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COVER NOTE

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PART 5/6

COMMISSION STAFF WORKING DOCUMENT

Digital Decade country reports

State of the Digital Decade 2024

Malta

1 Executive summary

Malta 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, Malta made notable **progress** in connectivity infrastructure, and specifically in the roll-out of fibre-to-the-premises (FTTP) networks, the uptake of Artificial Intelligence and Cloud by enterprises. However, FTTP networks remain to be fully deployed across the country and **challenges** persist in basic digital skills and in filling the ICT specialists' gap.

Digitalisation is a priority of Malta's authorities. Malta Digitali is the main strategy for 2022-2027. The country performs very well in several areas, and particularly in digital infrastructure, where it reached already the target VHCN and basic 5G coverage, and digital public services, already fully accessible to citizens and businesses. Moreover, Malta strategic approach focuses on a human-centred approach, recognizing the diverse digital needs across society, business, and government.

According to the Special Eurobarometer 'Digital Decade 2024'[1], 80% of Malta's population consider that the digitalisation of daily public and private services is making their lives easier (above the EU average of 73%).

Malta is an observing country on the already established Alliance for Language Technologies European Digital Infrastructure Consortium (ALT EDIC)[2].

Malta's Recovery and Resilience Plan (RRP) dedicates 26.2% to digital (EUR 68 million)[3], with measures on digital skills, digitalisation of enterprises and of the public sector. Under cohesion policy, an additional EUR 129 million (17% of the country's total cohesion policy funding) is allocated to the country's digital transformation[4].

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

[2] Information last updated on 31 May 2024.

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

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

Digital Decade KPI [1]	Malta			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	MT	EU
Fixed Very High Capacity Network (VHCN) coverage	100.0%	100.0%	0.0%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	56.2%	69.6%	23.8%	64.0%	13.5%	100%	-
Overall 5G coverage	100.0%	100.0%	0.0%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		21		1 186		x	10 000
SMEs with at least a basic level of digital intensity	72.8%	76.5%	2.5%	57.7%	2.6%	85%	90%
Cloud	47.5%	58.2%	10.7%	38.9%	7.0%	80%	75%
Artificial Intelligence	10.2%	13.2%	13.8%	8.0%	2.6%	27.2%	75%
Data analytics	NA	35.6%	NA	33.2%	NA	51.1%	75%
AI or Cloud or Data analytics	NA	68.3%	NA	54.6%	NA		75%
Unicorns		3		263		x	500
At least basic digital skills	61.2%	63.0%	1.5%	55.6%	1.5%	75%	80%
ICT specialists	5.0%	4.7%	-6.0%	4.8%	4.3%	8%	~10%
eID scheme notification		Yes					
Digital public services for citizens	100.0	100.0	0.0%	79.4	3.1%	100	100
Digital public services for businesses	97.2	100.0	2.9%	85.4	2.0%	100	100
Access to e-Health records	77.6	88.0	13.4%	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 **Malta's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating **a high ambition**, however, based on this document, intends to allocate **very significant effort** to achieve the Digital Decade objectives and targets.

The roadmap is overall coherent with the efforts needed in all the dimensions of digitalisation. The Maltese roadmap includes **66 measures** with a total budget of **EUR 214.65 million (1.5% of GDP) covering most of the targets.** In total, three targets (i.e., VHCN, 5G and Digital Public Service for Citizen) have already been reached, while five others align with EU's 2030 targets. However, according to the Country's roadmap, three national targets (**basic digital skills**, number of **ICT specialist** and **SMEs** with at least a basic level of digital intensity) fall slightly below the EU targets. This seems related to the estimation algorithm used to project historical values up to 2030. Trajectories for **edge nodes, e-Health** and **unicorns** are missing. Although the roadmap covers nearly all objectives of the Digital Decade, some aspects may require more effort. For instance, elements related to the green and digital activities are notably underreported in the roadmap.

Recommendations for the roadmap

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

- **TARGETS:** (i) Propose a target and trajectory for edge nodes and unicorns and formalise the trajectory for FTTP and eHealth (ii) Align the level of ambition of targets for the Digital Skills,

ICT specialists and SME with at least basic digital intensity to the corresponding EU targets.

- **MEASURES:** (i) Strengthen the measures contributing to targets that are the most difficult to achieve, notably those on digital skills, ICT specialists and digitalisation of enterprises; (ii) Review the budget description of all presented measures, duly highlighting EU sources such as the Recovery and Resilience Facility (RRF); (iii) Report what are the most important public support measures or private sector initiatives that are going to be implemented in the country contributing to the objective of assessing and monitoring the impact of the digital transformation on 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 on the consultation of stakeholders on the roadmap.

Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' reveals key insights into Maltese perceptions of digital rights. Despite a significant 16-point decrease, 49% believe the EU protects their digital rights, slightly above the EU average of 45%. Confidence in digital privacy stands at 56%, also higher than the EU average of 51%. Concerns have increased significantly, with 55% worried about online safety for children, up 24 points, and 36% about control over personal data, up 16 points. Positive trends include the high importance of digital technologies e.g., for connecting with friends and family (86%), above the EU average of 83%. The monitoring of the Declaration on Digital Rights and Principles shows that increasing the profile of the Declaration at national level and fostering better stakeholder engagement could help improve outcomes in the years to come[5].

A competitive, sovereign and resilient EU based on technological leadership

Malta can rely on good infrastructure and good uptake of technologies by businesses. Malta already reached 100% coverage for VHCN and 5G, in 2020 and 2022 respectively. However, 5G coverage in the 3.4–3.8 GHz bands remains limited, i.e., 24.7% versus 50.6% at the EU level. Moreover, despite the strong positioning on digital infrastructure, Malta currently has no known edge node deployment plans.

The indicators on the digitalisation of enterprises (basic intensity of SMEs and take-up of data analytics, AI and cloud) show values equal or above the EU average. The SME ecosystem is very dynamic, with 66.1% of SMEs having at least a basic level of digital intensity in 2023. On cloud computing, AI and data analytics various entities have initiated measures to facilitate technology adoption, placing Malta well above the EU average in almost all areas. In 2023 there were three unicorns in Malta, while the country continues focusing on developing an agile and conducive start-up ecosystem.

Malta is part of the European semiconductor ecosystem, specialising in back-end packaging operations which mainly cater to the automotive and telecommunications sectors, and is part of the Important Projects of Common European Interests (IPCEIs). Regarding quantum technologies, the country is active in QuantERA, a European network of public organisations funding quantum-related research and innovation projects.

