



Brussels, 2.7.2024  
COM(2024) 260 final

ANNEX 3 – PART 1/4

**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**

**Annex 3: Short EU 27 Member States reports**



# State of the Digital Decade 2024

---

**Austria**

## 1 Executive summary

**Austria brings a positive 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, Austria made notable progress** in the area of gigabit connectivity infrastructure (notably FTTP) and the adoption of cloud technologies. However, some **challenges** persist in high quality gigabit networks coverage and in the adoption of data analytics by enterprises. **The Digital Austria Act sets out the digital measures and principles of the governments' work programme.** This national strategy is well aligned with the Digital Decade targets (such as connectivity, skills, and e-government) and objectives (e.g., cybersecurity, competitiveness, innovation, climate action). The Austrian authorities recognise and actively engage with the transformative impact of digitalisation on economic growth and jobs. The self-assessment of strengths, weaknesses and challenges presented in the roadmap is consistent with the one carried out in the Digital Decade framework. Austria has a skilled population, competitive actors in semiconductors and quantum sectors and very good support system for start-ups. However, broadband connectivity remains underdeveloped and take up of digital technologies by enterprises could be improved. According to the **Special Eurobarometer 'Digital Decade 2024'**<sup>1</sup>, 71% of Austrian citizens consider that the digitalisation of daily public and private services is making their life easier, around the UE average (73%).

Regarding **European Digital Infrastructure Consortia** (EDICs), Austria is an observing country of the Alliance for Language Technologies European Digital Infrastructure Consortium and is finalising negotiations to become a member of the Local Digital Twins towards the CitiVERSE EDIC (ALT-EDIC, CitiVERSE EDIC, both already set up). Austria also participates in working groups aiming to set up EDICs in other areas, including Mobility and Logistics Data, Cybersecurity Skills Academy, Connected Public Administration, Digital Commons or AGRIfood<sup>2</sup>.

The Austrian **Recovery and Resilience plan allocates 36% to digital transformation (EUR 1.3 billion)**<sup>3</sup>, with priorities given to gigabit connectivity and digital skills. Under cohesion policy, an additional EUR 80 million (7% of the country's total cohesion policy funding) is allocated to the country's digital transformation<sup>4</sup>.

---

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

<sup>2</sup> Information last updated on 31 May 2024.

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

<sup>4</sup> 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 <sup>(1)</sup>	Austria			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	AT	EU
Fixed Very High Capacity Network (VHCN) coverage	54.8%	67.6%	23.3%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	36.6%	41.0%	11.9%	64.0%	13.5%	x	-
Overall 5G coverage	91.7%	96.0%	4.7%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		30		1 186		x	10 000
SMEs with at least a basic level of digital intensity	64.4%	57.9%	-5.2%	57.7%	2.6%	x	90%
Cloud	28.8%	35.6%	11.2%	38.9%	7.0%	x	75%
Artificial Intelligence	8.8%	10.8%	10.8%	8.0%	2.6%	x	75%
Data analytics	NA	23.9%	NA	33.2%	NA	x	75%
AI or Cloud or Data analytics	NA	47.0%	NA	54.6%	NA		75%
Unicorns		5		263		x	500
At least basic digital skills	63.3%	64.7%	1.1%	55.6%	1.5%	100%	80%
ICT specialists	5.0%	5.3%	6.0%	4.8%	4.3%	x	~10%
eID scheme notification		Yes					
Digital public services for citizens	78.4	80.7	2.9%	79.4	3.1%	x	100
Digital public services for businesses	82.9	82.9	0.0%	85.4	2.0%	x	100
Access to e-Health records	88.2	88.2	0.0%	79.1	10.6%	x	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

## National Digital Decade strategic roadmaps

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

**The roadmap is overall coherent and identifies relevant weaknesses but lacks formal national commitments.** The Austrian roadmap shows that the target for the KPI on access to a secure e-ID has been already achieved and includes 2030 national targets for 3 KPIs (VHCN, 5G, population with at least basic digital skills) but lacks formal national targets for the remaining 12 KPIs. The three 2030 national targets are aligned with the EU 2030 targets (VHCN and 5G) and 'at least basic digital skills' is more ambitious (100% instead of 80%). Trajectories with annual projections until 2030 are missing for **all targets except VHCN and 5G**. The roadmap covers several objectives of the Digital Decade such as resilience, security, and sovereignty. Other dimensions like the green transition could be further explored.

The total budget of the 60 measures proposed is **estimated to EUR 3.4 bn** (about 0.7% GDP) with priorities set on gigabit connectivity and support to start-ups and unicorns. According with the Austria's roadmap there are currently six unicorns in the country, just one more than the value recorded by [dealroom](#), used as data source in this report. Some aspects require more effort, especially for the digitalisation of enterprises (adoption of advanced technologies).

### Recommendations for the roadmap

In this context, Austria should, when submitting adjustments to its roadmap in accordance with Article 8(3) of the DDPP Decision:

- **TARGETS:** (i) Set explicit national targets for 2030 that will contribute to achieve the EU 2030 targets for ICT specialists, FTTP, edge nodes, SMEs with at least a basic level of digital intensity, take-up of data analytics, cloud, and artificial intelligence, unicorns, digital public services for citizens and businesses, and access to e-Health records; (ii) Define the related trajectories with annual projections until 2030 for all targets (except VHCN and 5G).
- **MEASURES:** (i) Add more details on budget and sources of funding for those measures lacking it; (ii) Add measures on edge nodes and take-up of Data Analytics; (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 **Special Eurobarometer 'Digital Decade 2024'** reveals key insights into Austrian perceptions of digital rights. With an 8-point increase, 55% of Austrians believe the EU protects their digital rights, above the EU average of 45%. Confidence in all relevant areas such as freedom of assembly online (65%), digital public services (65%) and privacy friendly technologies (67%), is higher than the EU average. Significant concerns include control over personal data (38%) and the online safety for children (47%). 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<sup>5</sup>.

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

**Austria could improve its technological leadership and competitiveness by bridging the gap in connectivity and take-up of technologies by enterprises.** The coverage of very high capacity networks (67.6%, EU average: 78.8%) and FTTP (41.0%; EU average: 64.0%) remains the major weakness of the Austrian digital infrastructure but the situation is improving due the implementation of the Broadband Austria 2030 initiative. 5G coverage is very good (96.0%) but take-up lags behind. For both fixed and mobile connectivity, particular attention is to be given to rural areas. The digitalisation of enterprises shows a mixed picture. There are flagship actors in the semiconductors and quantum sectors; public support to start-up is high and the take up of AI by enterprise is good. On the other side, the digitalisation of all SMEs remains average and the take up of data analytics and cloud technologies could be improved. The challenge for Austria is to preserve its frontrunner enterprises while ensuring that digitalisation percolates to all actors of the economy. The Digital Action Plan foresees general directions to ensure digital sovereignty, including data sovereignty. The Austrian Cybersecurity Strategy provides a strategic framework in the domain and will foster the implementation of the NIS2 Directive.

### Recommendations – Austria should:

- **CONNECTIVITY INFRASTRUCTURE:** (i) Take appropriate actions to maintain the current sustained FTTP rollout pace and carefully monitor the metrics including rural coverage in order to reach full coverage 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.

<sup>5</sup> 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.
- **EDGE NODES:** Propose dedicated measures to support the deployment of edge nodes.
- **SMEs:** Provide a clear strategy targeted at SMEs, proposing more ambitious dedicated support schemes to impulse new dynamics in their digitalisation.
- **AI/CLOUD/DATA ANALYTICS:** (i) Design specific measures to increase the take-up of advanced technologies by enterprises, especially for data analytics techniques and cloud; (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.

### Protecting and empowering EU people and society

**Austria can rely on a digitally skilled population but still experiences skills shortages on the job market.** The level of digital skills of the population (64.7%) is significantly above the EU average (55.6%). Under the Digital Decade, Austria’s ambition stands out as the country aims by 2030 to reach 100% of its population aged 16-74 having at least basic digital skills. Achieving this target will require a sustained progression pace with appropriate support measures. There are 237 000 ICT specialists in Austria (5.3% of employment, above the EU average). Still, Austria experiences challenges related to skills shortages, as also highlighted in the recent European Semester country reports. While measures on improving the digital skills of the population seem effective (mainly at the level of formal education), the use of this advantage to feed the labour market is still to be unlocked.

**The state of digitalisation of public services is average and might require acceleration.** The roadmap provides for prospective actions to improve its performance in digitalising the public services in the future. Austria has an overall e-Health maturity score of 88.2 in 2023 and remains stable compared to last year’s data and still above the EU average. All citizens have access to a secure digital identity (e-ID), but its use should be fostered. Austria is anticipating the implementation of the future European Digital Identity Wallet (EUDI Wallet).

#### Recommendations – Austria should:

- **BASIC DIGITAL SKILLS:** Explore measures to boost the digital skills of the population that is far from digitalisation (such as low-skilled jobseekers) in order to achieve the very ambitious national target.
- **ICT SPECIALISTS:** Based on the conclusion of the study on professionals in the Digital Skills Offensive, design new targeted measures to increase drastically the number of ICT specialists, including by upskilling/reskilling the labour force and bridging the gender gap.
- **e-ID/KEY DIGITAL PUBLIC SERVICES:** Promote the use of e-ID and digital public services by the citizens. Make use of the conclusions of the ‘Study on appropriate channels for digitalisation with maximum benefits’ to further digitalise public services in an efficient manner.
- **e-HEALTH:** (i) Make all data types available to citizens through the online access service; (ii) Offer a mobile application for citizens to access their electronic health records; (iii) Increase the supply of health data by onboarding more categories of healthcare providers.

### Leveraging digital transformation for a smart greening

**In Austria, the awareness of coupling the digital and green transitions is growing but should be backed up by actions in the roadmap.** Several measures dedicated to Digital Decade targets contain a green dimension

and the 'tech for green' area was identified as a priority for future digital challenges. However, the roadmap lacks dedicated measures on the decarbonation of the ICT sector, including monitoring frameworks.

**Recommendations – Austria 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

---

**Belgium**

## 1 Executive summary

**Belgium brings a positive 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, Belgium made notable progress** in terms of the adoption of artificial intelligence by its enterprises and stands out as a frontrunner in providing digital public services. However, **important challenges** persist in the area of basic and advanced digital skills.

