digital skills is just above the EU average, showing limited progress in the past few years. The proportion of ICT specialists in employment is lower than the EU average, with a decreasing share of women in the profession. Over the last few years, Portuguese authorities devised multiple initiatives to enhance the digital skills of the population, including in the workforce; these include reforms and investments in the education system and the provision of other training initiatives. The ambition of the Digital Decade and national targets will require Portugal to further intensify its efforts in this domain. The digitalisation of public services remains close to the EU average, while the level of e-health maturity improved significantly and is now above the EU average. With measures supporting digitalisation of the health system, implementing e-ID schemes and supporting the modernisation of public administration, Portugal is on track to achieve the EU-wide targets. At the same time, it could do more to raise awareness among the population about the benefits of the solutions in place.

Recommendations – Portugal should:

- **BASIC DIGITAL SKILLS:** Intensify efforts including by evaluating the take-up of the current measures and the remaining needs in order to meet the ambitious target.
- **ICT SPECIALISTS:** Adopt additional measures for ICT specialists, including cybersecurity talent and promoting ICT studies and gender balance in the field.
- **DIGITAL PUBLIC SERVICES/e-ID:** Continue developing user-friendly e-Government solutions and intensify efforts to promote their take-up, with particular attention to the e-ID.

- **E-HEALTH:** Make the data types of medical images and hospital discharge reports available to citizens through the online access service and, building on existing legal provisions, implement technical functionality for legal guardians and authorised persons to access electronic health data on behalf of others.

Leveraging digital transformation for a smart greening

Portugal is beginning to attach importance to twining the digital and green transitions. The Portuguese authorities have shown growing commitment to a more sustainable future, putting in place digital measures, such as paperless invoicing or energy efficiency tracking, to support more resource-efficient public administration, enterprises and individual lives. On the objective of making the ICT sector more environmentally friendly, most of the players in the telecoms sector are carrying out sustainability reporting, which makes it possible to track improvements in the connectivity sector. However, a more comprehensive approach in this area may be necessary.

Recommendations – Portugal 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.

State of the Digital Decade 2024

Romania

1 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)[6]. 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[7]. 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'[8], **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[9].

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

[7] 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.

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

[9] Information last updated on 31 May 2024.

Digital Decade KPI [1]	Romania			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	RO	EU
Fixed Very High Capacity Network (VHCN) coverage[10]	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%
eID 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

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

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[10] 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.

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[11].

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**.

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[11] 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.

Significant developments in the field of cybersecurity were also observed in 2023, initiated by both private and public actors, including efforts to raise awareness and build relevant skills.

> **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.

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.

State of the Digital Decade 2024

Slovakia

1 Executive summary

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

In 2023, Slovakia made notable progress in enhancing digital public services for citizens and businesses, as well as advancing e-Health initiatives. However, **significant challenges** persist in expanding gigabit network coverage and improving basic and advanced digital skills across the population.

Digitalisation has been at the centre of the government's latest reforms and plans. In addition to the Action plan for the digital transformation of Slovakia for 2023-2026 and the National Digital Skills Strategy of the Slovak Republic and the 2023-2026 Action Plan, Slovakia has published the Smart Cities and Regions Plan 2023-2026 and the National Research & Development & Innovation Strategy 2030, adopting comprehensive and challenging objectives at all levels for a better quality of life. The implementation of these strategies should boost Slovakia's digital transformation, as it still lags behind the EU average in all but one Digital Decade key performance indicators (KPIs).

According to the Digital Decade Eurobarometer[12], 82% of Slovakia's population consider that the digitalisation of daily public and private services makes their life easier. This score is significantly above the EU average of 73%.

Slovakia is a member of the Local Digital Twins – CitiVERSE European Digital Infrastructure Consortium (EDIC), an observer in the Alliance for Language Technologies EDIC, (all already set up). Slovakia is a member of the working groups aiming to set up the IMPACTS EDIC, the Mobility and Logistics Data EDIC, the Genome EDIC and the Digital Commons EDIC[13], and of working groups exploring other possible areas to set up EDICs. It is also a member of the important project of common European interest in the field of microelectronics and communication technologies (IPCEI-ME/CT).

Slovakia's Recovery and Resilience Plan (RRP) allocates 20.5% to digital (EUR 1.2 billion)[14]. It was updated in July 2023 to include reforms and investments that address REPowerEU objectives. Under Cohesion Policy, an additional EUR 0.9 billion (7% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation[15].

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[12] Special Eurobarometer 551 on 'the Digital Decade' 2024: https://digital-strategy.ec.europa.eu/en/news-redirect/833351
[13] Information last updated on 31 May 2024.
[14] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.
[15] 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.