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

Recommendations – Malta should:

- **DIGITALISATION OF BUSINESSES AND AI/CLOUD/DATA ANALYTICS:** (i) Continue implementing policies in the area of digitalisation of businesses. In particular, Malta should further facilitate access to secure and sovereign advanced digital technologies and solutions and encourage investment in digital research and innovation; (ii) Raise awareness about the benefits of digital technologies and increase participation in existing funding schemes, especially among the many family-owned micro, small and medium-sized businesses making up Malta's economy. (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:** Continue the implementation of 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.

Protecting and empowering EU people and society

Digital skills remain crucial to ensure that Maltese citizens have access to and make use of the available digital infrastructure to achieve the Digital Decade targets. Several initiatives have been implemented in recent years to incentivise individuals to attain at least basic digital skills, and to enhance levels of ICT employment. In 2023, Malta remains above the EU average, with 63% of the population having basic digital skills compared to the EU average of 55.6%. However, the share of ICT specialists in employment remains stagnant in Malta (4.7% vs the EU average of 4.8%), and it remains low in comparison to the required demand. Women are under-represented. The shortage of digital skills is partly addressed by Malta's National e-Skills Strategy 2022-2025 which provides a framework for evaluating existing initiatives and introducing new ones, to promote basic and above basic digital skills and tools that can translate into increased employment**.**

Malta is a leader in the provision of key digital public services and performs very well in the implementing and giving access to electronic health records.

Recommendations – Malta should:

- **BASIC DIGITAL SKILLS:** Continue encouraging people to take part in digital skills trainings by raising awareness and facilitating access, with a special focus on vulnerable groups.
- **ICT SPECIALISTS:** Continue skills forecasting and improve cooperation with industry and the civil society to regularly evaluate and adjust education and training offers to labour market needs and encourage women to become ICT specialists.
- **E-HEALTH:** Offer a mobile application for citizens to access their electronic health records. Increase the supply of health data by onboarding more categories of healthcare providers.

Leveraging digital transformation for a smart greening

Malta's movement to the twinning digital and green transition is slowly ramping up. It is primarily taking place in foreign direct investment operating enterprises and cascading into indigenous enterprises. The Ministry for Environment, Energy and Regeneration of the Grand Harbour has introduced Malta's

Sustainable Development Strategy for 2050 and opened it for public consultation. The Strategy is an ambitious document that translates Malta's Sustainable Development Vision for 2050 into a strategic policy direction for the environmental protection and socio-economic development of the Maltese Islands.

Recommendations – Malta 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.

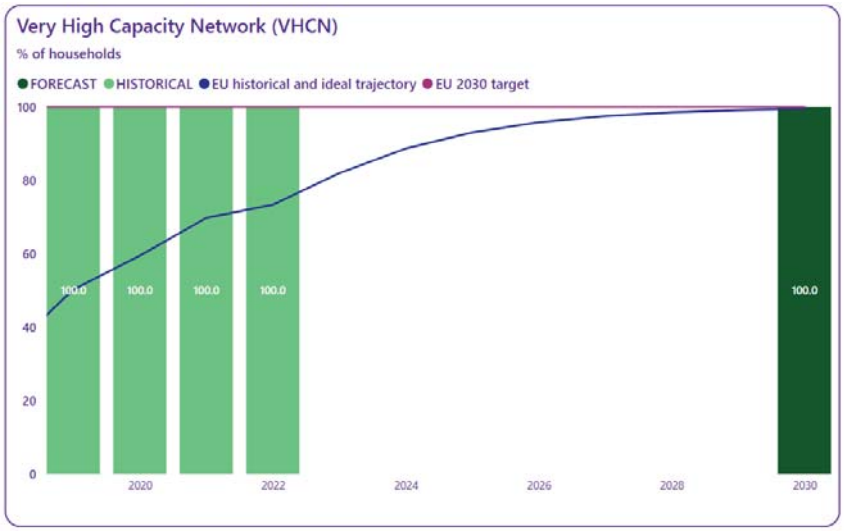
2 A competitive, sovereign and resilient EU based on technological leadership

Building sovereign and resilient digital infrastructure and technologies is seen as a key driver of economic growth, innovation and national security. Malta shows strong performance in the deployment of digital infrastructure. **Malta has achieved 100% coverage in VHCN and basic 5G**. The country also performs very well when it comes to the digitalisation of businesses.

The perception of digitalisation in Malta is quite positive. The country shows strong performance in various aspects of digital development. According with the Eurobarometer measuring the perception of digitalisation through different categories, Malta ranks above EU average in all the categories.

2.1 Building technological leadership: digital infrastructure and technologies

2.1.a Connectivity infrastructure (gigabit)[6]

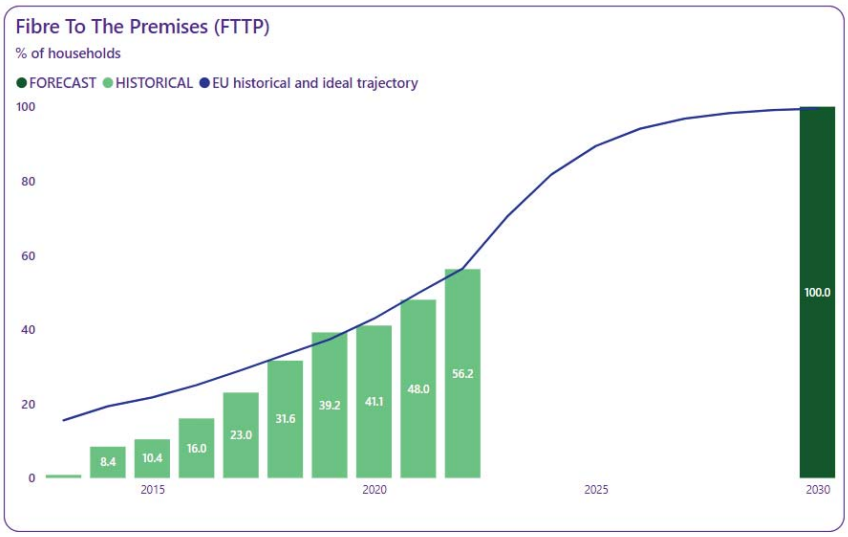


2023 state of play and recent progress

	Country level	EU level
FORECAST		82.0
DESI 2024	100.0	78.8
AVERAGE ANNUAL GROWTH %	0.0	7.4

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

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



2023 state of play and recent progress

	Country level	EU level
FORECAST		70.3
DESI 2024	69.6	64.0
AVERAGE ANNUAL GROWTH %	23.8	13.5

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

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

[6] All historical values presented in the figures are sourced from the corresponding data sources and not the national roadmaps.

Malta brings a very strong contribution in reaching the EU's Digital Decade target for Very High-Capacity Networks (VHCN). According to the Broadband Coverage Study in Europe, as of June 2021, Malta is the only country in the study to have recorded universal VHCN coverage[7]. FTTP coverage is 69.6%, standing slightly above the EU average of 64%.