As one of [Europe's 'innovation leaders'](#), Belgium can count on a combination of high-performing research institutions (such as Imec, which is known for its world-class R&D in semiconductors), and a dynamic **R&D ecosystem** to support the development and uptake of technologies and innovations by enterprises. Belgium's performance on both **digital skills and on connectivity infrastructures shows there is a need to increase efforts** substantially to achieve the EU's 2030 targets and objectives.

**According to the Special Eurobarometer survey on the 'Digital Decade 2024'**<sup>6</sup>, 77% of Belgium's population consider that the digitalisation of daily public and private services is making their lives easier (just above the EU average of 73%).

Concurrently, **Belgium is strongly engaged in several European Digital Infrastructure Consortia (EDICs)**. For the already established EDICs, Belgium is the hosting Member State of the **EUROPEUM / Blockchain EDIC** and member of the Networked Local Digital Twins towards the CitiVERSE (**LDT CitiVERSE EDIC**), which seeks to connect local digital twins across Europe. It participates as an observer in the Alliance for Language Technologies (**ALT-EDIC**) addressing the scarcity of European language data available for Artificial Intelligence (AI) solutions. To May 2024, Belgium is also involved in discussions on the preparations of the EDICs on Genome, Digital Commons, and Agri-Food. The country has also expressed interest in participating to the discussions about the setting up of the EDIC for Mobility and Logistics Data<sup>7</sup>.

Belgium allocates 27% of its total **Recovery and Resilience Plan** to digital objectives (EUR 1.25 billion)<sup>8</sup>. Under Cohesion Policy, an additional EUR 0.3 billion (13% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation<sup>9</sup>.

---

<sup>6</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>7</sup> Information last updated on 31 May 2024.

<sup>8</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>9</sup> 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 <sup>(1)</sup>	Belgium			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	BE	EU
Fixed Very High Capacity Network (VHCN) coverage	78.3%	96.0%	22.6%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	17.2%	25.0%	45.7%	64.0%	13.5%	x	-
Overall 5G coverage	29.6%	40.4%	36.2%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		8		1 186		x	10 000
SMEs with at least a basic level of digital intensity	65.3%	74.5%	6.8%	57.7%	2.6%	90%	90%
Cloud	46.9%	47.7%	0.8%	38.9%	7.0%	75%	75%
Artificial Intelligence	10.3%	13.8%	15.7%	8.0%	2.6%	75%	75%
Data analytics	NA	44.5%	NA	33.2%	NA	75%	75%
AI or Cloud or Data analytics	NA	64.2%	NA	54.6%	NA		75%
Unicorns		7		263		14	500
At least basic digital skills	54.2%	59.4%	4.6%	55.6%	1.5%	80%	80%
ICT specialists	5.6%	5.4%	-3.6%	4.8%	4.3%	10%	~10%
eID scheme notification		Yes					
Digital public services for citizens	81.5	82.3	1.1%	79.4	3.1%	100	100
Digital public services for businesses	87.6	91.6	4.6%	85.4	2.0%	100	100
Access to e-Health records	85.1	100	17.6%	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 **Belgium’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 **some effort** to achieve the Digital Decade objectives and targets.

**Belgium’s roadmap is coherent overall with the efforts needed across all the dimensions of digitalisation.** Belgium has integrated the regional dimension of the DDPP, in particular with a dedicated roadmap for Flanders. Belgium has seized the opportunity of its EU Presidency to foster references to the Digital Decade and the Declaration in Council work, as well as to explore **closer cooperation with its regions**. **The total budget for the 161 measures presented in the country’s roadmap is estimated to be EUR 892 million (about 0.2% of GDP).** The Belgian roadmap is a **comprehensive exercise, with most measures ongoing or adopted in 2023 and 2024**, and Belgium has prioritised **the digitalisation of key public services and the promotion of basic and advanced digital skills**. The roadmap includes **national target values** for almost all DDPP targets (except FTTP and edge nodes), all matching the level of ambitions in the EU targets. **Recommendations from the State of the Digital Decade 2023 report were taken on board**, especially on coordination and synergies between private and public actors. Nevertheless, as acknowledged in the roadmap, **several of the measures adopted in response to these recommendations have yet to be further advanced** into solid actions.

## Recommendations for the roadmap

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

- **TARGETS:** Propose a target and trajectory for **FTTP and edge nodes**.
- **MEASURES:** (i) Review and update the **budget description** of all presented measures, highlighting EU sources e.g., RRF; (ii) Include more measures and policies that contribute to the **twin transition**; (iii) Provide **more information on the implementation of digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it.
- **CONSULTATION:** Report with **more detail the results of the consultation process** and include more information about the stakeholders invited.

## Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' highlights key insights into Belgian perceptions of digital rights. With 51% of Belgians believing the EU protects their digital rights, this figure has decreased by 5 percentage points, while remaining above the EU average. Concerns are growing, with 48% worried about children's online safety and 42% about control over personal data. On a positive note, 66% trust in privacy online, and 70% value the freedom of association online, both well 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<sup>10</sup>.

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

Despite progress in its gigabit and 5G networks' coverage, **Belgium remains far below the EU's average for FTTP and 5G coverage**. Nevertheless, Belgium is in leading position and way above the EU average as far as VHCN (gigabit) coverage is concerned. **5G in the 3.4-3.8 GHz band**, an essential band for enabling advanced applications requiring large spectrum bandwidth, covered 14.2% of Belgian households in 2023, far below EU average (50.6%). 5G coverage is however increasing substantially. In January 2024, 87% of the Belgian households could already benefit from 5G. Take-up of high-speed broadband is low, with the share of fixed broadband subscriptions reported at 5.4% for speeds greater than 1 Gbps (compared to the EU average of 18.5%), despite Belgium being above the EU average (72.25% versus 65.9%) for subscriptions to services that provide speeds greater than 100 Mbps.

On the **cybersecurity** front, many initiatives are in place to raise the country's capabilities and preparedness, especially through awareness raising and educational efforts by Belgium's National Cybersecurity Centre. **Belgium's SMEs are making good progress on digitalisation**, with a strong uptake of cloud and data analytics, and very strong progress (above the EU average) in AI. The country is dedicated to and has strong capabilities in R&D such as in **semiconductors**. It is also engaged in partnerships in areas like **quantum computing**. This shows Belgium is well-aligned with the Digital Decade's governance mindset: i.e., collaboration across the EU and joint efforts.

<sup>10</sup> 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.

#### Recommendations – Belgium should:

- **CONNECTIVITY INFRASTRUCTURE:** (i) Accelerate efforts to ensure full FTTP and 5G coverage, addressing the remaining issues such as limited speed and service 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.
- **CYBERSECURITY:** (i) Continue support its national Centre for Cybersecurity's (CCB) activities, including to raise awareness among enterprises for their internal strategies; (ii) Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.
- **CLOUD:** Support 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 liaising with the direct participants to develop a country-specific dissemination strategy reaching beyond the participating organisations.

#### Protecting and empowering EU people and society

Belgium's regions and its national level, the federal government, have all made it a priority to tackle the digital divide and promote an inclusive, green digital transformation, including through RRF projects. Belgium is a frontrunner in providing key digital public services and solutions to citizens and enterprises. A large share of measures and programmes listed in Belgium's roadmap are focused on enhancing the digitalisation of key public services, which reflects the country's determination to make progress on these targets. Belgium's performance on e-government is particularly solid. In 2023 Belgium was the first Member State to score 100 on the e-Health indicator, well above the EU-27 average of 79. Measures to promote the digitalisation of key public services are balanced, with a significant focus on skills. Continuing efforts to reach its 2030 goals will bear fruit, but more work is needed to increase the basic digital skills of Belgians and to address the country's persisting labour shortages in ICT positions.

#### Recommendations – Belgium should:

- **BASIC DIGITAL SKILLS:** (i) Integrate the learning of digital skills into all levels of education and training, notably on AI, cybersecurity, and ethics of technology; (ii) Accelerate efforts to strengthen adults' participation in up- and reskilling training and elevate lifelong learning initiatives.
- **ICT SPECIALISTS:** (i) Pursue academic and industrial partnerships, lowering barriers to attract and employ digital talent; (ii) Seek to increase the number of female ICT graduates.
- **E-HEALTH:** To improve the quality of service, Belgium could consider going beyond the requirements of the eHealth methodology and monitor the supply of a diverse set of health data by all categories of healthcare providers, as well as establish a feedback system for citizens enabling them to report any limitations in access to their data.

#### Leveraging digital transformation for a smart greening

Belgium's federal government, regional governments, and enterprises prioritise environmental impacts when adopting ICT strategies and solutions, reflecting a proactive stance toward smart greening. However, Belgium's performance in environmental innovation and in addressing sustainability objectives could be improved. Its telecom sector, already, remains committed to further reducing emissions and increasing

energy efficiency. The national regulatory authority (BIPT) **monitors and encourages environmental efforts** among operators, contributing to the industry's overall sustainability.

#### Recommendations – Belgium 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

---

**Bulgaria**

## 1 Executive summary

**Bulgaria has scope to improve its performance to contribute** 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, Bulgaria has made notable progress** in the delivery of online services to businesses, and in its contribution to the development of strategic technologies such as chips and quantum computing. Particularly important **challenges** persist in terms of basic and advanced digital skills, the adoption of technologies by its enterprises, and closing urban-rural divides.

**Although Bulgaria continues to perform well on fixed gigabit connectivity, its 5G coverage** remains below the EU average. The **uneven distribution of digital infrastructure in sparsely populated, remote and rural areas** also requires further attention. Bulgaria should promote favourable conditions for the successful digitalisation of its SMEs to **foster technology transfer and accelerate the uptake** of technologies, in particular Artificial Intelligence (AI). The **uptake of digital public services by citizens is still low** and targeted measures are needed to address this. Leveraging its strong performance in connectivity, Bulgaria can accelerate access to digital services for all.

**According to the Special Eurobarometer survey on the 'Digital Decade 2024'**<sup>11</sup>, 73% of the Bulgarian population considers that the digitalisation of daily public and private services is making their lives easier (on a par with the EU average of 73%).

Regarding participation in **European Digital Infrastructure Consortia** (EDICs), Bulgaria is a member of the established Alliance for Language Technologies European Digital Infrastructure Consortium (**ALT-EDIC**), which aims to address the scarcity of European language data available for AI solutions. To May 2024 and with other Member States, Bulgaria is developing the Statute of the Genome EDIC and the Statute of the Mobility and Logistics Data EDIC within their respective informal Working Groups<sup>12</sup>.