Digital Decade KPI [1]	Slovakia			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	SK	EU
Fixed Very High Capacity Network (VHCN) coverage	71.3%	69.1%	-3.1%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	66.9%	64.2%	-4.0%	64.0%	13.5%	x	-
Overall 5G coverage	55.3%	79.0%	42.8%	89.3%	9.8%	98.5%	100%
Semiconductors		NA					
Edge Nodes		8		1 186		x	10 000
SMEs with at least a basic level of digital intensity	43.0%	42.2%	-0.9%	57.7%	2.6%	90%	90%
Cloud	30.8%	30.2%	-1.0%	38.9%	7.0%	75%	75%
Artificial Intelligence	5.2%	7.0%	16.0%	8.0%	2.6%	75%	75%
Data analytics	NA	30.2%	NA	33.2%	NA	75%	75%
AI or Cloud or Data analytics	NA	45.8%	NA	54.6%	NA		75%
Unicorns		0		263		3	500
At least basic digital skills	55.2%	51.3%	-3.6%	55.6%	1.5%	70%	80%
ICT specialists	4.3%	4.2%	-2.3%	4.8%	4.3%	6%	~10%
eID scheme notification		Yes					
Digital public services for citizens	67.2	72.1	7.2%	79.4	3.1%	100	100
Digital public services for businesses	77.9	79.2	1.6%	85.4	2.0%	100	100
Access to e-Health records	42.0	66.3	57.8%	79.1	10.6%	100	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 **Slovakia's** contribution to the Digital Decade Policy Programme, its national roadmap demonstrates **a high ambition** while it intends to devote **significant effort** to achieve the Digital Decade objectives and targets.

Slovakia's roadmap, published in March 2024, presents a comprehensive overview of the country's digital strategic direction for development. The document provides insights into the state of play, challenges, and strengths across various sectors. In particular, the roadmap outlines numerous targets, most of them (nine targets on connectivity, businesses, and public services) in line with the EU target. It also mentions 113 measures, with a significant commitment to digital advancement, underscored by an estimated budget of EUR 2 270 million (1.8% of GDP).

Some areas are presented in less detail. For example, no detailed measures are mentioned for edge nodes, semiconductors, and quantum technologies. The roadmap partially aligns with key recommendations presented in the Slovak Digital Decade Country Report 2023, with an emphasis on action to improve access to information and knowledge sharing for businesses, including through European Digital Innovation Hubs and action to digitalise public services. However, more ambition is needed on connectivity and digital skills.

Recommendations for the roadmap
Slovakia should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the DDPP Decision: - **TARGETS:** (i) Propose national target values for FTTP and edge nodes. (ii) Recompute the VHCN trajectory using the correct values. (iii) Re-evaluate possible efforts on 5G coverage, basic digital skills and ICT specialists.   - **MEASURES:** (i) Reinforce measures aimed to contribute to digital skills development and to foster connectivity. (ii) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including what national measures contribute to it. (iii) Review the budget estimated for all presented measures, highlighting the different sources, including more detail on EU funds such as RRF.   - **CONSULTATION:** Provide further detail on the consultation process of the roadmap.

Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' provides key insights into Slovak perceptions of digital rights. 47% of Slovak respondents believe the EU protects their digital rights, a 5-point increase since last year. Confidence in digital privacy stands increased by 5 points to 52%, aligning with the EU average. Notable concerns include worries about online safety for children (57% of respondents, up 8 points), and about control over personal data (39%). Positive trends are evident in the high value placed on digital technologies for accessing public services (84%) and connecting with friends and family (89%), both above the EU average. 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[16].

A competitive, sovereign and resilient EU based on technological leadership

Despite a commitment to ensure equal access to affordable high-quality digital connectivity, with 69% of households currently covered by VHCN, challenges remain to ensure Gigabit coverage for all. Action to create opportunities through research, development and innovation is underway, although the share of the ICT sector in private R&D expenditure remains relatively low at 0.6%. Initiatives for collaboration undertaken between academia, industry, and government aim to drive innovation and develop capacities in areas like semiconductors and quantum. Infrastructure enhancements, such as the new international optical backbone route and development of the Slovak quantum communication infrastructure, help to further improve the resilience of Slovakia's digital ecosystem. Moreover, Slovakia has taken action to promote the uptake of digital technologies by businesses, with currently 42% of SMEs having at least a basic level of digital intensity, recognising their role in driving economic growth.

Recommendations – Slovakia should:
- **CONNECTIVITY INFRASTRUCTURE:** (i) Develop targeted initiatives to fill the investment gap and secure public and private funding in broadband coverage and uptake to address the identified gigabit and 5G connectivity challenges, especially in rural areas. (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.

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[16] 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.

- **SMEs:** Accelerate the diffusion of innovative technologies and solutions across the economy to improve digital adoption and competitiveness.
- **SEMICONDUCTORS/EDGENODES/QUANTUM:** Foster increased involvement at the European level to promote the adoption of semiconductors, edge nodes, and quantum technologies.
- **AI/CLOUD/DATA ANALYTICS:** (i) Support the development, roll out and take up, including support for capital investment in cloud computing, artificial intelligence, data analytics, and other cutting-edge technologies. (ii) 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 coordinators and the Member States participating in the IPCEI-CIS.
- **UNICORNS:** Expand existing measures aimed at supporting the growth of scale-ups and startups that drive innovation and invest in emerging technologies.
- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Protecting and empowering EU people and society

Slovakia is actively fostering a human-centred, inclusive, and transparent digital environment, in alignment with overarching EU objectives for the digital empowerment of its citizens. Measures such as the adoption of the Consumer Protection Act reflect efforts to empower individuals by ensuring a fair balance between consumer rights and obligations in the digital sphere. These legislative measures address emerging challenges in the digital realm and align with EU consumer legislation. Additionally, Slovakia's participation in the INHOPE network underscores the country's dedication to promoting digital inclusion and safeguarding online safety, particularly for vulnerable groups like children. However, Slovakia's measures have not yet translated into better performance on digital skills. Actions in education at all levels still require improvement, with a decline in basic digital skills from 55% to 51% in the past year, below the EU average of 55%, possibly due to post-COVID-19 effects (i.e., lower usage of ICT tools). Special attention is needed for age groups 55 to 64 (38%) and 65 to 74 (19%). The national targets for 2030 are lower than the EU targets. With a national target of 70% for basic digital skills, and 6% for the population being ICT experts by 2030, more specific and broader measures are necessary and are crucial for strengthening digital skills in Slovakia, in alignment with existing national strategies.