The share of fast fixed broadband take-up is increasing but remains limited. In 2023, the share of fixed broadband subscriptions ensuring connectivity speeds equal or above 1 Gbps was 11.7% (up from 6.8% in 2022 and slightly below the EU average of 18.5%).

Currently, in Malta there are two nationwide networks providing gigabit connections, i.e., GO plc (hereafter "GO"), which provides services based on its fibre (c.a. 80% of households, and growing) and copper network, and Melita Ltd (hereafter "Melita"), which has a full nationwide HFC (Hybrid Fibre-coaxial) network coverage. A third network, owned by Epic Communications Ltd (hereafter "Epic"), covers only part of Malta and is relying on the applicable ex-ante regulation to provide country-wide services.

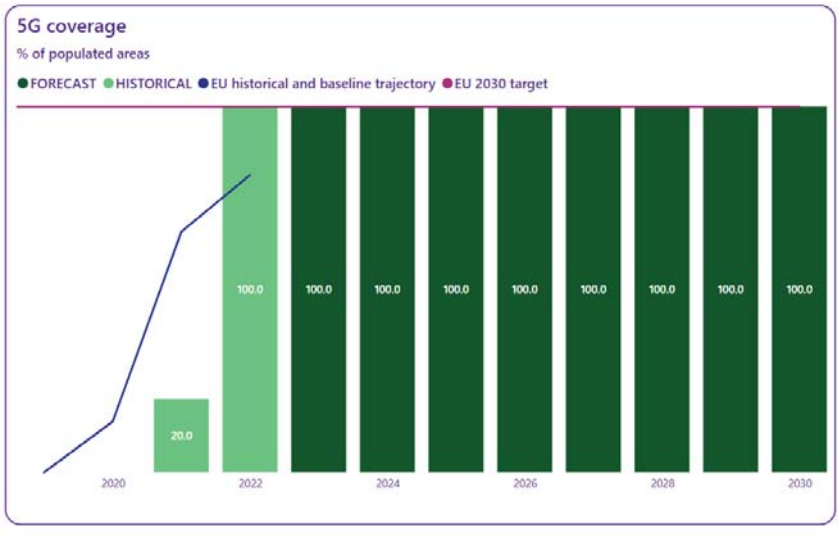
Best practice: Switching off the copper network

The roll-out of the fibre network enables the incumbent (GO) to progress on the path to the eventual decommissioning its legacy copper network. In Malta GO's network, which is subject to a transition from coper to fibre, competes at retail level with the nationwide network of Melita (mainly coaxial) which also provides gigabit connectivity.

In 2023, GO had announced plans to switch off its copper network. Given developments over the past years, focus of the incumbent is on expanding and upgrading its FTTH network, as well as increasing FTTH coverage. Currently applicable ex-ante regulation mandates access to GO's fibre network for alternative access seekers.

GO states that it will conclude its nationwide deployment of FTTH by the end of 2024.

2.1.b Connectivity Infrastructure (5G)



2023 state of play and recent progress

	Country level	EU level
FORECAST	100.0	
DESI 2024	100.0	89.3
AVERAGE ANNUAL GROWTH %	0.0	9.8

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

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

[7] For the purposes of this report, VHCN includes FTTP and DOCSIS 3.1 networks, cf. Methodological note and the Decision C(2023) 4288 Implementing Act setting out Key Performance Indicators to measure the progress towards the digital targets established by Article 4(1) of Decision (EU) 2022/2481 of the European Parliament and of the Council.

Malta brings a very strong contribution to the EU's Digital Decade on overall 5G. Nationwide 5G coverage was achieved by one of the three operators in 2022, while the other two mobile operators provided such coverage towards the end of 2023, in line with spectrum assignment conditions. However, 5G coverage in the 3.4–3.8 GHz bands remains limited, i.e., 24.7% versus 50.6% at the EU level.

The three main operators are actively deploying 5G in the 3.6 GHz band. In Malta, there are three main service providers who operate both mobile and fixed networks, namely Epic, GO and Melita. The National Frequency Plan already allocated the 3.6GHz to Mobile Applications all over the country, with the lower part being assigned and licenced for Broadband Wireless Access.

The three mobile network operators were granted the rights to use radio spectrum in the 3.6 GHz band during 2021. They then started their respective 5G network roll-out. In 2023, the roll-out was completed, as all three operators had deployed 5G nationwide. The licenses required them to make any technology and services they offer, available nationwide within a period of up to 24 months from the date of assignment, and to maintain them for the whole duration of the license. The Malta Communications Authority (MCA) further consulted on updating the spectrum management frameworks for the 900 MHz, 1800 MHz and 2.5 GHz bands designated for terrestrial systems capable of providing electronic communications services. They also continued to monitor for interest in the 700 MHz and the 26 GHz band. In addition, for the indicator on 5G SIM cards share of population, Malta has a value equal to 21.32%, standing slightly below the EU average value of 24.62%.

2.1.c Semiconductors

The semiconductor sector is central to Malta's strategic objectives of bolstering its economic resilience in the manufacturing sector while giving impulse to a high-value-adding economic activity.

The sector in Malta is a significant part of the country's economy, involving several enterprises and employing around 1 800 individuals. Malta is part of the European semiconductor ecosystem, specialising in back-end packaging operations which mainly cater to the automotive and telecommunications sectors. The country has the potential to contribute to the EU target on semiconductor, although the national roadmap does not report on the ambition in this area.

Malta Enterprise is taking a leading role in ensuring that Malta is part of the global technological race which is shaping the future. This is being done mainly through Malta's participation in the EU's Important Projects of European Interest (IPCEI) for semiconductors and communication technology, in partnership with STMicroelectronics Malta. Malta Enterprise took an active role in the context of the EU's Chips Act. This led to set up a microchips competence centre in Malta, which is expected to open new important opportunities to attract main industry players, academics, disruptors and innovators in such a crucial global strategic sector.

Specific figures on the current production capacity of semiconductors in Malta are not provided. However, the roadmap suggests that Malta is actively expanding its capabilities and presence in the semiconductor industry as part of its strategic economic objectives.

2.1.d Edge nodes

Latest studies estimate 21 edge nodes in Malta, which represents a very good level considering the country size. This value is just an estimation and could not correspond to the real situation in the country. It represents around 2% of the total edge nodes estimated at the EU level, a ratio above its GDP or population contribution to the EU. Moreover, Edge computing is a critical enabler of AI, future networks rollout, and IoT.

In the national roadmap, Malta indicates that the existing infrastructure already provides latencies below 20 milliseconds.

2.1.e Quantum technologies

Malta is active in the field of quantum technologies. As part of the EuroQCI initiative, the country is in the progress of establishing an ambitious quantum network, known as the PRISM (Physical Security for Public Infrastructure in Malta). This project aims to set up Malta's first quantum communication network, covering the entire nation.