**Bulgaria's Recovery and Resilience Plan (RRP)** dedicates 23.1% of its funding to the digital transformation (EUR 1.3 billion)<sup>13</sup>. Under Cohesion Policy, an additional EUR 1.3 billion (13% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation<sup>14</sup>.

---

<sup>11</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>12</sup> Information last updated on 31 May 2024.

<sup>13</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>14</sup> 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 <sup>(1)</sup>	Bulgaria			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	BG	EU
Fixed Very High Capacity Network (VHCN) coverage	85.6%	88.6%	3.5%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	85.6%	88.6%	3.5%	64.0%	13.5%	100%	-
Overall 5G coverage	67.2%	70.9%	5.4%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		5		1 186		x	10 000
SMEs with at least a basic level of digital intensity	25.2%	28.4%	6.2%	57.7%	2.6%	60%	90%
Cloud	9.9%	14.2%	19.8%	38.9%	7.0%	15%	75%
Artificial Intelligence	3.3%	3.6%	4.4%	8.0%	2.6%	11%	75%
Data analytics	NA	21.9%	NA	33.2%	NA	9%	75%
AI or Cloud or Data analytics	NA	29.3%	NA	54.6%	NA	35%	75%
Unicorns		0		263		x	500
At least basic digital skills	31.2%	35.5%	6.7%	55.6%	1.5%	52%	80%
ICT specialists	3.8%	4.3%	13.2%	4.8%	4.3%	5%	~10%
eID scheme notification		Yes					
Digital public services for citizens	59.5	67.5	13.4%	79.4	3.1%	100	100
Digital public services for businesses	80.8	91.9	13.8%	85.4	2.0%	100	100
Access to e-Health records	77.2	77.2	0.0%	79.1	10.6%	100	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

## National Digital Decade strategic roadmap

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

**Bulgaria's roadmap partly reflects the efforts needed in all the dimensions of digitalisation.** The roadmap presents a realistic, comprehensive assessment of the country's state of play and capacity to achieve the Digital Decade targets, aligning its efforts with the recommendations of the 2023 State of the Digital Decade report. **The total budget for the 60 measures presented is estimated to be EUR 2.19 billion (about 2.3% of GDP).** Around three fourths of the roadmap's measures presented are new and are especially focused on **basic digital skills, the digitalisation of businesses, and of key public services**, which reflect Bulgaria's main areas for improvement. There are **fewer measures on targets and objectives related to connectivity**, although the country is a frontrunner in gigabit connectivity. The roadmap **includes targets and trajectories for all KPIs except for unicorns.** Most targets that Bulgaria has set for 2030 are below the **EU's target levels of ambition, with the exception of digital public services and 5G coverage.** Some aspects require more effort, especially targets for basic and advanced digital skills as well as for the digitalisation of enterprises. Bulgaria only refers once to the Declaration on Digital Rights and Principles in its roadmap. **Limited information is provided on the green transition and Bulgaria could strengthen its narrative** on objectives, in particular in the areas of cybersecurity, resilience and sovereignty, and digital inclusion.

## Recommendations for the roadmap

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

- **TARGETS:** (i) Provide national targets for the following KPIs: unicorns, edge nodes and e-ID; (ii) Present national projected trajectory for unicorns; (iii) Align the level of ambition of the national targets for basic digital skills, ICT specialists, digitalisation of SMEs, take up of advanced technologies (cloud, AI, data analytics) by enterprises.
- **MEASURES:** (i) Clarify the budget description of all presented measures, highlighting EU sources such as the RRF; (ii) Indicate clearly whether the measures are investments or reforms; (iii) Include more targeted, specific measures and policies that contribute to synergising the digital transformation and the green transition; (iv) Provide **more information on the implementation of digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it;
- **CONSULTATION:** Report with more detail the results of the consultation process and include more information about the stakeholders invited.

## Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' highlights key insights into Bulgarian perceptions of digital rights. While 40% of Bulgarians believe the EU protects their digital rights, their confidence remains below the EU average of 45%. Concerns have grown, with 52% worried about children's online safety, a 12-point increase, and 36% concerned about their online privacy, up 7 points. On a positive note, 63% trust in affordable high-speed internet and the advancement of their digital skills. 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<sup>15</sup>.

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

**In the area of digital infrastructure and connectivity, Bulgaria is one of the frontrunners in the EU.** It is important for Bulgaria to **address inadequate digital infrastructure coverage in sparsely populated**, remote and rural areas, as this is a persistent challenge for 5G wireless and gigabit connectivity, in particular with public funding, especially in the rural, remote and scarcely populated areas where operators have no commercial drivers in investing in the deployment of VHCN. 5G in the 3.4-3.8 GHz band, an essential band for enabling advanced applications requiring large spectrum bandwidth, covered 45.1% of Bulgarian households in 2023, slightly below the EU average (50.6%). Take-up of high-speed broadband is poor with the share of fixed broadband subscriptions reported at 53.4% for speeds of more than 100 Mbps (below the EU average) and 1% for speeds of more than 1 Gbps. The high prices of gigabit services are an issue, given the low purchasing power of the average user. **Cybersecurity** is an area in which Bulgaria has made regulatory progress, but the country continues to grapple with high cybersecurity risks. According to its roadmap, Bulgaria's digital ecosystem benefits from **established ICT clusters and technology parks, along with access to a skilled workforce and scientific talent**. Despite positive dynamics on SMEs' take-up of cloud and their overall digital intensity, and involvement in AI (such as with the ALT-EDIC, centres of excellence and the creation of BgGPT), the **uptake of digital technologies in the country remains significantly below the EU**

<sup>15</sup> 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.

**average.** Areas of the Digital Decade to which the country is expected to contribute significantly include **semiconductors and quantum computing.**

**Recommendations – Bulgaria should:**

- **COMPETITIVENESS/RESILIENCE:** (i) Stimulate demand in view of reaching full FTTP coverage; (ii) Accelerate efforts to increase 5G coverage; (iii) 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 / TAKE UP OF AI/CLOUD/DATA ANALYTICS:** (i) Accelerate its efforts with more measures aiming to increase SMEs' uptake of technologies, including measures to stimulate investments in technology transfers, such as through more lab-to-market measures, and support to its innovative start-ups; (ii) **Leverage activities as part of the ALT-EDIC and build on its capabilities such as BgGPT** to design new measures aiming at developing the AI ecosystem and fostering AI adoption; (iii) 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:** (i) **Establish a national cybersecurity infrastructure** to increase the efficiency of cybersecurity measures and integrate cybersecurity into all digitalisation programmes and projects; (ii) Continue the implementation of the **5G Cybersecurity Toolbox** to ensure secure and resilient 5G networks;

**Protecting and empowering EU people and society**

**There have been rapid, positive developments in the field of digital democracy and e-Government** over the past 2 years in Bulgaria. **The national scheme for electronic identification is still under construction**, but **regulatory adjustments** introduced in 2023 are considerably improving the situation. **Bulgaria had an overall e-Health maturity score of 77.2 in 2023**, close to the EU average of 79.1. **Despite a positive dynamic, the take-up of online public services by citizens remains below the EU average**, with too few public services provided fully online. Bulgaria has put in place a significant number of measures for training programmes in line with recommendations to upskill and reskill the workforce and address adult learning needs. Nevertheless, **some aspects require more effort**, in particular to improve basic and advanced digital skills, enhance digital inclusion especially for **vulnerable, ageing, or remotely located populations**. There is **room for progress in both raising the population's awareness of its rights and addressing the lack of trust online.**

**Recommendations – Bulgaria should:**

- **BASIC DIGITAL SKILLS / DIGITAL EDUCATION:** (i) Take additional support measures to compensate for the deficit of basic to advanced digital skills, reviewing the approach on talent retention and providing attractive conditions; (ii) Ensure the implementation of measures that can enhance digital inclusion of vulnerable populations, raise awareness of people about their rights through guidance, and stimulate digital competence/culture from early childhood and throughout working life.

- **ICT SPECIALISTS:** Develop measures including through EU programmes to support companies to hire experts in the least populated areas where technology uptake and the skills gap are pressing issues.
- **KEY PUBLIC SERVICES:** (i) **e-ID: Further develop and improve the architecture of e-Government, beyond digitisation,** to enhance public procedures' user-friendliness while minimising administrative burden, such as by considering implementing the Once Only Principle; (ii) Continue collaborations with local public or private actors, to address the pronounced regional imbalances which hinder the access to, use and awareness of digital services, in particular regarding the delivery of online services for citizens.
- **E-HEALTH:** (i) Expand the coverage of the online access service to ensure that all citizens can access their electronic health data online; (ii) make the data type of medical images available to citizens through the online access service; (iii) ensure that all data types are made available in a timely manner.

### Leveraging digital transformation for a smart greening

**Bulgaria has adopted several sustainable ICT practices for its digital transformation.** In 2023, several measures promoted the green transition. Some of these measures are ongoing, while others are pending launch or evaluation, and they include measures that focus on the circular economy. Of note, the country aims to become a **world-leading hydrogen valley** – which contributes to priorities of the EU's hydrogen strategy and REPowerEU plan and objectives to achieve climate neutrality. Bulgaria is home to 4 **European Digital Innovation Hubs (EDIHs) with co-funding from Digital Europe Programme and 8 Seals of Excellence,** which play a role in promoting the green and digital development of Bulgarian enterprises. However, there is no comprehensive framework that would make it possible to monitor the impact of digital on the twin transition.

#### Recommendations – Bulgaria 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

---

**Croatia**

## 1 Executive summary

**Croatia brings a positive 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, Croatia made notable progress** in increasing the number of ICT specialists, in the digitalisation of its SMEs, and in the rollout of gigabit connectivity (FTTP networks). However, particularly **important challenges** persist in the digitalisation of government services and in the adoption of AI and data analytics, as well as in increasing connectivity in rural areas.

Croatia's [National Digital Strategy for the period until 2032](#) (DCS 2032) provides the strategic framework for action in line with the Digital Decade. It establishes a set of clear goals for a digital Croatia over the next years, defining the priorities of public policies' implementation in all areas of the digital transformation.

According to the **Special Eurobarometer 'Digital Decade 2024'**<sup>16</sup>, 83% of the population consider that the digitalisation of daily public and private services is making their lives easier, proportion which is significantly higher than the EU average of 73%.