The use of e-ID remains limited as only 8% of the population use e-ID for public services, compared to an EU average of 36%. To address this, Slovakia has launched the Digital Identity Testing and Deployment project, which will run until 2026, aiming to enable access to digital identity through mobile devices. In the realm of digital public services, Slovakia's performance in services offered to citizens and businesses, although showing some improvement, continues to lag behind the EU average. Actions are underway to promote digitalization, including by streamlining public procurement processes, increasing electronic communication with public administration, and improving access to electronic health records. Awareness campaigns and the development of dedicated mobile applications are being considered to boost usage and accessibility of e-Health services, aligning with Slovakia's commitment to leveraging technology to improve healthcare provision.

Recommendations – Slovakia should:

- **BASIC DIGITAL SKILLS:** (i) Expedite the implementation of new curricula in primary and secondary schools, incorporating robust programs focused on informatics and digital skills. (ii) Implement a comprehensive upskilling program for schoolteachers to ensure that all educators possess adequate digital competencies.

- **ICT SPECIALISTS:** Foster the development of more flexible and diverse certified ICT studies at various levels and modalities within higher education.
- **DIGITAL PUBLIC SERVICES:** Strengthen the digital transformation of public services and actively encourage the adoption of electronic modalities by both workers and retired citizens.
- **E-HEALTH:** (i) Offer a mobile application for citizens to access their electronic health records, enhancing the authentication method for logging into the online access services with full accessibility compliance. (ii) Make the data type of medical images available to citizens through the online access service. (iii) Expand the coverage of the online access service to ensure that all citizens can access their electronic health data online.

Leveraging digital transformation for a smart greening

Slovakia can still capitalise on green transformation opportunities, fostering the development of green skills and advancing its digital and professional capabilities in line with its strategic objectives. Measures like the 'Analysis of the transition to green ICT in public administration' are underway to assess the impact of transitioning to sustainable communication infrastructures, green data centres, and energy-efficient ICT services. These initiatives prioritize digital rights and sustainability by integrating principles of data privacy, security, and ethical technology use, helping to achieve environmental sustainability and digital inclusion.

Recommendations – Slovakia 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.

State of the Digital Decade 2024

Slovenia

1 Executive Summary

Slovenia has untapped potential 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, Slovenia made notable progress in e-government, through the notification of its national e-ID scheme and a high overall eHealth maturity, and in 5G coverage, including in the 3.4-3.8 GHz bands. However, despite ongoing efforts, **challenges persist** in improving basic digital skills of the population, while Slovenian enterprises, especially SMEs, lag behind in the adoption of advanced technologies like data analytics.

According to the Special Eurobarometer 'Digital Decade 2024'[17], 74% of Slovenia's population considers the digitalisation of daily public and private services to be making their lives easier (just above the EU average of 73%).

Slovenia is actively laying the foundation for its digital transformation by developing complementary strategic orientations and action plans, including strategies on semiconductors and quantum technology. The long awaited **Digital Public Services Strategy 2030** was published in 2023 and Slovenia's participation in EDICs underlines its commitment to advancing digital initiatives.

Slovenia is a member of several **EDICs**, including the **Alliance for Language Technologies** (ALT), **Local Digital Twins towards the CitiVERSE** and **EUROPEUM** (all already set up). It is also developing the Statute and other relevant documents of the possible future **Cybersecurity Skills Academy** EDIC and is engaging in discussions on the setup of the possible future **Digital Commons** EDIC, within informal Working Groups.[18] However, Slovenia does not participate in the IPCEI CIS.

Even though some implementation activities have taken place, broader scale progress and transformational effects have yet to materialise.

The Slovenian **Recovery and Resilience Plan (RRP) allocates 20% (EUR 0.5 billion) to digital[19] policy measures.** Priority is given to digitising public services and e-Health as well as participation in digital multi-country projects for example on cloud and semiconductors. Additionally, 9% (EUR 0.3 billion) of Slovenia's total Cohesion Policy funding is dedicated to digital transformation[20].

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[17] Special Eurobarometer 551 on 'the Digital Decade' 2024: https://digital-strategy.ec.europa.eu/en/news-redirect/833351
[18] Information updated on 31 May 2024.
[19] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.
[20] 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.

Digital Decade KPI [1]	Slovenia			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	SI	EU
Fixed Very High Capacity Network (VHCN) coverage	75.5%	78.5%	4.0%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	75.5%	78.5%	4.0%	64.0%	13.5%	100%	-
Overall 5G coverage	63.9%	82.1%	28.5%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		5		1 186		200	10 000
SMEs with at least a basic level of digital intensity	55.2%	50.4%	-4.4%	57.7%	2.6%	90%	90%
Cloud	37.6%	36.0%	-2.2%	38.9%	7.0%	75%	75%
Artificial Intelligence	11.7%	11.4%	-1.3%	8.0%	2.6%	75%	75%
Data analytics	NA	19.1%	NA	33.2%	NA	75%	75%
AI or Cloud or Data analytics	NA	44.7%	NA	54.6%	NA		75%
Unicorns		0		263		7	500
At least basic digital skills	49.7%	46.7%	-3.0%	55.6%	1.5%	80%	80%
ICT specialists	4.5%	3.8%	-15.6%	4.8%	4.3%	10%	~10%
eID scheme notification		Yes					
Digital public services for citizens	71.4	77.0	7.9%	79.4	3.1%	100	100
Digital public services for businesses	82.7	84.0	1.5%	85.4	2.0%	100	100
Access to e-Health records	80.4	87.6	8.9%	79.1	10.6%	100	100