The PRISM involves a consortium coordinated by RSM Malta, with members including Merqury Cybersecurity Limited, Melita Limited, the University of Malta, Umnai Limited, the Critical Infrastructure Protection Directorate within the Ministry for Home Affairs, Security, Reforms and Equality, and the Malta Information Technology Agency (MITA).

The project has received initial funding of EUR 11.6 million, with EUR 5.8 million committed by the European Commission as part of the Digital Europe Programme 2021-2027. This funding will support the design, development, and deployment of the EUROQCI, which includes a terrestrial segment based on fibre communications networks and a space segment utilizing satellites

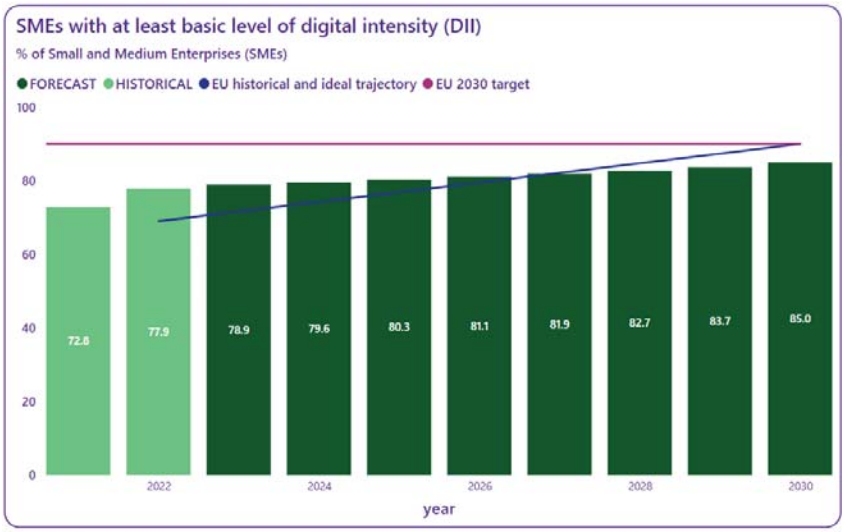
The PRISM project is expected to be a key component of the new Infrastructure for Resilience, Interconnectivity, and Security by Satellite (IRIS2), positioning Malta as a leader in quantum technologies1. The project will also develop groundbreaking quantum cryptography technology to ensure digital information is secure against any potential attack, now and in the future.

Malta is also active in QuantERA, a European network of public organisations funding quantum-related research and innovation projects. There are some gaps in the value chain, in particular when it comes to the integration of quantum communication technologies into standard communication networks.

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

Digitalisation remains a key priority for businesses in Malta, particularly following the COVID-19 pandemic that saw a necessary transition towards innovative solutions for entrepreneurs. In Malta, 97% of the business landscape is comprised of SMEs, with most, around 76.5%, having at least a basic level of digital intensity in 2023.

2.2.a SMEs with at least basic digital intensity



2023 state of play and recent progress

	Country level	EU level
FORECAST	78.9	71.6
DESI 2024	76.5	57.7
AVERAGE ANNUAL GROWTH %	2.5	2.6

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

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

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

Malta brings a very strong contribution to EU's Digital Decade target for the digitalisation of SMEs and shows a positive dynamic. Malta performs above the EU average with 76.5% of SMEs having at least a basic level of digital intensity (EU 57.7%). This represents an annual growth of +2.5%. The value is estimated over 2 years compared with 2021, which is the last comparable year that used a similar methodology for measuring the digital intensity of businesses. Progress is very high considering the current level of digital intensity in Malta, demonstrating an improvement in the situation.

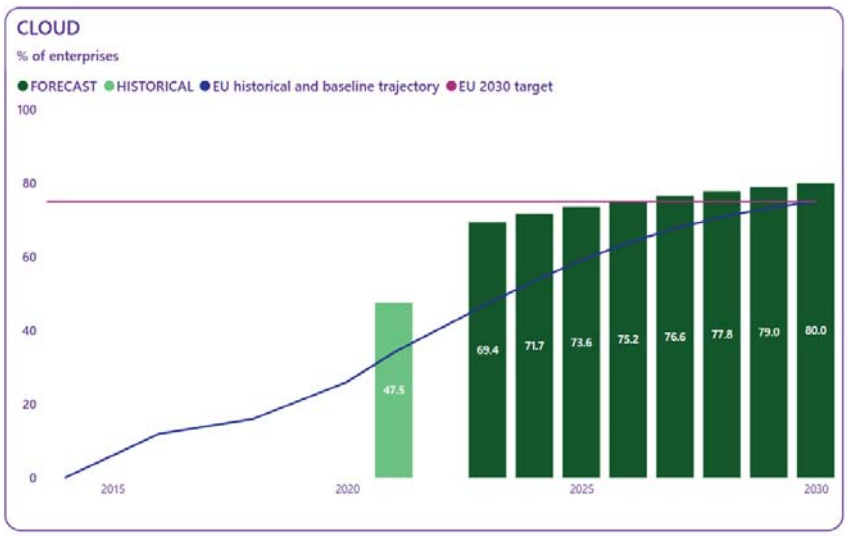
The roadmap shows a level of ambition slightly below the 2030 EU target of 90% of SMEs having at least a basic level of digital intensity. Even if, reaching the EU target by 2030 is considered very likely as the country has a level of digitalised SMEs (76.5%) around 20% above the EU average, the roadmap presents a value (85%) below the EU target. The distance between the current level and the target is equal to 13.5%. With the current observed growth rate, Malta is expected to reach its target already in 2028-2029.

Malta's roadmap presents four measures to digitalise SMEs. The total budget for all these four measures for this target is EUR 7.6 million. All the measures have a short time horizon fixed to 2024. The main challenge to be addressed by these measures is to boost SMEs' knowledge in optimising the use of technology, including e-commerce. In particular, the measure 'eBiznify courses' and the 'Business re-engineering and transformation scheme' are expected to address this challenge.

Moreover, Malta has a European Digital Innovation Hub managed by the Maltese government that supports the digitalisation of the ecosystem.