Regarding participation in **European Digital Infrastructure Consortia** (EDICs), Croatia has joined several EDICs including the Language Technologies **ALT-EDIC**, the **Agri-food EDIC**, the Blockchain **EUROPEUM-EDIC** (both already set up) and is participating in the working groups aiming to set up EDICs in other areas, including: Cancer Images **EUCAIM EDIC**, the **Genome EDIC**, the Connected Public Administration **IMPACTS EDIC**; and the **Cybersecurity Skills Academy EDIC**<sup>17</sup>.

Croatia allocates 20% of its total Recovery and Resilience plan to digital (EUR 1.4 billion)<sup>18</sup>. Under cohesion policy, an additional EUR 0.8 billion (9% of the country's total cohesion policy funding) is allocated to the country's digital transformation<sup>19</sup>. The largest investment is dedicated to digital public services for citizens and enterprises (EUR 303 million) and eHealth (EUR 66 million), followed by VHCN gigabit connectivity (EUR 207.5 million) and digital skills (EUR 134.4 million).

---

<sup>16</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>17</sup> Information last updated on 31 May 2024.

<sup>18</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>19</sup> 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 <sup>(1)</sup>	Croatia			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	HR	EU
Fixed Very High Capacity Network (VHCN) coverage	61.5%	67.8%	10.3%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	54.0%	62.1%	15.1%	64.0%	13.5%	100%	-
Overall 5G coverage	82.5%	83.4%	1.1%	89.3%	9.8%	95%	100%
Semiconductors		NA					
Edge Nodes		3		1 186		x	10 000
SMEs with at least a basic level of digital intensity	49.7%	56.0%	6.1%	57.7%	2.6%	90%	90%
Cloud	34.6%	40.7%	8.5%	38.9%	7.0%	75%	75%
Artificial Intelligence	8.7%	7.9%	-4.7% <sup>(2)</sup>	8.0%	2.6%	20%	75%
Data analytics	NA	51.7%	NA	33.2%	NA	30%	75%
AI or Cloud or Data analytics	NA	65.6%	NA	54.6%	NA		75%
Unicorns		2		263		4	500
At least basic digital skills	63.4%	59.0%	-3.6%	55.6%	1.5%	80%	80%
ICT specialists	3.7%	4.3%	16.2%	4.8%	4.3%	7%	~10%
eID scheme notification		Yes					
Digital public services for citizens	71.1	67.2	-5.6%	79.4	3.1%	100	100
Digital public services for businesses	66.8	66.2	-0.9%	85.4	2.0%	100	100
Access to e-Health records	85.6	85.6	0.0%	79.1	10.6%	100	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

<sup>(2)</sup> The variation between the two years is not considered statistically significant but in line with the stagnation of this indicator.

## National Digital Decade strategic roadmap

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

In March 2024, Croatia adopted its national strategic roadmap, in accordance with Article 7 of the DDPP Decision, following a consultation with a series of workshops with stakeholders and then [published it in Croatia's official journal](#). The Croatian roadmap includes national targets and trajectories for all Digital Decade targets, except semiconductors. All national target values provided are aligned with the 2030 EU targets, except for the ones on the adoption of AI, big data, ICT specialists and 5G, which are lower and justified by the Croatian authorities in view of the national context, starting point and planned measures. Measures in the roadmap are supporting all the Digital Decade targets, although measures on connectivity and digitalisation of business are very likely to fall short of the 2030 target.

### Recommendations for the Roadmap:

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

- **TARGETS:** (i) Raise the level of ambition for the targets on for the ICT specialists, AI / data analytics adoption, and 5G.

- **MEASURES:** (i) Include more measures supporting connectivity, digital skills, for cloud, AI, and data analytics, and in the digitalisation of public services. (ii) Provide a better overview of measures supporting the wider objectives of the programme. (iii) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including what national measures contribute to it.
- **CONSULTATION:** Ensure a wider and more thorough consultation process with relevant stakeholders.

## Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' provides key insights into Croatian perceptions of digital rights. While 56% of Croatians believe the EU protects their digital rights effectively, this figure is above the EU average of 45%. Concerns have increased, with 44% worried about children's online safety and 40% about control over personal data, reflecting a growing awareness of digital risks. On a positive note, 69% trust in the freedom of expression online as well as in online privacy, 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<sup>20</sup>.

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

In 2023 Croatia brought a positive but limited contribution to the EU's Digital Decade targets for digital infrastructures, particularly evident in terms of Fixed Very High-Capacity Network (VHCN) coverage, which has shown an increase of about 6 percentage points compared to the previous year: 61% in 2022 and 67.8% in 2023. There is still untapped potential with respect to the coverage of rural areas, with 25.5% of rural areas covered compared to an EU average of 55.6%. In terms of Fibre to the Premises (FTTP) coverage, Croatia improved from 54% in 2022 to 62.1% in 2023, but Croatia risks missing the FTTP target for 2030. 5G in the 3.4-3.8 GHz band, an essential band for enabling advanced applications requiring large spectrum bandwidth, covers 40% of Croatian households in 2023, below the EU average (50.6%). In 2023 Croatia started an initiative aimed at the establishment of the Croatian Competence Centre for Semiconductors (CROCCS) as a contribution to the EU's semiconductors target.

The digitalisation of SMEs in Croatia reveals a mixed dynamic, with several indicators close to the EU average (for example e-Commerce where with 11.3% is it close to the EU average of 11.9%) and others where the country performs much better than the EU average (29.5% versus an EU average of 19.1%). Croatia is also among the EU forerunners concerning the use of data analytic by enterprises (51.7 % versus an EU average of 33.20%). Croatia's contribution in the field of unicorns is limited to 2, among the 263 unicorns in the entire EU. Some of the reasons include the low R&D investment (an annual R&D in the ICT sector of only 0.2% of GDP) and the suboptimal access to finance. Croatia is putting in place a number of measures to facilitate access to finance in order to increase the number of unicorns.

<sup>20</sup> 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.



#### Recommendations – Croatia should:

- **CONNECTIVITY:** (a) Continue and expand the measures aimed at supporting FTTP rollout, aiming to fully close the rural urban divide, including by supporting the demand of gigabit services; (ii) Ensure sufficient access of new players to spectrum for innovative B2B and B2C applications and encourage operators to speed up the deployment of 5G stand-alone core networks.
- **QUANTUM & EDGE NODES:** Increase efforts in the areas of quantum computing and edge nodes, in view of their importance for competitiveness, resilience, sovereignty, European values and climate action.
- **CLOUD:** Support 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 liaising with the direct participants to develop a country-specific dissemination strategy reaching beyond the participating organisations.
- **TAKE UP OF AI/CLOUD/DATA ANALYTICS & UNICORNS:** Increase the level of effort to support the unicorns target, including by increasing the level of R&D in the ICT sector, by improving access to finance and by supporting the development and deployment of trustworthy, secure, sovereign advanced technologies and solutions.
- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

#### Protecting and empowering EU people and society

Croatia is well placed in terms of basic digital skills, with 59% of the population having at least basic digital skills compared with an EU average of 55.6%. There is also a good overall gender balance in the distribution of digital skills. The percentage of the Croatian population with digital content creation skills (81.5%) is well above the EU average of 68.3%. The percentage of ICT specialists in employment in Croatia of 4.3% is below the EU average of 4.8%. Croatia's RRP investment of EUR 176.5 million on "Digital products and platforms" aims at further increasing the percentage of ICT experts in the workforce.

Croatia has scope to improve its performance in the field of digital public services with scores of 67.2 for digital services available to citizens (versus an EU average of 79.4) and 66.2 for digital services for business (versus an EU average of 85.4). Nevertheless, Croatia scores significantly above the EU average for e-Government users, reflecting the good level of digital skills of its population and underlining the relevance of improving the delivery of the services. Croatia is making a positive contribution to the eHealth target.

Croatia is also making a positive contribution in the field of human centred digitalisation, implementing new regulatory solutions that ensure the safe and ethical implementation of digital technologies.

#### Recommendations – Croatia should:

- **DIGITAL SKILLS:** Continue the efforts on digital basic skills and ICT specialists in view of ensuring sufficient progress towards the 2030 targets.
- **KEY DIGITAL PUBLIC SERVICES:** Take measures to increase the digitalisation of public services and improve the accessibility and user friendliness of its services to citizens and enterprises.
- **e-HEALTH:** (i) Introduce a legal basis and provide the technical functionality for authorised persons to access electronic health data on behalf of others; (ii) Make the data type of medical images available to citizens through the online access service; (iii) Offer a mobile application for citizens to access their electronic health records.

### Leveraging digital transformation for a smart greening

Croatia has taken extensive measures to renew and digitalise its energy system, with Eurostat reporting the country as one of the best-performing Member States in the decarbonization of the energy and transport sectors. Nevertheless, the country's contribution towards the Digital Decade objectives remains limited in the areas of more sustainable energy and more resource efficient digital infrastructure and technologies. This indicates that Croatia has untapped potential to contribute to the EU's digital objective of twinning the green and digital transitions.

#### Recommendations – Croatia 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

---

**Cyprus**

## 1 Executive summary

**Cyprus 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, Cyprus made notable progress** in gigabit connectivity infrastructure (notably FTTP), and in the share of ICT specialists in employment. However, **important challenges** persist in at least basic digital skills and e-health.

**Cyprus has made significant progress over the last few years.** The country's National Digital Strategy 2020-2025 aims to make Cyprus 'a fit-for-the-future society and knowledge-based economy'. Implementation of the strategy is showing positive results, in particular the deployment of the gigabit connectivity infrastructure reaching 77.1% coverage in 2023. Although Cyprus made progress in almost all indicators compared to 2022, half the population still lacks at least a basic level of digital skills. But the results for ICT specialists in employment with 5.4% shows a very strong dynamic, exceeding the expectations. Building a solid, secure, integrated, and modern digital government architecture is at the core of Cyprus's digital transition to provide safe and inclusive digital services for people and businesses.

**According to the Special Eurobarometer 'Digital Decade 2024'**<sup>21</sup>, 79% of respondents in Cyprus consider that the digitalisation of daily public and private services is making their lives easier, considerably above the EU average of 73%. However, only 56 % of respondents are aware that rights that apply offline should also be respected online, below the EU average (62%).