[1] See the methodological note for the description of the indicators and other descriptive metrics

National Digital Decade strategic roadmap

With respect to **Slovenia's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating a **very high ambition** and, based on this document, intends to allocate **very significant effort** to achieve the Digital Decade objectives and targets. However, **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.**

Slovenia's roadmap is very ambitious and coherent, addressing all Digital Decade objectives through a comprehensive range of **99 measures**. Its 2030 targets for the key performance indicators (KPI) are aligned with those of the EU and it introduces additional targets such us the uptake of e-ID. It also includes quantitative estimations of how it expects to help achieve the edge node and semiconductor targets.

The total budget for the measures outlined in the roadmap **is estimated to be EUR 1 billion** (approximately 1.7% of GDP), with the priorities being basic digital skills, digital public services, gigabit connectivity, and the uptake of AI / cloud / data analytics (especially AI). However, more comprehensive action is required to address limitations (e.g., ICT specialists) and bring forward targeted initiatives (i.e., for the digitalisation of SMEs). Additionally, the roadmap would benefit from a more detailed description of the planned strategies and activities for semiconductors, quantum and AI, including the planned competence centre.

> **Recommendations for the roadmap**
>
> In addition to horizontal recommendations provided to all Member States (MS) regarding their national roadmaps, Slovenia should consider the following adjustments to its roadmap (Article 8(3) of the DDPP Decision):
>
> - **MEASURES:** (i) Bring forward additional measures for the digitalisation of SMEs and the uptake of advanced technologies, particularly data analytics, along with upskilling the population, focusing on ICT specialists and women in ICT, and emphasising semiconductors, quantum and AI; (ii) Revise the budget description to ensure overall consistency and complement the information on expected impact on measure-level; (iii) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including what national measures contribute to it.

Digital rights and principles

The Digital Decade Eurobarometer shows that 46% of Slovenians feel the EU protects their digital rights, a 5-point drop from last year, just below the EU average of 47%. Rising concerns include 62% worried about children's online safety (up 11 points) and 47% about their control over personal data. However, 62% trust in online freedom of assembly and 57% in safe and privacy-friendly technologies, both above the EU average. 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[21].

A competitive, sovereign and resilient EU based on technological leadership

To underpin its technological leadership and competitiveness, Slovenia is taking considerable action to develop cutting-edge technologies, but further measures are required to boost the digital transformation and uptake of advanced technologies in businesses, especially SMEs.

On connectivity, Slovenia performs fairly well, with the exception of fixed and mobile connectivity in rural areas. This long-standing issue, which is partially structural (i.e., topography-related), is being addressed through measures such as the ongoing construction of broadband networks of at least 100 Mbps in white areas, co-funded by public and private stakeholders. Furthermore, Slovenia is taking action to prepare for the next generation of electronic communication networks, including with the auctioning of private 5G networks in March 2024, and preparing to auction bands for machine-to-machine communication networks, including Internet of Things.

Slovenia falls below the EU average in the digitalisation of businesses. Despite the strong digitalisation of large enterprises (including the high uptake of AI) and the country's participation in initiatives (including at EU level) to develop cutting-edge technologies (i.e., cloud, semiconductors, quantum – with a focus on research – and blockchain), the uptake of digital technologies remains a persisting challenge. Slovenian SMEs, in particular, have the lowest scores in the EU in basic digital intensity, cloud computing adoption, and data analytics uptake. This is being addressed by action to boost the uptake of advanced technologies among large companies and SMEs, unprecedented investments via the Technology Innovation Fund (part of the Slovene Enterprise Fund), and structural framework improvements, particularly regarding the employment of non-EU nationals (although some of these programmes are currently on hold). European Digital Innovation Hubs are

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[21] 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.

also making their services available to Slovenian SMEs. Moreover, Slovenia is taking action to improve its cybersecurity with projects to set up cybersecurity schools and a national cybersecurity coordination centre, but not yet on a broad scale.

> **Recommendations – Slovenia should:**
>
> - **CONNECTIVITY INFRASTRUCTURE:** (i) Continue and supplement measures to tackle 5G connectivity challenges, especially in rural areas. (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.
> - **SEMICONDUCTORS:** Sustain activities on semiconductors and quickly implement them on the ground.
> - **SMEs:** Accelerate policies to increase the uptake of digital technologies by SMEs. In particular by quickly implementing, maintaining and complementing the efforts to provide supportive framework conditions, including a highly skilled workforce, in a continuous manner and by paying particular attention to the specificities of industries.
> - **AI/CLOUD/DATA ANALYTICS:** (i) Accelerate policies to increase and speed up the uptake of advanced technologies. In particular by stepping up actions on data analytics, and by speeding up and further targeting preparation and implementation of measures on AI. (ii) Support broad uptake of the next generation of cloud infrastructure and services under development in the IPCEI-CIS by companies of all sizes, including by liaising with the direct participants to develop a country-specific dissemination strategy reaching beyond the participating organisations.
> - **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Protecting and empowering EU people and society

Slovenia is committed to achieving an inclusive digital transformation, yet significant and continuous action is needed to ensure people have the necessary digital skills and can access user-friendly digital public services, and to address the shortage of ICT specialists to help boost economic competitiveness.