2.2.b Take up of cloud / data analytics / AI

- **Cloud**



2023 state of play and recent progress

	Country level	EU level
FORECAST	69.4	47.3
DESI 2024	58.2	38.9
AVERAGE ANNUAL GROWTH %	10.7	7.0

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

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

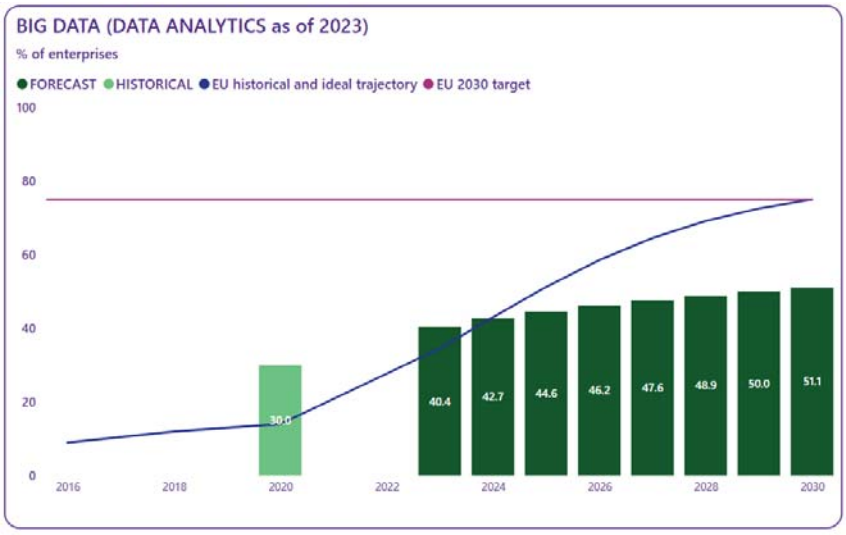
Malta brings a very strong contribution to the EU's Digital Decade target for cloud adoption while showing a very strong dynamic. The take-up of cloud solutions by Maltese businesses (at 58.2% in 2023) is significantly above the EU average (38.9%) and continues to rise compared to 2021 (47.5%) while the EU is globally improving (+7% compound annual growth rate).

The roadmap shows a level of ambition equal to the EU's 2030 target of 75% of businesses adopting the cloud. The value is linked to a strong starting point, exceeding the EU average and already close to the target. Based on the current rate of progress, it appears that Malta's contribution to the EU target will be reached on time.

Malta has allocated a significant part of its Recovery and Resilience Plan to be spent on digitalisation. One of the main measures adopted by the country to reach the cloud target is the 'SME digitalisation Scheme.' The measure, funded by the Recovery and Resilience Plan, seeks to support digitalisation investment initiatives by SMEs in several economic sectors, as part of their digitalisation endeavours and when seeking to intensify the digitalisation of operations.

The SME digitalisation scheme is however strictly related to the cloud target. The scheme focuses on supporting digitalisation investment initiatives by SMEs across all business sectors and is expected to contribute directly to the uptake of cloud computing and other related technologies. It is crucial that businesses step up the adoption of the cloud since it supports the deployment of other technologies, such as Artificial Intelligence and edge nodes, both associated to a Digital Decade target.

- **Data Analytics (Big Data)[8]**



2023 state of play and recent progress

	Country level	EU level
FORECAST	40.4	34.6
DESI 2024	35.6	33.2
AVERAGE ANNUAL GROWTH %		

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

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

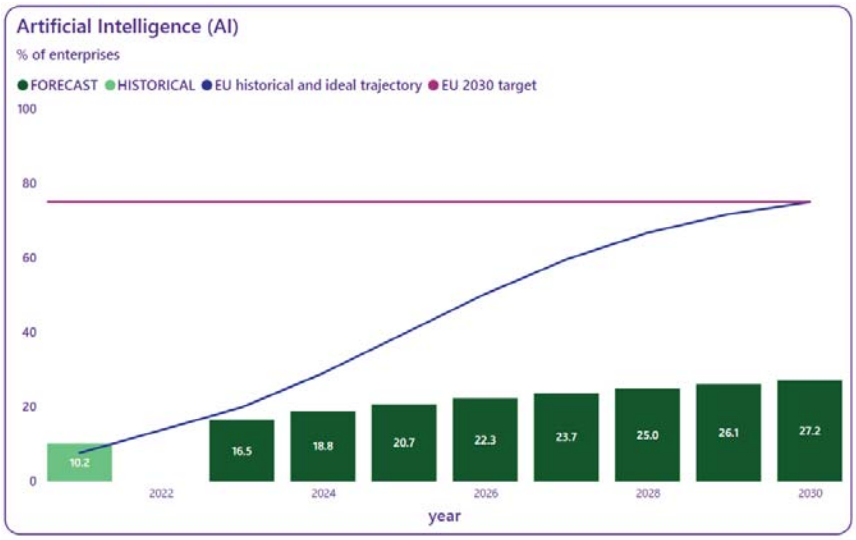
On the use of data analytics by businesses, Malta contributes positively to the EU's Digital Decade target. The value of the indicator measuring the uptake of data analytics by Maltese businesses (35.6%) is slightly above the EU average (33.2%). Progress cannot be assessed since the indicator's definition has evolved.

The roadmap sets out a level of ambition (51.1%) below the EU's 2030 target of 75% of businesses adopting data analytics. With a starting point standing above the EU average, a higher level of ambition for this national target could be envisaged. The growth rate of the indicator cannot be computed, but nothing indicates that Malta is not on track to reach the EU target of 75%.

Malta's roadmap presents a targeted measure to boost the adoption of data analytics. The measure 'Technological assurance sandbox' (MDIA-TAS) is intended to guide solution owners throughout a residency of a maximum of 4 years, as they align their solution with established control objectives based on international standards, in a phased-in approach. This alignment to known control objectives can help the applicant align to established expectations in technology related to data and data handling. The measure is directly focused on assisting businesses to have access to and use the reporting elements of data analytics solutions in direct relation to the Key Performance Indicator (KPI) on data analytics.

[8] As of 2023, Eurostat changed the Big Data into a Data Analytics indicator, thus disabling comparison with previous years.

- **Artificial Intelligence**



2023 state of play and recent progress

	Country level	EU level
FORECAST	16.5	19.9
DESI 2024	13.2	8.0
AVERAGE ANNUAL GROWTH %	13.8	2.6

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

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

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

Malta provides strong contribution to the EU's Digital Decade target for AI adoption and showing a good dynamic. Malta has already taken a number of initiatives focused on intensification of the efforts to leverage its good positioning and high growth rates recorded to sustain AI adoption. Adding up to the establishment of a European Digital Hub, a number of support schemes were launched to help companies, particularly the Malta Enterprise Business Development Scheme (Business RE-engineering and Digital Transformation). These initiatives are intended for Malta to sustain its leadership position in digital innovation.

Furthermore, Malta is one of the first EU countries which is realigning its National AI Strategy and it is planned to have measures specifically to target this objective.

Malta sets a 2030 target of 27.2% for AI adoption in its roadmap, below the EU-level target of 75%. According with current data (13.2% in 2023) Malta is strongly contributing to the EU target in 2024.

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

Taking the three technologies together (adoption of either AI, Cloud, or Data analytics), Malta stands at 68.3%, significantly above the EU average of 54.6%. The above-average performance of Malta is related to the high adoption of all the three technologies. However, according the National targets reported in the roadmap, while the target on cloud is aligned with the EU target the country's roadmap on AI and Data analytics reports a target below the EU level.