**Cyprus is actively collaborating at EU level**, being member of the European Digital Infrastructure Consortium (EDIC) on Blockchain, EUROPEUM-EDIC (already set up). It is also developing the Statute and other relevant documents of the possible future Cybersecurity Skills Academy EDIC, within an informal working group. In addition, the country is participating in Multi-Country Projects (MCPs) such as EuroHPC and the European consortium POTENTIAL (Pilots for European digital Identity Wallet).

**Cyprus's Recovery and Resilience plan (RRP) allocates 24.6% of its total budget to the digital transformation** (EUR 274 million). A high priority is given to digitalising public services and upgrading connectivity infrastructure in line with the European Semester country-specific recommendations<sup>22</sup>. Under Cohesion Policy, an additional EUR 0.1 billion (12% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation<sup>23</sup>.

---

<sup>21</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>22</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>23</sup> 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 <sup>(1)</sup>	Cyprus			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	CY	EU
Fixed Very High Capacity Network (VHCN) coverage	60.0%	77.1%	28.5%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	60.0%	77.1%	28.5%	64.0%	13.5%	100%	-
Overall 5G coverage	100.0%	100.0%	0.0%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		7		1 186		x	10 000
SMEs with at least a basic level of digital intensity	66.2%	67.3%	0.8%	57.7%	2.6%	90.1%	90%
Cloud	42.2%	45.5%	3.8%	38.9%	7.0%	75%	75%
Artificial Intelligence	2.6%	4.7%	34.5%	8.0%	2.6%	75%	75%
Data analytics	NA	33.5%	NA	33.2%	NA	75%	75%
AI or Cloud or Data analytics	NA	58.0%	NA	54.6%	NA		75%
Unicorns		3		263		x	500
At least basic digital skills	50.2%	49.5%	-0.7%	55.6%	1.5%	80%	80%
ICT specialists	4.6%	5.4%	17.4%	4.8%	4.3%	9%	~10%
eID scheme notification		Yes					
Digital public services for citizens	63.6	74.0	16.3%	79.4	3.1%	100	100
Digital public services for businesses	84.7	86.1	1.6%	85.4	2.0%	100	100
Access to e-Health records	70.2	68.1	-3.0%	79.1	10.6%	100	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

## National Digital Decade strategic roadmap

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

**The national strategic roadmap of Cyprus is well aligned with the vision of the Digital Decade and is nearing full completion.** It sets out measures for the majority of the targets, and 12 national trajectories to help reach the corresponding targets by 2030. Only trajectories and targets for edge nodes and unicorns are missing. The 5G target has already reached 100% coverage. The national targets are in line with the EU's 2030 target values, except for the percentage of ICT specialists in employment: the national target is cautiously set at 9%, and the EU's is 10%. Some parts of the roadmap could benefit from additional focus and effort, given the current results and the slow annual growth. This particularly concerns improving the population's digital skills, encouraging business take-up of AI, and digitalising public services for citizens. The broad objectives of the Digital Decade are presented alongside existing strategies. In particular, a green digital transition is part of the National Digital Strategy 2020-2025, with a target to reduce the digital sector's environmental impact by 20% by 2025. However, no specific measures are described in the roadmap to accelerate progress on these objectives, even though several initiatives are on-going at national level. The Digital Decade and the Declaration of Digital Rights and Principles are implicitly included in the national strategies for the country's digital transition.

The total budget of the measures presented is estimated at EUR 497.1 million (about 1.7% GDP), with priorities set on digitalising public services, promoting the digital transformation of SMEs and creating an innovative ecosystem for start-ups and scale-ups. Funding the digital transformation relies heavily on EU funding (the Recovery and Resilience Facility (RRF) and cohesion policy funding).

### Recommendations for the roadmap

When adjusting its national roadmap in accordance with Article 8(3) of the Digital Decade Policy Programme (DDPP) Decision, Cyprus should:

- **TARGETS:** Provide a target and trajectory for **unicorns** and **edge nodes**
- **MEASURES:** (i) Review and strengthen measures to contribute to the targets that are the most challenging to reach, such as **digital skills for all** and **business take-up of AI**; (ii) Provide **more information on the implementation of the digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it.

### Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' provides insights into Cypriot perceptions of digital rights. While 43% of Cypriots believe the EU protects their digital rights effectively, a decrease of 10 percentage points from last year, it is slightly below the EU average of 45%. Concerns are notable, with 54% worried about children's online safety, up 15 points, and 47% concerned about control over personal data, up 12 points. Positively, 58% appreciate access to online public services and freedom of assembly and association in the online environment. 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<sup>24</sup>.

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

**On technological leadership and competitiveness, Cyprus recently made good progress in deploying gigabit connectivity infrastructure** and has already reached the 5G coverage 100% target for 2030. On advanced digital infrastructure, Cyprus's contribution to reaching the Digital Decade targets is currently limited in scope. Technological advancements are a challenge to an economy specialised in service industry, even though technology continues to play an essential role in making digital services resilient to cyberthreat. Cyprus has recently taken a significant step in building capabilities to strengthen cybersecurity with the establishment of the National Security Operations Centre (SOC). Furthermore, Cyprus brings a positive contribution to the EU's Digital Decade target on digitalisation of SMEs: 67.3% of SMEs have at least a basic level of digital intensity. The country is also committed to developing its innovation ecosystem for start-ups and scale-ups. It created the country's first equity fund with the support of the RRF.

### Recommendations – Cyprus should

- **CONNECTIVITY INFRASTRUCTURE:** (i) Maintain the pace of VHCN roll-out, with a special attention to reach the underserved areas; (ii) Regularly assess emerging market demand for the remaining unassigned spectrum in the 26GHz band; (iii) 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.

<sup>24</sup> 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.
- **SEMICONDUCTORS:** Draw up a strategy to support research and innovation to contribute to the European semiconductor ecosystem.
- **EDGE NODES:** Continue to assess the market to develop measures or actions in the short term to contribute to the EU edge nodes target.
- **CLOUD/AI/DATA ANALYTICS:** (i) Consider if additional targeted measures for facilitating the adoption of AI by enterprises, in particular SMEs, would be necessary to reach the target by 2030; (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.

### Protecting and empowering EU people and society

**Equipping people with digital skills is a priority for Cyprus which put the digital transformation of schools at the core of the overall digital transition policy.** A major reform includes revising the curricula, developing educational material and training teachers. The reform is on track to contribute to the Digital Decade target for basic digital skills and lay the groundwork for nurturing future ICT specialists. In 2023, Cyprus already made a positive contribution to the EU’s Digital Decade target with ICT specialists making up 5.4% of the population in employment, above the EU average (4.8%). However, in 2023, half the population lacked at least a basic level of digital skills, which is a challenge given the pace of society and the economy’s digital transformation. In its roadmap, Cyprus has also planned to develop a solid, secure, integrated and modern government digital architecture to provide safe and inclusive digital services to improve people’s quality of life and the business environment. Nonetheless, in 2023, Cyprus demonstrated it had untapped potential to contribute to the Digital Decade targets for digital public services for citizens, scoring lower (74 out of 100) than the EU average (79.4). However, Cyprus has shown significant progress since 2022 when the score was 63.6.

#### Recommendations – Cyprus should

- **BASIC DIGITAL SKILLS:** Consider, based on the current moderate results, strengthening the strategy for developing the population’s basic digital skills, especially by training people over 55.
- **DIGITAL PUBLIC SERVICES:** Consider focused measures, after further analysis of the e-government benchmarking methodology, to ensure that the benchmarking results reflect the current status of the country’s digital public services.
- **E-HEALTH:** (i) Enhance the authentication method for logging into the online access service by using a notified e-ID; (ii) Make the data types of medical images and hospital discharge reports available to citizens through the online access service; (iii) Ensure that the online access service complies to web accessibility guidelines.

### Leveraging digital transformation for a smart greening

**The National Digital Strategy 2020-2025 commits Cyprus to the objective of a green digital transition.** The plan sets out a target to reduce the digital sector’s environmental impact by 20% by 2025 and promote the use of digital technologies to support sustainable development. Several actions, notably in R&D, have been undertaken in 2023.

**Recommendations – Cyprus 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 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

---

**Czechia**

## 1 Executive summary

**Czechia 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, Czechia made notable progress** in enhancing digital skills and up-take of AI. Significant efforts were made to digitalise key public services. However, important **challenges persist** in the roll out of FTTP networks and the digitalisation of SMEs.

**Czechia aims to excel in cutting-edge technologies like quantum, microchips, and AI, as well as upskill its population to keep up with innovation.** To nurture its ambitions and keep up with the growing adoption of AI by its enterprises, Czechia is updating its National AI Strategy of the Czech Republic, its National Quantum Strategy 2030 and its National Semiconductor Strategy 2030. Czechia also continues to improve children, students and workers' **digital skills** and to make more online public services available and increase their use. Improving online public services is essential as, according to the **Special Eurobarometer 'Digital Decade 2024'**<sup>25</sup>, 78% of Czechia's population consider that digitalising everyday public and private services makes their lives easier.

However, Czechia faces big challenges with the **digitalisation of businesses**, especially SMEs, **recruiting ICT experts** and expanding fixed **very-high capacity networks (VHCN)**, particularly in rural areas. Tackling these challenges is needed: the European Declaration on Digital Rights and Principles states that 'everyone, everywhere in the EU should have access to high-speed digital connectivity'. Small enterprises need access to a good network infrastructure and resources to embrace digitalisation. Czechia introduced several initiatives to improve connectivity and business digitalisation to improve the situation.

Czechia is active in several multi-country projects, such as **the IPCEI on Microelectronics and Communications Technologies**, and is a member of the **European Digital Infrastructure Consortia (EDIC)** on **Language Technologies (ALT-EDIC)** and on **Local Digital Twins towards the CitiVERSE**. The country is also engaged in the discussions related to the setting up of the Genome and Digital Commons EDICs. In quantum technologies Czechia participates in EuroQCI, EURHPC-LUMI-Q, CLONETS and EPIQUE<sup>26</sup>.

Czechia's **recovery and resilience plan (RRP)** allocates 22.8% of the total budget to digital (EUR 1.94 billion)<sup>27</sup>. Under cohesion policy, an additional EUR 1.9 billion (9% of the country's total cohesion policy funding) is allocated to the country's digital transformation<sup>28</sup>.

---

<sup>25</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>26</sup> Information last updated on 31 May 2024.