The country's performance on basic digital skills is below the EU average (including a further decrease since last year, possibly due to post-COVID-19 effects, i.e., lower use of ICT tools), with ongoing measures targeting various groups (i.e., young people, adults, and vulnerable populations). Slovenia also aims to tackle challenges in recruiting ICT specialists through reforms in higher education curricula (which are ongoing) and (a small number of) specific training programmes, including initiatives to promote the presence of women in the ICT field. Action is under way to gain an understanding of the need for ICT specialists through the 'Skills Forecasting and Labour Market Platform'.

In the area of digital public services, e-health and e-ID, Slovenia performs close to the EU average, but there is also a gap between the services offered and their utilisation. Improving digital literacy could help bridge this gap, particularly as a significant number of people do not interact with public authorities online due to a lack of skills and knowledge. The Digital Public Services Strategy 2030 is expected to put such measures in practice.

Recommendations – Slovenia should:

- **BASIC DIGITAL SKILLS:** Accelerate efforts in the area of basic digital skills. In particular, by increasing the level of these skills to allow its population and economy to make full use of the potential of digital transformation. This can be done through an increased and intensified offer and collaboration between public and private actors.
- **ICT SPECIALISTS:** Strengthen the early identification of labour market needs and further complement them for a swift reaction, especially in the area of digital upskilling and reskilling, adapt the (higher) education curricula to the latest digital needs and addressing the gender gap. Strengthened collaboration between industries, (higher) education institutions, public administration and relevant stakeholders can increase the effectiveness of those measures.
- **e-HEALTH:** Make the data types of medical imaging reports and medical images available to citizens through the online access service and build on existing legal provisions as well as technical solutions, for authorised persons to access electronic health data on behalf of others.
- **DIGITAL PUBLIC SERVICES:** Continue efforts to digitalise public services. Slovenia should continue to pay particular attention to the participatory development and user-friendliness of these services.

Leveraging digital transformation for a smart greening

Slovenia has started to make use of digital technologies to support the green transition, with a particular focus on increasing energy efficiency. An example of the latter is a pilot project prepared by the Ministry of Digital Transformation using the Internet of Things to collect data on energy consumption in buildings managed by the Ministry of Public Administration. The promotion of sustainable, circular business models starts to fall under the scope of public support measures on digital. Furthermore, Slovenia is developing a green budgeting framework.

Recommendations – Slovenia 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.

State of the Digital Decade 2024

Spain

1 Executive summary

Spain brings a very strong contribution 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, Spain made notable progress** on increasing basic digital skills and in the use of artificial intelligence by enterprises. Spain has an excellent FTTP coverage and has taken significant action in the area of semiconductors. However, important **challenges persist** regarding the lack of ICT specialists and some indicators related to the digitalization of business, including the take up of cloud.

The [Digital Spain Agenda](#) is the country's digital transformation strategy aiming to leverage new technologies to drive intensive economic growth, placing people at the centre, and reaching all territories. The agenda is structured around ten strategic axes and two cross-cutting axes, which are framed by three dimensions reflecting the Digital Decade Policy Programme: (i) infrastructure and technology; (ii) economy; and (iii) people. It was approved in 2020 and updated in 2022 under the name 'Digital Spain 2026'. According to the special Eurobarometer on 'the Digital Decade' 2024[22], **73% of Spanish citizens consider that the digitalisation of daily public and private services is making their lives easier**. This percentage aligns with the EU average and reflects the success of Spanish authorities in the inclusive implementation of the Digital Agenda.

Spain is a member and the host of the **European Digital Infrastructure Consortium** of the Local Digital Twins towards the **CitiVERSE – EDIC** (already set up) and has recently joined the Alliance for Language Technologies EDIC (**ALT-EDIC**, already set up), which addresses the scarcity of European language data needed for AI solutions. Spain is also developing the Statutes and other relevant documents of the possible future Genome EDIC and the EDIC for Mobility and Logistics Data, within their informal working groups. In addition, the country is engaging in discussions on the setting up of the Cancer Image Europe (EUCAIM) and the Agri-Food EDICs, within their informal Working Groups[23]. Concerning the Important Projects of Common European Interest (IPCEIs), Spain takes part in the IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS) and the **IPCEI on Microelectronics and Communication Technologies** (IPCEI-ME/CT). In addition, Spain takes part in the European High Performance Computing Joint Undertaking (EuroHPC) with the supercomputer MareNostrum 5 based in Barcelona.

The Spanish Recovery and Resilience Plan (RRP) allocates 26% of its budget to measures linked to the digital area[24]. The modified plan, updated in October 2023, has a stronger focus on the digital transition, devoting **EUR 40.4 billion to measures that support digital objectives** (up from EUR 19.7 billion in the original plan). Under the cohesion policy, an additional EUR 5.7 billion (16% of the country's total cohesion policy funding) is allocated to the country's digital transformation[25].

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[22] Special Eurobarometer 551 on 'the Digital Decade' 2024: https://digital-strategy.ec.europa.eu/en/news-redirect/833351
[23] Information last updated on 31 May 2024.
[24] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.
[25] 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.