2.2.c Unicorns, scale-ups and start-ups

The Maltese start-up ecosystem is very dynamic and recognised for its growth and potential. The sector is supported by different government initiatives, including 'Start in Malta' which is aimed at supercharging the local startup ecosystem to make Malta the birthplace of start-up success stories.

While traditionally known for e-gaming and blockchain, the Maltese start-up scene is diversifying with companies in various sectors, such as fintech, artificial intelligence and legal tech[9].

[9] 20 Malta-based startups that are continuing to grow fast during 2021

Malta was home to three unicorns **in 2023.** According to the roadmap, despite the significant stimulus being provided to start-ups who wish to set-up in Malta, the doubling of the start-ups target is ambitious and cannot be committed to. However, according to the roadmap, new measures are continuously being implemented to develop a start-up ecosystem which is agile to the needs of operators, allowing them to get off the ground more easily, scale-up and be sustainable.

2.3 Strengthening cybersecurity & resilience

During 2023, different public support measures and private sector initiatives were launched. To mention is the CYBER+ALT scheme whereby the target audience are SMEs. This scheme is intended to strengthen the cybersecurity posture of these businesses through the uptake and dissemination of state-of-the-art cybersecurity solutions.

During the last quarter of 2023 a further service was launched addressed to the Public Service and the Private Sector whereby through the Client Assessment Framework both the Public Service and the Private Sector can benefit from free Security Assessments. For the private sector the scheme opened in 2024.

In 2023, there was also the launch of the National Cybersecurity Community which brought together relevant stakeholders from the private sector, the public sector, academia, and research. The ultimate goal is to grow cybersecurity in both a local and EU context. A Consultation Council governing the National Cybersecurity Community has been established, which is composed of elected and appointed members from both the public and private sector.

One of the goals of the National Cybersecurity Community is to put in place a system of coordinated vulnerability disclosure (CVD), which ensures a structured process through which vulnerabilities are reported to the manufacturer or provider of the relevant product or service[10].

In 2023, the Malta Critical Infrastructure Protection (MaltaCIP) Directorate secured an EU-supported Grant Agreement on 'Connecting and strengthening the government of Malta and other Computer Security Incident Response Teams (CSIRTs) within the context of the CSP,' as part of the Connecting Europe Facility. Through this project, the Directorate made available internal services to operators of essential services and digital service providers. These services promoted further cybersecurity information sharing, voluntary or otherwise, involving the public administration, the private sector and society; enabled through policy direction agreed procedures and information sharing tools; established an early warning system as part of the formation of an operational, cooperation and coordination framework for cybersecurity response; and acted as a secure Information Exchange Engine.

In 2023, Malta took several steps to strengthen cybersecurity which contributed to meeting relevant digital rights and principles, namely, the implementation of the National Cybersecurity Coordination Centre **(NCC) that was launched by the end of 2022 during the Cyber ROOT 2022 Conference.** Furthermore, the Cybersecurity Digital Skill Level Initiative (2023-2026) launched by the Cybersecurity National Coordination Centre (CNCC) aims to improve the cybersecurity skills and readiness of individuals and organisations in Malta. This effort is particularly crucial to ensuring a fair digital environment where all concerned are equipped to protect themselves against cyber threats.

[10] Cybersecurity: 2023 in Review - MITA (gov.mt)

3 Protecting and empowering EU people and society

3.1 Empowering people and bringing the digital transformation closer to their needs

Malta has proposed a strategy promoting digital citizenship and inclusion. Putting people at the heart of digitalisation is the objective of many initiatives in Malta. In the broader context of education, Malta has planned to launch the '2024-2030 National Education Strategy.' The strategy mentions the implementation of structured programmes to boost digital literacy and digital citizenship skills. Moreover, the strategy aims to transform the Maltese education system, focusing on putting people front and centre to ensure an inclusive and fair education for all.

It proposes a comprehensive plan to address existing challenges, laying the groundwork for a skilled, resilient and adaptable society. The strategy encompasses 36 measures and 120 initiatives based on three strands: (i) Wellbeing; (ii) Growth & Empowerment; and (iii) Equity & Inclusion. A notable example of an initiative is the National Skills Council's support for professional development sessions for educators on education for future skills, and the strengthening of career guidance services. In particular, the strategy looks at digitalisation as both an enabler in education and as a skill to be acquired, both by the educators and the students alike. It advocates for providing educators with continuous professional development on the latest technologies to help support them in the acquisition of digital skills that support learning and also their teaching profession.

The strategy also promises to provide structured programmes, offered as part of the extra-curricular modules and/or within the After School Programme. The programmes will address digital literacy, media literacy and digital citizenship; the creation of a resource pack for educators on how to pass on digital literacy and media literacy skills as cross-curricular themes; and the strengthening of the home-school link through the organisation of courses and other initiatives to help parents build resilience and learn effective coping skills to better support the progress and wellbeing of their children in the digital age. In terms of benefits and outcomes, one of specific goals of the National Education Strategy is that by 2030, the share of low-achieving eighth graders in computer and information literacy is less than 15%.

3.1.1 Equipping people with digital skills

3.1.1.a Basic digital skills

Note 1: Data break-in-series in 2020

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

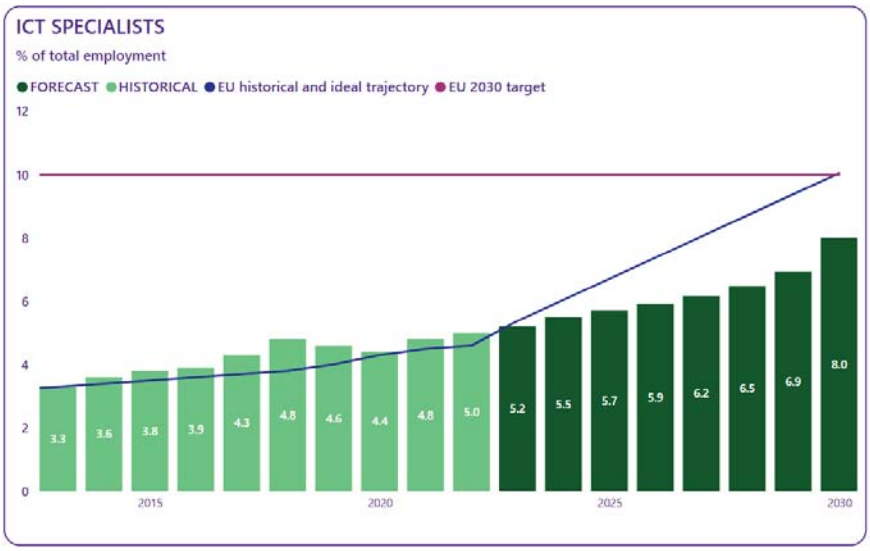
Malta brings a positive contribution to the EU digital decade target on digital skills and shows positive dynamic. The country is likely to reach the EU target and should consider a higher level of ambition for this indicator to align its 2030 target (75%) to the EU target (80%). In 2023, 63% of the Maltese population had at least basic digital skills, standing above the EU average of 55.4%, which makes Malta one of the front-runners for this Key Performance Indicator (KPI). The indicator slightly increased compared with 2021 (61.2%). However, it is equal to the EU progress (1.5 Compound Annual Growth Rate) over the same period. The slight increase could be explained by post-COVID-19 effects with a drop in the population's digital activity with less teleworking or use of e-commerce between 2021 and 2023. The basic digital skills indicator and other indicators, such as internet use, above basic digital skills, and basic digital skills in content creation all point Malta as being above the EU average.