<sup>27</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>28</sup> 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 <sup>(1)</sup>	Czechia			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	CZ	EU
Fixed Very High Capacity Network (VHCN) coverage	53.2%	50.5%	-5.0%	78.8%	7.4%	95%	100%
Fibre to the Premises (FTTP) coverage	37.4%	36.1%	-3.7%	64.0%	13.5%	x	-
Overall 5G coverage	82.6%	94.6%	14.5%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		10		1 186		x	10 000
SMEs with at least a basic level of digital intensity	52.5%	49.3%	-3.1%	57.7%	2.6%	80%	90%
Cloud	40.0%	35.2%	-6.2%	38.9%	7.0%	60%	75%
Artificial Intelligence	4.5%	5.9%	14.5%	8.0%	2.6%	16%	75%
Data analytics	NA	19.5%	NA	33.2%	NA	25%	75%
AI or Cloud or Data analytics	NA	43.1%	NA	54.6%	NA		75%
Unicorns		4		263		6	500
At least basic digital skills	59.7%	69.1%	7.6%	55.6%	1.5%	80%	80%
ICT specialists	4.5%	4.3%	-4.4%	4.8%	4.3%	7%	~10%
eID scheme notification		Yes					
Digital public services for citizens	76.2	76.3	0.2%	79.4	3.1%	100	100
Digital public services for businesses	83.8	83.8	0.0%	85.4	2.0%	100	100
Access to e-Health records	46.6	51.1	9.5%	79.1	10.6%	100	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

## National Digital Decade strategic roadmap

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

**Overall, Czechia's roadmap is consistent with the efforts needed to support the country's digitalisation, but the specific targets should be more detailed.** The roadmap includes 2030 targets for all indicators, except for Fibre to the Premises (FTTP) and edge nodes which will be introduced next year. In total, 5 of the national targets are aligned with the EU's 2030 targets, and 7 are lower: VHCN, ICT specialists, SMEs with at least a basic level of digital intensity, the number of unicorn companies, and take-up of AI, data analytics and cloud. There are no trajectories for FTTP and edge nodes. Moreover, on skills, Czechia could make a distinction between basic and advanced skills and set out targeted measures to increase the number of ICT specialists. Although the roadmap partially covers Digital Decade objectives such as online safety, sovereignty, representation of women working in ICT and online access to public services, it does not cover the green transition. The total budget for the roadmap's 58 measures is **estimated at EUR 1.77 billion** (about 0.6% of GDP), prioritising ICT specialists, connectivity, and key public services. Some aspects require more action, especially the aim of business digitalisation (in terms of both basic intensity and the rate of adoption of advanced technologies).

### Recommendations for the roadmap

When adjusting its national roadmap in accordance with Article 8(3) of the Digital Decade Policy Programme (DDPP) Decision, Czechia should tackle the additional recommendations below:

- **TARGETS:** (i) Propose a target and trajectory for **edge nodes** and formalise the trajectory for **FTTP**; (ii) Distinguish and align **the level of ambition of targets for the 3 technologies' take up by enterprises (AI, cloud, data analytics) to the EU's targets.**
- **MEASURES:** (i) Strengthen the measures contributing to targets that are most difficult to achieve the **digitalisation of enterprises and distinguish measures contributing to basic digital skills and advanced ones**; (ii) Review the **budget description** of all presented measures, duly highlighting EU sources such as the RRF; (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 Special Eurobarometer 'Digital Decade 2024' sheds light on Czech perceptions of digital rights. 46% of Czechs doesn't believe the EU protects their digital rights well, a decrease in confidence of 5 percentage points from last year. Concerns have escalated, particularly with 58% worried about children's online safety and 44% about control over personal data, both experiencing increases in concern. On the positive side, 57% value freedom of expression and 55% appreciate the availability of privacy-friendly technologies, both figures aligning closely with EU averages. 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<sup>29</sup>.

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

**To underpin its technological leadership and competitiveness, Czechia must strengthen its fixed network infrastructure and boost business digitalisation.** Czechia's infrastructure has problems in reaching 100% coverage for VHCN due to the slow roll-out of fibre and a very low take-up of fixed broadband capable of 1 Gbps speed. 5G coverage is rapidly expanding, with nearly 95% of households now covered. However, in 2023, only 39.3% of Czech households had 5G in the 3.4-3.8 GHz band, which was slightly below the EU average (50.6%). Digitalisation indicators for businesses are all below the EU average, including the basic intensity of SMEs and the adoption of data analytics, AI and cloud technologies. A revised strategy for AI is being drawn up, with the aim to raise business interest and promote its adoption. Improving the start-up ecosystem could be achieved by helping entrepreneurs raise funds and access consulting services. The country can also count on technology-intensive companies in areas such as microelectronics, quantum computing and AI start-ups. Lastly, on cybersecurity, Czechia is facing an increasing number of threats. The country's agency, the National Cyber and Information Security Agency (NUKIB), is actively trying to address them and disseminates best practices and supporting materials to stakeholders through its websites and conferences to facilitate the transition to post-quantum encryption.

### Recommendations – Czechia should:

- **CONNECTIVITY INFRASTRUCTURE:** (i) Accelerate the rollout of FTTP, among others by raising awareness on the benefits of Gigabit networks, by simplifying processes and permits for rolling out networks, and by promoting the construction of fibre-ready buildings. (ii) Ensure sufficient

<sup>29</sup> 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.

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 ENTERPRISES:** Continue and scale up the subsidy calls for digitalisation of SMEs to increase their capacity building through supporting services in the implementation of their project.
  - **UNICORNS:** (i) Support applied research for patents and ideas to be adapted to the market and create a business case for innovation; (ii) Facilitate access to capital for start-ups, including venture and growth capital.
- AI/CLOUD/DATA ANALYTICS:** (i) Review the mix of measures to support the adoption of advanced digital technologies including AI, Cloud and big data to understand the decline in adoption. (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.
- **EDGE NODES:** As edge computing is an important component of AI, future network deployment, and the Internet of Things, member states should consider edge node deployment when creating investment programmes and strategies in these areas.
  - **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

### Protecting and empowering EU people and society

**Czechia is well equipped to deliver an inclusive digital transition thanks to continuous efforts to increase digital skills. However, there should be a stronger focus on training ICT specialists.** The population's level of digital skills is well above the EU average. Since 2022, Czechia has been implementing a reform of its primary and secondary school curricula to integrate digital subjects and equip schools with digital tools. ICT specialists as a percentage of the population in employment is below the EU average, partly due to a shortage of workers in the country; moreover, of the 4.3% of ICT specialists in the workforce, only 12.4% are women. **Progress on the digitalisation of public services and e-health development needs to pick up as Czechia's scores are below the EU average.** The creation of the Digital and Information Agency (DIA) is a promising development as it centralises e-government decisions. This has helped make initiatives more consistent with each other and accelerate the roll-out of the Czech digital wallet. However, the number of projects to be managed should be carefully assessed, and more staff might be needed.

#### Recommendations – Czechia should:

- **ICT SPECIALISTS:** Increase the attractiveness of science, technology, engineering and mathematics (STEM) studies and ICT careers especially among women.
- **DIGITALISATION OF PUBLIC SERVICES:** Accelerate efforts for the digitalisation of public services, also ensuring sufficient administrative resources to support these.
- **e-HEALTH:** (i) Expand the coverage of the online access service to ensure that all citizens can access their electronic health data online. (ii) Expand the data types made available to citizens through the online access service. (iii) Increase the supply of health data by onboarding more categories of healthcare providers.

### Leveraging digital transformation for a smart greening

Czechia has not set a strategy to bring the digital and green transitions together. The country has only started to reflect how to calculate the ICT sector's environmental footprint, promote responsible energy use among consumers and advance the eco-design of ICT equipment and services.

#### Recommendations – Czechia 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 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

---

**Denmark**

# 1 Executive Summary

**Denmark 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, Denmark made notable progress** in digitalising public services for businesses and in increasing the number of ICT specialists. However, **challenges persist** in the digitalisation of SMEs and, more generally, in enterprises' take-up of advanced technologies, such as artificial intelligence (AI).

With a focus on solving societal challenges through digital means, Denmark presented a national roadmap that demonstrates plans to strengthen **the competitiveness of enterprises, improve public services and advance the green transition**. The updated [Digitalisation Strategy 2024 – 2027](#), launched in November 2023, marks the allocation of approximately EUR 100 million for initiatives that focus on providing technology knowledge in primary schools, increasing the uptake of digital technologies such as AI and robotics, using data for the green transition, among other things. Relevant strategies also include the Joint Government Digital Strategy 2022-2025, the national Broadband Strategy, [Denmark's National Strategy for Quantum Technology](#) and the [Strategy for Cyber and Information Security](#).

According to the **Special Eurobarometer 'Digital Decade 2024'**<sup>30</sup> survey, 83% of the Danish population consider that the digitalisation of daily public and private services is making their lives easier, well above the EU average of 73%.

Denmark is a member of the **Alliance for Language Technologies European Digital Infrastructure Consortium (ALT-EDIC)**, which addresses the scarcity of European language data needed for AI solutions. It is also developing the Statute and other relevant documents of the possible future **Genome EDIC** and engaging in discussions on the set-up of the **Digital Commons EDIC**, both within informal Working Groups. Denmark is also finalising membership negotiations with the **Local Digital Twins towards the CitiVERSE – EDIC**. Finally, the country has set up **five European Digital Innovation Hubs (EDIHs)** to build up the digital capacity of companies and public sector organisations<sup>31</sup>.

---

<sup>30</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>31</sup> Information last updated on 31 May 2024.