Digital Decade KPI [1]	Spain			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	ES	EU
Fixed Very High Capacity Network (VHCN) coverage	93.3%	96.3%	3.2%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	91.0%	95.2%	4.6%	64.0%	13.5%	100%	-
Overall 5G coverage	82.3%	92.3%	12.1%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		171		1 186		x	10 000
SMEs with at least a basic level of digital intensity	59.7%	60.5%	0.7%	57.7%	2.6%	90%	90%
Cloud	27.0%	27.2%	0.4%	38.9%	7.0%	75%	75%
Artificial Intelligence	7.7%	9.2%	9.3%	8.0%	2.6%	75%	75%
Data analytics	NA	38.0%	NA	33.2%	NA	75%	75%
AI or Cloud or Data analytics	NA	49.9%	NA	54.6%	NA		75%
Unicorns		11		263		24	500
At least basic digital skills	64.2%	66.2%	1.6%	55.6%	1.5%	85%	80%
ICT specialists	4.3%	4.4%	2.3%	4.8%	4.3%	8.6%	~10%
eID scheme notification		Yes					
Digital public services for citizens	86.2	84.2	-2.3%	79.4	3.1%	100	100
Digital public services for businesses	91.0	91.0	0.0%	85.4	2.0%	100	100
Access to e-Health records	83.2	84.6	1.7%	79.1	10.6%	100	100

[1] See the methodological note for the description of the indicators and other descriptive metrics

National Digital Decade strategic roadmap

Regarding the **Spain's** contribution to the Digital Decade reflected in its roadmap, the country is demonstrating a **very high ambition** while intends to dedicate **significant effort** to achieve the Digital Decade objectives and targets.

The Spanish roadmap is ambitious, comprehensive, and coherent with the vision of Spain making a strong contribution to achieving the EU's Digital Decade targets. Building on the roadmap, Spanish authorities have paved the way for the digital transformation of the Spanish economy throughout the past years, with the document reflecting this vision and commitment. The roadmap presents targets and trajectories for all the Digital Decade targets, except for Edge-nodes. Overall, the targets are aligned with the EU values with the exception of the basic digital skills, which surpasses the EU target, and the ICT specialists, which stands slightly below the EU ambition level. **The roadmap contains up 67 measures with a total budget of EUR 33 750 million** (about 2.3% of its GDP), setting as key deliverables the growth of unicorns, innovative scale-up ecosystem, and the production of semiconductors.

Recommendations for the roadmap

Spain should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the DDPP Decision:

- **TARGETS:** (i) Propose targets and develop trajectories for edge nodes; (ii) align with the EU level of ambition for ICT specialists.
- **MEASURES:** (i) Reinforce the roadmap with additional measures on ICT specialists, on the adoption of the advanced digital technologies, and on objectives; (ii) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including on contributing measures.
- **CONSULTATION:** Publish the roadmap to encourage open debate and engagement with the Digital objectives and receive future stakeholder feedback.

Digital rights and principles

The Special Eurobarometer on 'the Digital Decade' 2024 highlights that only 36% of Spaniards believe the EU protects their digital rights, a significant 9-point gap below the EU average (45%) and a 13-point increase in distrust since last year. Concerns are growing, notably with 61% alarmed about children's online safety—up 21 points, and 53% about control over personal data—up 17 points. Positively, 60% trust in affordable high-speed internet and 62% are satisfied with the level of digital skills. These findings underscore the urgency of enhancing digital rights and principles in Spain's roadmap and digital strategies. 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 to improve outcomes in the years to come[26].

A competitive, sovereign and resilient EU based on technological leadership

Spain performs exceptionally well in connectivity: FTTP stands at 95.2% and 5G coverage at 92.3%, much above the EU average and close to reaching the target. Concerning **semiconductor production**, the country set it up as a priority through the PERTE Chip. Although the roadmap does not present targets and trajectories for it, the country can be considered ambitious in Edge nodes given the public and private investments and its participation in IPCEI-CIS to accelerate the edge nodes deployment. The same approach applies to Quantum technology, given Spain's participation in the EuroHPC and the presentations in last December of the 'Quantum Pact' and the MareNostrum 5 supercomputer. While the country performs relatively well in the basic digital intensity of SMEs (60.5%), it is facing challenges although improving, in the advanced digitalisation of enterprises, such as the uptake of cloud, data analytics, and AI. The country is also **focused on supporting the innovative scale-up ecosystem**, planning, and implementing investments to support innovative enterprises.

Recommendations – Spain should:

- **CONNECTIVITY INFRASTRUCTURE:** 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.
- **DIGITALISATION OF SMEs/ AI, CLOUD and DATA ANALYTICS:** (i) Continue the efforts to support the digitalisation of enterprises, in particular to foster the adoption of advanced technologies; (ii) Ensure the broad uptake of the next generation of cloud infrastructure and services under development in the IPCEI-CIS by companies of all sizes, including by developing a country-specific dissemination strategy (complementing what has already been committed under IPCEI-CIS); contributing to the additional dissemination activities led by the Cloud IPCEI Exploitation Office.

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[26] 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.

- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Protecting and empowering EU people and society

Spain is taking positive steps toward empowering people and promoting continuous opportunities for all individuals in the digital economy. To bridge gaps, digital technologies should be accessible to all, and that is what Spain is aiming for through all the activities related to its National Digital Skills Plan. The national target for basic digital skills of 85% of the population by 2030 is above the EU level of ambition, just as the current value is above the EU average (66.2% vs 55.6%). **On the other hand, more ambition could be envisaged for the ICT specialists as the roadmap sets a target that is lower than the EU expectations**. Concerning the **Digital Public Services, Spain brings a positive contribution to the EU's Digital Decade targets** on both public services for citizens (84) and businesses (91), ranking well above the EU average (79 and 85, respectively).