Despite a good starting point, the roadmap sets the target below the EU level target, 75% versus 80% of people with at least basic digital skills by 2030.

To improve the basic digital skills of the population, several initiatives have been implemented in recent years. Malta is very active in the EU CodeWeek. As an example, in the scoreboard of EU Code Week, Malta is consistently positioned in the top three. Moreover, the country is participating in the Digital Skills and Jobs Coalition with its National Coalition as highlighted in the National Digital Skills & Jobs Coalitions | Digital Skills & Jobs Platform (europa.eu). The lack of digital skills is partly addressed by Malta's 2022-2025 eSkills Strategy, which provides a framework for evaluating existing and introducing new initiatives to promote basic and above basic digital skills and tools that translate to more employment. In this context, Malta committed to investing in an educational app store to further promote the use of digital tools for learning. The country also increased digital training for teachers, including cybersecurity training as part of the EU-funded CybARverse strategic partnership, jointly promoting digital security and inclusion principles.

Malta also launched the Digital Connect Scheme. This initiative, launched through the use of Recovery and Resilience Plan funding, provided over 1 664 people from low-income households with a laptop and an internet connection. This is aligned to the recommendations put forward in Malta's 2023 Digital Decade Country report where such schemes are facilitating access to different segments of society, particularly vulnerable groups. These schemes are expected to lead to an increase in inclusion, digitalisation skills, and the improvement of people's digital literacy, connectivity, integration of digital technology and computer skills.

3.1.1.b ICT specialists



2023 state of play and recent progress

	Country level	EU level
FORECAST	5.2	5.4
DESI 2024	4.7	4.8
AVERAGE ANNUAL GROWTH %	-6.0	4.3

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

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

Malta brings a positive contribution to the EU target on ICT specialist but shows a very limited dynamic. In 2023, ICT specialists in Malta were 4.7% of the people in employment, just below the EU average of 4.8%. The dynamic has been limited, with progress stagnating over the last years. The long timeseries provided by the Eurostat's Labour Force Survey shows that the percentage of ICT specialists among the Maltese has a variable trend between 2013 and 2023. The values increased from 3.3% in 2013 up to 4.8% in 2017. After a period of negative trend (2017-2020), in 2023 Malta shows a value equal to 4.7%.

The target set by Malta on the number of ICT specialists is below the EU level. The proposed trajectory with a 2030 target of 8% is below that of the EU (10% by 2030). The path to the 2030 target corresponds to doubling the current share of ICT specialists. In absolute numbers, Malta had 0.0139 million ICT specialists in 2023; reaching the 2030 EU goal requiring more than doubling the current share would mean increasing to about 0.0286 million ICT experts.

Supply of ICT specialists and graduates remains low in comparison to the required demand. Supply of ICT specialists and graduates remains low in comparison to the demand. At postgraduate and doctorate level, Malta extended the Pathfinder MDIA Digital Scholarship launched under its Recovery and Resilience Plan to support students in ICT-related graduate programmes. Skills shortage still poses a significant local challenge. The University of Malta has estimated that there is a skills gap of around 1:6, namely having 6 available open posts for ICT-specific related employment to 1 local available skilled individual. Other challenges relate to the mathematical competency of the younger student population that has also been reported to decline over recent years. As such, various initiatives to be employed address such issues by integrating the notions of coding and availability of technology-related skills and courses at younger ages, to be easily adopted at more advanced levels.

Malta promotes the inclusion of women by training women in ICT sector. In 2023, according with the Eurostat indicator (isoc_sks_itsps) describing the percentage of women ICT as share of ICT specialists, the number of women ICT specialist was equal to 13.8 % (86.2% were men). To further promote gender convergence, Malta also engaged in a multi-stakeholder partnership called Women4IT that saw the training of over 87 women in Malta to take successful steps into digital related employment.

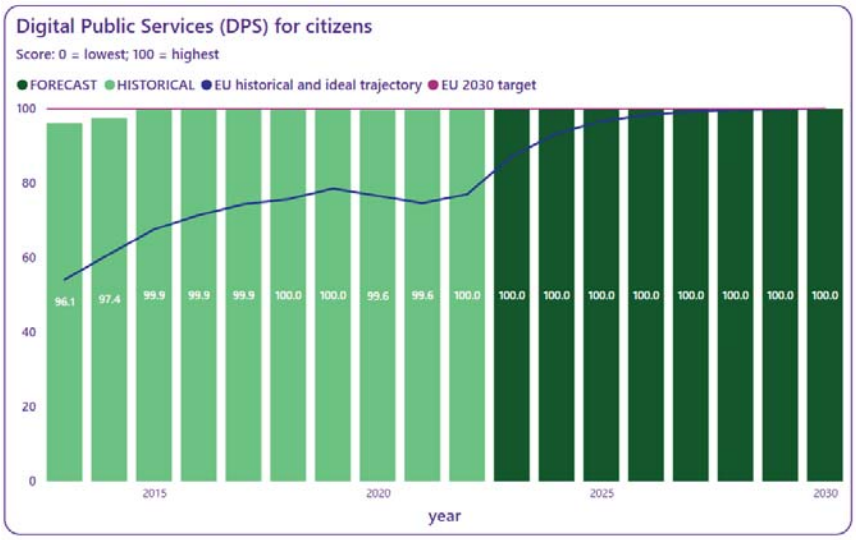
3.1.2 Key digital public services and solutions – trusted, user-friendly and accessible to all

3.1.2.a e-ID

Malta has made progress in e-ID implementation, enabling access to a substantial number of online public services. Malta has notified one electronic identification (e-ID) scheme under the eIDAS Regulation and is advancing on cross-border use. According to 2022 eGovernment Benchmark, e-ID can be used to log in to 91% of online public services.