Digital Decade KPI <sup>(1)</sup>	Denmark			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	DK	EU
Fixed Very High Capacity Network (VHCN) coverage	96.3%	97.2%	0.9%	78.8%	7.4%	x	100%
Fibre to the Premises (FTTP) coverage	77.9%	84.0%	7.9%	64.0%	13.5%	x	-
Overall 5G coverage	97.8%	100.0%	2.2%	89.3%	9.8%	x	100%
Semiconductors		NA					
Edge Nodes		22		1 186		x	10 000
SMEs with at least a basic level of digital intensity	79.4%	75.3%	-2.6%	57.7%	2.6%	95%	90%
Cloud	62.2%	66.2%	3.2%	38.9%	7.0%	78%	75%
Artificial Intelligence	23.9%	15.2%	-20.3% <sup>(2)</sup>	8.0%	2.6%	76.6%	75%
Data analytics	NA	49.5%	NA	33.2%	NA	72.7%	75%
AI or Cloud or Data analytics	NA	77.4%	NA	54.6%	NA	75%	75%
Unicorns		8		263		x	500
At least basic digital skills	68.7%	69.6%	0.7%	55.6%	1.5%	80%	80%
ICT specialists	5.7%	5.9%	3.5%	4.8%	4.3%	7.7%	~10%
eID scheme notification		Yes					
Digital public services for citizens	84.1	84.2	0.2%	79.4	3.1%	100	100
Digital public services for businesses	88.7	88.7	0.0%	85.4	2.0%	100	100
Access to e-Health records	95.8	97.9	2.2%	79.1	10.6%	100	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

<sup>(2)</sup> The decrease recently observed on the AI value is likely linked to a heightened awareness among enterprises regarding both the utilisation of specific AI technologies, like for example Robotic Process Automation (RPA) based on AI.

Denmark's Recovery and Resilience plan (RRP) devotes 27% of the total budget to the country's digital transformation (approximately EUR 382 million)<sup>32</sup>. Priority is given to implementing the new digital strategy, extending high-speed rural broadband coverage, improving cybersecurity readiness and the use of AI, further digitalising SMEs and the public administration, with a particular attention to developing digital solutions for the healthcare sector, and boosting R&D. Under Cohesion Policy, an additional EUR 1.9 billion (9% of the country's total cohesion policy funding) is allocated to the country's digital transformation<sup>33</sup>.

### National Digital Decade strategic roadmap

With respect to Denmark'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.

The Danish roadmap is **coherent**, including on objectives, but only partly reflects the efforts needed to achieve the Digital Decade targets. **It includes 2030 national targets for 10** of the 15 key performance

<sup>32</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>33</sup> 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.

indicators (KPIs) but lacks formalised targets and trajectories for **Fibre-to-the-premises (FTTP) coverage, edge nodes and unicorns**. The Fixed Very High-Capacity Networks (VHCN) coverage target is set for 2025, while the 5G target is assumed not to feature because the country has already reached full coverage. In total, 9 of the national targets presented are aligned with the EU's 2030 targets, while **ICT specialists** is below. The roadmap covers all objectives, namely digital citizenship, fostering leadership and competitiveness, and digital for green. With **55 measures** presented, the total reported budget in the roadmap at the time of writing is **estimated at EUR 145.4 million** (less than 0.11% of GDP), with priorities set on quantum, the uptake of key technologies by enterprises and the digitalisation of public services. Some aspects might require more effort, especially for digital skills, boosting the number of edge nodes and the uptake of digital technologies by smaller enterprises.

### Recommendations for the roadmap

Denmark should, when submitting adjustments to its national roadmap in accordance with Article 8(3) of the Digital Decade Policy Programme (DDPP) Decision:

- **TARGETS:** (i) Provide targets and trajectories for **FTTP, edge nodes and unicorns**, and formalise the trajectory for **VHCN up to 2030**. (ii) Consider aligning the level of ambition of targets for the **number of ICT specialists** to the corresponding EU targets. (iii) **Recalculate some of the trajectories using the correct starting year** for the following KPIs (basic digital skills, cloud, data analytics and SMEs with at least a basic level of digital intensity), as in SDDR2023.
- **MEASURES:** (i) Strengthen the measures contributing to targets where Denmark has the potential to do more, including on **digital skills, edge nodes and the uptake of digital technologies by smaller enterprises**; (ii) Review the budget description for all measures, highlighting EU sources of funding such as the Recovery and Resilience Facility (RRF). (iii) Provide **more information on the implementation of digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it.
- **CONSULTATION:** Provide additional detail on the stakeholder consultation of the roadmap.

### Digital rights and principles

The Digital Decade Eurobarometer sheds light on Danish perceptions of digital rights. While 60% of Danes believe the EU protects their digital rights effectively, a 4-point decrease from last year, it remains above the EU average of 45%. Concerns have escalated, particularly with 67% worried about children's online safety, a significant 25-point increase, and 47% about control over personal data, up 6 points. Positively, 74% value the freedom of assembly online, and 72% appreciate access to free public services, both well 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<sup>34</sup>.

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

**To underpin its technological leadership and competitiveness, Denmark is equipped with strong infrastructure and a high-quality research community**, particularly in the fields of robotics and deep-tech centres for the fabrication of nano technologies like quantum technologies, sensors and chips. However, **more can still be done to transfer R&D into market innovation and to boost the use of new technologies**, in

<sup>34</sup> 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.

particular AI and cloud, by smaller younger companies, and help them to keep pace with larger companies when it comes to the level of digitalisation.

On infrastructure, Denmark is on track to reach 100% coverage for VHCN and 5G by 2025, 5 years earlier than the EU's 2030 target. The country boasts one of the highest percentages of fixed broadband subscriptions with speeds above 1 Gbps in the EU (29.3%). 5G in the 3.4-3.8 GHz band, which is essential for enabling advanced applications requiring large spectrum bandwidth, covered 85.0% of Danish households in 2023, significantly above the EU average of 50.6%. Denmark continues to focus on technological leadership and sovereignty, with plans to invest more in semiconductors and the commercialisation of quantum technologies, where Denmark is already contributing significantly.

Although all indicators on businesses digitalisation exceed the EU average (for example, 75.3% of SMEs have at least a basic level of digital intensity), their limited or at times very limited dynamic suggests there can still be some room for improvement. Through automation initiatives like SME:Digital and SME:Robot, Denmark aims to streamline digital processes in SMEs. However, more could be done to promote a wide range of digital solutions designed to meet the needs and resources of all types of SMEs, particularly smaller enterprises. The recent allocation of a EUR 4.2 million research fund under the Danish Innovation Fund will already contribute to reinforcing strategic research in key technologies, particularly big data, AI, as well as cyber, information security and semiconductors. More could be envisaged when it comes to Danish enterprises taking advantage of European co-funding to have a real impact on the country's competitiveness and productivity. Denmark's start-up scene thrives in robotics, automation, quantum, and drone technologies, but still faces challenges in accessing venture capital and competing for talent. On cybersecurity, the National Strategy for Cyber and Information Security is being implemented to protect critical government ICT systems and improve the cyber skills of people, businesses, and authorities.

#### Recommendations – Denmark should:

- **DIGITALISATION OF ENTERPRISES:** Focus on supporting and raising smaller enterprises' awareness of digital solutions to improve their businesses and learn how to better use them.
- **AI/CLOUD/DATA ANALYTICS:** (i) Review the mix of measures to support the adoption of advanced digital technologies by businesses, particularly those targeting the adoption of AI by enterprises. (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 to implement the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.
- **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.
- **EDGE NODES:** Consider integrating the deployment of more edge nodes at national level, as well as investment programmes, factoring in the innovation that edge nodes will bring in the areas of AI, the Internet of Things (IoT) and networks rollout.

#### Protecting and empowering EU people and society

**Denmark is delivering a digital transformation that aims to boost digital inclusion and a skilled workforce.** In 2023, 69.6% of the population had at least a basic level of digital skills, above the EU average of 55.6%. However, there is still scope for improvement to bridge the urban-rural divide and the gender gap, especially to avoid the risk of digital exclusion in a country where the digital transformation is steadily advancing. ICT

specialists as a percentage of the Danish population in employment is 5.9%, which is also above the EU average of 4.8%, yet still showing important gender differences (only 22.6% of employed ICT specialists are women). Moreover, the share of companies that had hard-to-fill ICT vacancies looking for ICT specialists in 2022 (10.7%) was generally higher than in the EU (6%), showing there is still an issue in the ICT labour market. Looking ahead, more can be done to improve young people’s interest in the ICT field, especially among women. Denmark also aims to step up existing efforts in upskilling and reskilling the labour force and to retain more international ICT students in the Danish labour market. These efforts could help increase enrolment rates in ICT courses and the number of graduates in the country (currently representing 5.5% of graduates in the country) as, although ICT-focused degree programmes have enough places available, they often go unfilled. On the digitalisation of the administration (public services for citizens and businesses, e-ID and access to e-health records), Denmark is on track and performing above the EU average, with a notable e-Health maturity score of 97.9 out of 100 and with health data supplied across all the categories of healthcare providers. The country’s new single secure e-ID solution, MitID, was notified under the e-IDAS regulation with a substantial and high level of assurance. Data shows that 83.9% of Danish citizens made use of the e-ID to access public services in the last 12 months, which is much higher than the EU average (36.1%). With a high level of digitalised public services, Denmark pays particular attention to ensuring inclusiveness and accessibility giving, whenever necessary, the possibility to those with impairments to opt out.

**Recommendations – Denmark should:**

- **BASIC DIGITAL SKILLS:** Focus on integrating basic digital skills in primary and lower-secondary education at national level, to ensure there is an equal level of basic digital skills among the Danish population, paying particular attention to the existing urban-rural divide and gender gap.
- **ICT SKILLS:** Follow up on the plans set out in the new digitalisation strategy to upskill and reskill ICT specialists. Design schemes to improve young people’s interest in ICT, including among women, and retain international students in ICT-related degree programmes to increase enrolment rates.
- **E-HEALTH:** Make the data type of medical images available to citizens through the online access service.

**Leveraging digital transformation for a smart greening**

Denmark is actively improving the standardisation, digitalisation, and automation of data to support businesses, public authorities and the population in accessing their climate and environmental footprints and make smarter, more informed choices. In line with this, the Danish government wants to create a circular data bank that collects and shares data on waste and materials.

**Recommendations – Denmark should:**

- Continue developing a coherent approach to twinning the digital and green transitions, including by supporting relevant pilots. First, continue to promote 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.
- Build on existing measures to 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. Where possible, take the lead in this area by promoting national tools and methodologies at EU level.



# State of the Digital Decade 2024

---

**Estonia**

# 1 Executive summary

**Estonia brings a positive 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, Estonia made notable progress** in digitalisation of public services, and in digital skills including ICT specialists as well as cybersecurity initiatives. However, important **challenges** persist in reaching full gigabit coverage and the digitalisation of SMEs.

**Digitalisation is a priority in Estonia, as demonstrated by its national Digital Agenda for 2030, adopted in 2021.** The Digital Strategy focuses on three areas: the digital state, cyber security, and connectivity. Estonia's digitalisation policies are very comprehensive, however, there are no strategies on semiconductors, edge nodes and quantum policies. Furthermore, Estonia could improve its connectivity infrastructure, in particularly its coverage and speed. The digitalisation of key public services is a top priority in Estonia.