The country proceeded with the promotion of the **Charter of Digital Rights** approved in 2021 as well as the creation of a Digital Rights Observatory.

Recommendations – Spain should:

- **ICT SPECIALISTS:** Continue implementing its efforts to achieve a greater number of ICT specialists, designing incentives schemes to attract and retain them, and increasing the visibility and readability of training and reskilling options.
- **DIGITAL PUBLIC SERVICES:** Continue efforts to digitalise public services and further promote their use.
- **e-HEALTH:** (i) Make the data types of medical devices/implants, procedures/operations, and medical images available to citizens in all regions through the online access services; (ii) Increase the supply of health data by onboarding more categories of healthcare providers, especially in the private sector; (iii) Build on existing legal provisions and implement technical functionality for authorised persons to access electronic health data on behalf of others.

Leveraging digital transformation for a smart greening

Spain is harnessing digital technologies to enhance the green transition in key areas while implementing innovative programs to reduce the environmental impact of energy-intensive digital technologies. To develop environmentally friendly technologies guided by sustainability criteria, the National Green Algorithms Plan (PNAV) has been launched, with an investment of EUR 257 million from the European Next Generation EU funds.

Overall, Spain is committed to ensuring that all the measures included in the Digital Spain agenda adhere to the principle of not causing significant harm to the environment, which, combined with the relevant climate/environmental labelling, ensures that digitisation progresses in a sustainable manner.

Recommendations – Spain should:

- Continue developing and implementing a coherent approach to twinning the digital and green transitions, by leveraging advanced technologies and scaling up successful initiatives that improve the energy and material efficiency of digital infrastructures, in particular data centres, and by proposing decarbonisation measures and supporting the take up of green technologies that reduce the carbon footprint in other sectors, such as energy, transport, buildings, and agriculture.

- 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.

European
Commission

State of the Digital Decade 2024

Sweden

1 Executive summary

Sweden brings a very strong contribution 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, Sweden made notable progress in 5G coverage, including in the 3.4-3.8 GHz bands, and in promoting unicorns. However, **challenges persist** in the area of e-health and the country needs to continue the work on e-ID.

Sweden seeks to be a global leader in digitalisation and continues to build on the increasing economic importance of its ICT sector. Its main strength is its digitally skilled workforce, combined with well-developed infrastructure in most of the country. Eurostat data show that the ICT sector accounted for 6.5% of the economy in 2019 and 7.1% in 2020. Venture capital investments as a share of GDP grew from 7% in 2020 and 8% in 2021 to 9% in 2022. Sweden continues to perform well and is one of the top digital skills performers in the EU. Sweden has made significant steps in rolling out 5G – increasing from 21% to 90% household coverage compared to the previous year. Fibre deployment continues with public support. Despite the funding available, notably under the Recovery and Resilience plan, it will be difficult to ensure that all households have access to a FTTP network by 2030.

According to the Digital Decade Eurobarometer[27], 88% of Sweden's population (well above the EU average of 73%) consider that the digitalisation of daily public and private services is making their lives easier.

Sweden does not at present participate in any European Digital Infrastructure Consortium (EDIC) but may join in the future. In this context, Sweden has expressed interest in the established Alliance for Language Technologies (ALT EDIC) project[28].

Sweden's Recovery and Resilience plan allocates 21% (EUR 674 million)[29] of its funding to digital, most of it to support the deployment of VHCNs in rural areas. Under cohesion policy, an additional EUR 0.2 billion (13% of the country's total cohesion policy funding) is allocated to the country's digital transformation[30].

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

[28] Information last updated on 31 May 2024.

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

[30] 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.

Digital Decade KPI [1]	Sweden			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	SE	EU
Fixed Very High Capacity Network (VHCN) coverage	81.6%	88.5%	8.4%	78.8%	7.4%	98.5%	100%
Fibre to the Premises (FTTP) coverage	81.5%	83.9%	2.9%	64.0%	13.5%	98.5%	-
Overall 5G coverage	20.5%	90.3%	341.3%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		34		1186		x	10000
SMEs with at least a basic level of digital intensity	86.1%	79.9%	-3.7%	57.7%	2.6%	95%	90%
Cloud	69.2%	66.0%	(2)	38.9%	7.0%	94%	75%
Artificial Intelligence	9.9%	10.4%	2.5%	8.0%	2.6%	39%	75%
Data analytics	NA	35.0%	NA	33.2%	NA	56%	75%
AI or Cloud or Data analytics	NA	73.1%	NA	54.6%	NA		75%
Unicorns		36		263		64	500
At least basic digital skills	66.6%	66.4%	-0.1%	55.6%	1.5%	89%	80%
ICT specialists	8.6%	8.7%	1.2%	4.8%	4.3%	12%	~10%
eID scheme notification		Yes					
Digital public services for citizens	88.2	93.3	5.8%	79.4	3.1%	90	100
Digital public services for businesses	87.9	96.0	9.2%	85.4	2.0%	90.5	100
Access to e-Health records	70.3	77.9	10.9%	79.1	10.6%	78.5	100

[1] See the methodological note for the description of the indicators and other descriptive metrics
[2] Comparison with previous years cannot be done for Sweden due to methodological changes.