Estonia is putting people at the centre of digitalisation, focusing on inclusion and participation: it has implemented accessible key public services for people and enterprises, enabling activities such as engaging in the democratic process. Estonia's focus on cybersecurity also shows its commitment to ensuring a safe and secure digital environment.

According to the **Special Eurobarometer 'Digital Decade 2024'**<sup>35</sup> (Digital Decade Eurobarometer), 81% of Estonians consider that the digitalisation of daily public and private services is making their lives easier, considerably above the EU average of 73%. Additionally, 73% of Estonians are aware that rights that apply offline should also be respected online.

Estonia is a member of the Networked Local Digital Twins towards CitiVERSE European Digital Infrastructure Consortium (EDIC), and an observer in the Alliance for Language Technologies EDIC which addresses the scarcity of European language data needed for AI solutions (both EDICs have already been set up). Estonia is also in the working groups aiming to set up the Genome and the Digital Commons EDICs<sup>36</sup>.

**Estonia's Recovery and Resilience Plan (RRP) allocates 24.1% of its budget to digital policies (EUR 208 million),** with priorities on digitalising enterprises and public administrations, and increasing connectivity<sup>37</sup>. Under Cohesion Policy, an additional EUR 0.4 billion (11% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation<sup>38</sup>.

---

<sup>35</sup> Special Eurobarometer 551 on 'the Digital Decade' 2024: <https://digital-strategy.ec.europa.eu/en/news-redirect/833351>

<sup>36</sup> Information last updated on 31 May 2024.

<sup>37</sup> The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation.

<sup>38</sup> 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 <sup>(1)</sup>	Estonia			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	EE	EU
Fixed Very High Capacity Network (VHCN) coverage	76.3%	76.9%	0.8%	78.8%	7.4%	x	100%
Fibre to the Premises (FTTP) coverage	76.3%	76.9%	0.8%	64.0%	13.5%	x	-
Overall 5G coverage	43.3%	87.5%	102.0%	89.3%	9.8%	x	100%
Semiconductors		NA					
Edge Nodes		3		1 186		x	10 000
SMEs with at least a basic level of digital intensity	54.0%	55.9%	1.7%	57.7%	2.6%	x	90%
Cloud	50.5%	52.6%	2.1%	38.9%	7.0%	x	75%
Artificial Intelligence	2.8%	5.2%	36.3%	8.0%	2.6%	x	75%
Data analytics	NA	25.6%	NA	33.2%	NA	x	75%
AI or Cloud or Data analytics	NA	60.6%	NA	54.6%	NA		75%
Unicorns		2		263		x	500
At least basic digital skills	56.4%	62.6%	5.4%	55.6%	1.5%	60%	80%
ICT specialists	6.6%	6.7%	1.5%	4.8%	4.3%	x	~10%
eID scheme notification		Yes					
Digital public services for citizens	94.0	95.8	1.9%	79.4	3.1%	x	100
Digital public services for businesses	98.8	98.8	0.0%	85.4	2.0%	x	100
Access to e-Health records	89.2	97.5	9.3%	79.1	10.6%	x	100

<sup>(1)</sup> See the methodological note for the description of the indicators and other descriptive metrics

## National Digital Decade strategic roadmap

With respect to **Estonia's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating a **low ambition** and, based on this document, intends to allocate **limited 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**.

The roadmap presents one national target out of 15, zero **trajectories** out of 13 possible and three measures. The roadmap does not present targets nor trajectories on very high-capacity networks (VHCN), Fibre-to-the-premises (FTTP) coverage, overall 5G coverage, edge nodes, SMEs with at least a basic level of digital intensity, cloud, artificial intelligence, data analytics, unicorns, ICT specialists, digital public services for citizens, and businesses, nor access to e-health records.

The national target included in the roadmap and the three measures briefly referred to in the roadmap refer to basic digital skills. The national target being 60% is not in line with the **EU's level of ambition**, which is 80% by 2030. Moreover, with 62.6% of its population having already at least a basic level of digital skills, Estonia has in fact already reached its national target.

Furthermore, the roadmap does not detail the amount of funds dedicated to the Digital Decade. In addition, Estonia did not consult stakeholders on the roadmap. Given Estonia's digital steps forward, it is important that the roadmap reflects these. The roadmap requires more effort in all areas.



## Recommendations for the roadmap

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

- **TARGETS:** (i) Establish a national target and trajectory on VHCN coverage, FTTP coverage, 5G coverage, edge nodes, SMEs with at least a basic level of digital intensity, cloud, AI, data analytics, unicorns, ICT specialists, digital public services for citizens, digital public services for business, and access to health records. (ii) Align the level of ambition of the national target and propose a trajectory for at least basic digital skills.
- **MEASURES:** (i) Clearly present measures dedicated to VHCN coverage, FTTP coverage, 5G coverage, edge nodes, SMEs with at least a basic level of digital intensity, cloud, AI, data analytics, unicorns, ICT specialists, at least basic digital skills, digital public services for citizens, digital public services for business, and access to health records considering the Digital decade objectives. When presenting the measures in the roadmap provide a description of the measures, describe its intended effects and results, state the budget of the measure differentiating from public, EU and private funding. (ii) Provide **more information on the implementation of digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it.
- **CONSULTATION:** (i) Consult stakeholders in the drafting of the roadmap. (ii) Report on the consideration of stakeholders' feedback in the roadmap.

## Digital rights and principles

The Digital Decade Eurobarometer reveals Estonian perceptions of digital rights. While 42% of Estonians believe the EU protects their digital rights effectively, a decrease of 6 points from last year brings it below the EU average of 47%. Concerns have intensified, particularly with 55% worried about children's online safety, a 10-point increase, and 46% about control over personal data, up 11 points. On the positive side, 66% appreciate the level of digital skills and education, and another 68% access to online public services, both well 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<sup>39</sup>.

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

**Estonia is committed to improving digital infrastructures and technologies.** The country is working on infrastructure improvements, such as the Access to Networks Support Scheme 1.0 and 2.0. There has been significant annual growth in 5G coverage thanks to the radio spectrum auctions of the 700 MHz and 3.4-3.8 GHz bands in 2022. There is an important urban rural divide, and the government aims to tackle this and ensure full coverage for all through the Access to Networks Support Scheme 4.0. However, there is a greater need for public and private investment to reach more households and cover the white areas (areas with low connectivity). Additionally, Estonia does not have measures on edge nodes or semiconductors. The percentage of SMEs with at least a basic level of digital intensity is falling behind the EU average. Estonia's progress on data analytics and AI take-up is slow. Creating a safe and secure digital environment is of importance to Estonia at every level. Measures include strengthening the country's infrastructure and improving the population's cybersecurity skills.

<sup>39</sup> 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.

**Recommendations – Estonia should:**

- **CONNECTIVITY INFRASTRUCTURE:** (i) Continue the ongoing efforts to support VHCN, FTTP and 5G rollout, including by fostering private investment and by stimulating take-up. (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.
- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.
- **SEMICONDUCTORS/QUANTUM COMPUTERS:** Develop strategies and measures for semiconductors, and quantum computing.
- **EDGE NODES:** As edge computing is an important component of AI, future network deployment, and the Internet of Things, consider edge node deployment when creating investment programmes and strategies in these areas.
- **DIGITALISATION OF ENTERPRISES AND AI/CLOUD/DATA ANALYTICS:** (i) Continue work on digitalising SMEs especially for data analytics and AI. (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.

**Protecting and empowering EU people and society**

**Estonia is heavily committed to improving peoples' digital skills and putting them at the centre of digital transformation.** Estonia is actively creating a human-centred, inclusive, and transparent digital environment in line with the overarching EU objectives for digitally empowering people. The country performs above the EU average in improving the public's digital skills and ICT specialists already make up a high percentage of the in employment (6.7%). Estonia also has the second highest percentage of female ICT specialists in the EU (26.8%). Estonia has introduced educational measures aiming to educate both educators and people in different parts of life, by focusing on lifelong learning.

Estonia is a front runner in providing key public services for people and businesses, striving to make digital services available for every major life event. In 2023, the government introduced new online applications to streamline administrative processes such as marriage, childbirth, military service, migration and death of a loved one. The application Digigate is set to reduce the administrative burden on entrepreneurs by letting them provide all relevant information in one place online, streamlining communication with the authorities.

Almost 80% of the Estonian population has at least one e-ID. Additionally, Estonia's high e-health maturity places it in the trendsetter cluster. All data categories investigated in this framework are made available to citizens in a timely manner. Moreover, all the categories of healthcare providers investigated in the eHealth survey supply relevant data to the online access service for electronic health records. Citizens can access these data through an online portal, although a mobile application is not available. Furthermore, all applicable categories of healthcare providers supply relevant data. Regarding access opportunities for certain categories of people, Estonia scores 100/100 compared to a European average of 77/100 and does follow the Web Content Accessibility Guidelines accessibility guidelines. Overall, Estonia is working to further streamline public service applications to make data accessible in a single, user-friendly platform.

**Recommendations – Estonia should:**

- **BASIC DIGITAL SKILLS:** Continue implementing initiatives to improve digital skills and ensure that no one is left behind.
- **ICT SPECIALISTS:** Continue measures aiming at increasing the number of more senior ICT specialists (higher level of experience) and continue improving gender balance.
- **E-HEALTH:** Offer a mobile application for citizens to access their electronic health records.

**Leveraging digital transformation for a smart greening**

**Estonia shows great ambition to bringing the green and digital transitions together** with the government aiming at becoming “[the greenest digital government in the world](#)”, in its Digital Agenda 2030. Estonia needs to continue capitalising on opportunities presented by the green transition by integrating related initiatives into a wider framework. Through its study carried out in 2023, ‘Analysis of the Current State and Opportunities for environmental friendliness in the digital state environment’, the country aims to identify key digital and green challenges. The findings will be presented in 2024, which will pave the way for an action plan. Although Estonia has already introduced green requirements into public procurement procedures, the country could develop a more extensive strategy that combines green and digital measures for the private sector. Private enterprises, particularly the start-ups, are taking steps to create synergies between green and digital steps.

**Recommendations – Estonia should:**

- Continue developing 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.
- Encourage private investments and initiatives in responsible green tech.