National Digital Decade Strategic Roadmap

With respect to **Sweden's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating a **very high ambition** and, based on this document, intends to allocate **significant effort** to achieve the Digital Decade objectives and targets.

The roadmap is overall consistent with the efforts needed across all the dimensions of digitalisation. It provides a good overview of the areas where Sweden can contribute to the Digital Decade programme and where Sweden needs to step up its efforts. The roadmap sets targets and trajectories for most of the KPIs, but some, such as the KPI on access to e-Health records, are not expected to achieve EU targets for 2030. Trajectories are based on information available before 1 June 2023. Measures are especially focused on digital skills and digital infrastructures, with fewer measures focusing on the digitalisation of public services. Some aspects require more efforts, such as the greening of digitalisation.

Recommendations for the roadmap

Sweden should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the DDPP Decision:

- **TARGETS**: (i) Complete the roadmap with the missing target for edge nodes; (ii) When there is more than one trajectory for a target, identify the most likely one.
- **MEASURES:** (i) Give a fuller account of how the measures that are broader in scope, such as Strategic Innovation Programmes, Impact Innovation and Business Sweden, support the Digital

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Decade objectives and targets; (ii) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including on contributing measures.
- **CONSULTATION**: Explain in greater detail how the stakeholder comments were addressed during the consultation process.

Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' offers key insights into Swedish perceptions of digital rights. Despite a 5-point decline from last year, 50% of Swedes still believe the EU effectively protects their digital rights, which is above the EU average of 45%. Concerns are growing, particularly with 74% expressing worry about children's online safety—a 21-point increase and the highest in the EU. Additionally, 59% are concerned about control over digital legacy, 19 points above the EU average. On a positive note, 80% trust in the freedom of assembly online, 21 points above the EU average, and 65% appreciate the level of digital skills in the country. 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[31].

A competitive, sovereign and resilient EU based on technological leadership

Sweden is active in deploying connectivity infrastructure. A substantial share of households already have access to VHCNs and 5G networks; however, the cost of connecting a household to FTTP is rapidly increasing and the most remote households will be the costliest to cover. 5G in the 3.4-3.8 GHz band, an essential band for enabling advanced applications requiring large spectrum bandwidth, covers 64.5% of Swedish households in 2023, above the EU average (50.6%).

Sweden has a business environment conducive to innovation with good access to finance, as evidenced by the high number of unicorn companies. Enterprises in Sweden have a high take-up of cloud technologies; however, the take up of AI and data analytics is slower . Sweden argued in the roadmap that the insufficient number of ICT specialists, in particular, restricts the take-up of AI. Sweden is developing a STEM-strategy. By increasing the number of engineers, Sweden can better meet the demand on skills.

Sweden continues to strengthen the National Cybersecurity Centre to further enhance cybersecurity. Sweden is also preparing national information and cybersecurity strategy to be presented in 2024. This will be complemented at a later stage by a national strategy on international cyber and digital issues.

Recommendations – Sweden should:

- **CONNECTIVITY INFRASTRUCTURE**: (i) Continue efforts to achieve full Gigabit coverage, starting with the implementation of the national broadband strategy which sets targets for 2025. Meeting the national targets will be a step towards meeting the Digital Decade targets by 2030; (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.
- **AI/CLOUD/DATA ANALYTICS:** (i) Maintain attention to encourage the use of AI and big data analytics by enterprises in Sweden; and (ii) Liaise with the Cloud IPCEI Exploitation office and/or the coordinators and the Member States participating in the IPCEI-CIS.

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[31] 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.

- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Protecting and empowering EU people and society

The level of digital skills of the population and the share of ICT specialists among the workforce ensure that Sweden will make a strong contribution to the EU targets. Sweden relies heavily on developing and using digital solutions which require a high level of digital skills. Sweden scores well above the EU average in both basic digital skills and ICT specialists; in the former area, however, there is a disparity between rural and non-rural areas regarding the former. Sweden is increasingly taking measures to meet the demand for basic digital skills as well as the demand from industry for more ICT specialists and increased digital skills in the general workforce.

Access for all to an e-ID is also essential in order to use digital solutions provided by both public services and enterprises. Sweden has started a number of actions that aim to ensure that everyone has access to an e-ID.

Recommendations – Sweden should:

- **BASIC DIGITAL SKILLS:** Continue efforts to ensure that the population can improve basic skills, in particular, in rural areas.
- **ICT SPECIALISTS:** (i) Finalise the discussions on a national strategy focussing on science, technology, engineering and mathematics (STEM); (ii) Take action to ensure that more ICT specialists are women.
- **e-ID:** Continue efforts to ensure that everyone has access to an e-ID.
- **e-HEALTH:** Increase efforts to ensure that everyone can access their health records online by 2030, in line with the requirements under the upcoming European Health Data Space regulation. In particular (i) make the data type of medical devices/implants, available to citizens in all regions through the online access services, (ii) Ensure that all data types are made available in a timely manner and (iii) implement technical functionality with the necessary legal basis for legal guardians and authorised persons to access electronic health data on behalf of others.

Leveraging digital transformation for a smart greening

Sweden underlines the potential of digitalisation to green the economy. Replacing old copper and weak mobile connectivity with broadband is important for the society as a well as for the green transition. Surveys show the importance Swedes attach to the use of digital tools to support greening. Sweden is carrying out several projects to better understand the impact of digitalisation on greening; however, it proposes relatively few concrete actions in this area

Recommendations – Sweden 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.