The country has also undertaken technical work to facilitate the use of digital identity for accessing e-government services in other EU Member States, aligning with the Single Digital Gateway Regulation and the Digital Decade's objectives. Moreover, Malta is involved in the pilot project DC4EU focusing on social security documents, and is part of the pilot projects launched in preparation of the EU Digital Identity Wallet.

3.1.2.b Digitalisation of public services for citizens and businesses



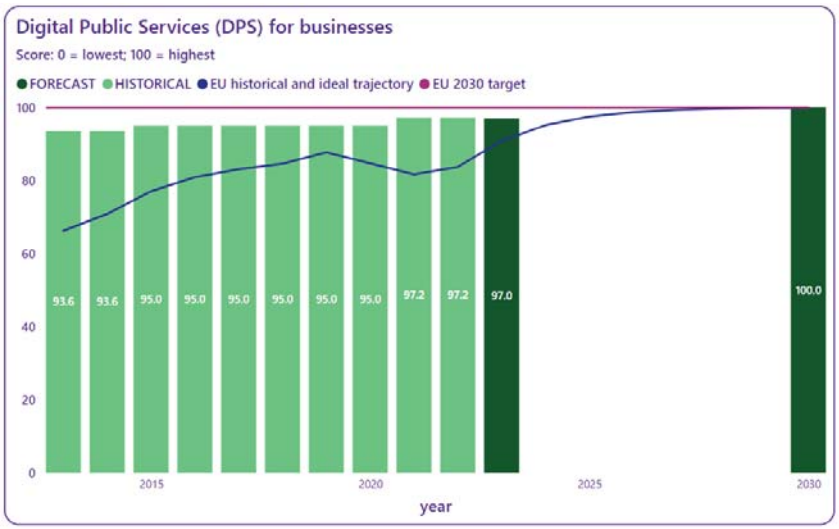
2023 state of play and recent progress

	Country level	EU level
FORECAST	100.0	87.2
DESI 2024	100.0	79.4
AVERAGE ANNUAL GROWTH %	0.0	3.1

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

Note 1: Data break-in-series in 2020

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



2023 state of play and recent progress

	Country level	EU level
FORECAST	97.0	90.9
DESI 2024	100.0	85.4
AVERAGE ANNUAL GROWTH %	2.9	2.0

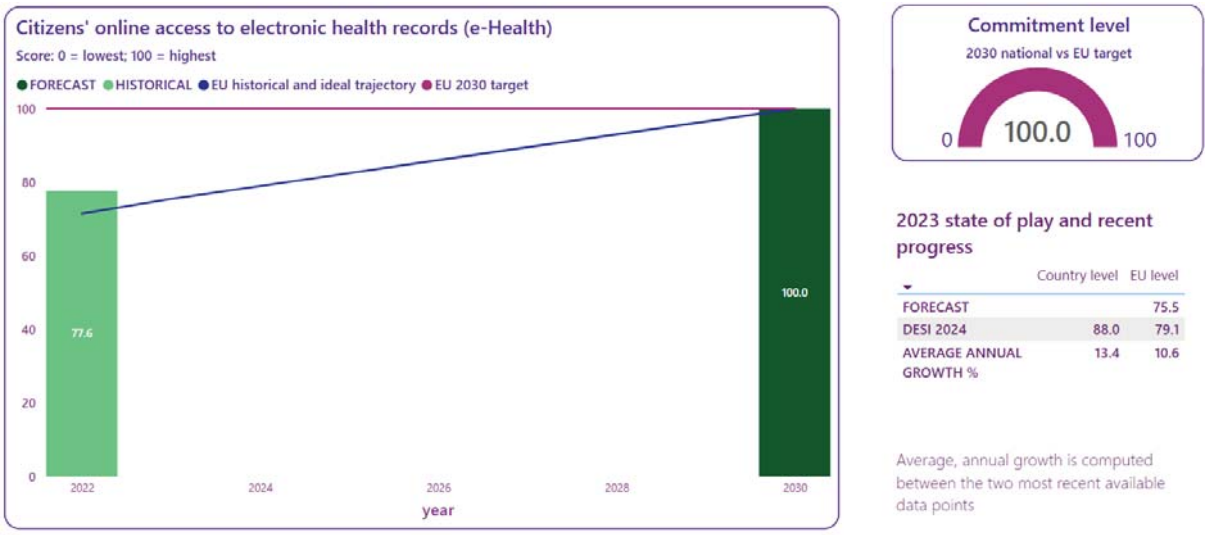
Average, annual growth is computed between the two most recent available data points

Note 1: Data break-in-series in 2020

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

Malta brings very strong contribution on digital public services. Malta already achieved the EU's Digital Decade target of providing people with 100% access to key public services online. With an impressive score of 100 for both people and businesses. Businesses have access to key digital public services through the user-friendly servizz.gov.mt portal, the country reached a score of 98.27 also in terms of transparency and 93.97 in pre-filled forms. This performance is further boosted by extensive user support scoring 100.

3.1.2.c e-Health



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

Malta brings a very strong contribution to the target of providing all citizens with access to their electronic health record. The country has significantly improved an overall eHealth maturity score, which stands at 88 in 2023. This compares to a maturity score of 77.6 in 2022. In 2023, the EU-27 average is 79.1.

In 2023, medical images were added to the access service (the myHealth portal). Malta scores 100 on categories of health data, compared to an EU average of 74. Malta has shown further growth in maturity by confirming that their online access service enables authentication with a (pre)notified e-ID.

For 2030, Malta aims at a score of 100 in e-Health, in line with the EU target. While performing well, Malta acknowledges challenges in healthcare data integration and connectivity between public and private healthcare sectors. The National Health Systems Strategy 2023-2030 and the upcoming Digital Health & Health Data Strategy 2030 will further address these issues and ensure seamless access to electronic health records. Citizens in Malta have online access to most electronic health data as part of a minimum health data set, with all reported medical images also available to all patients and their linked doctors (even those who work only in the private sector), and access also being provided to parents of children under 14. The National Health Systems Strategy 2023-2030 earmarks the digital patient portal, myHealth, for further development and expansion to fulfil the target of 100% citizens' access to electronic health records data by 2030. The country also provides the European Health Insurance Card (EHIC). The card is issued free of charge and allows anyone who is insured by or covered by a statutory social security scheme of the EEA countries, Switzerland, and the United Kingdom to receive medical treatment in another member state in the same way as residents of that state.

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

A large number of Maltese (76%) consider digital technologies important for engaging in democratic life. As measured in the 2024 Special Eurobarometer Digital Decade, the rate stood above the EU average (74%) and in progress since last year.

According to the results of the 2024 Eurobarometer, Maltese people are especially concerned by the impacts of misuse of personal data (flagged as important by 52% of the respondents) and fake news and disinformation (42%).

Another important element is that Hate speech is one of the online issues that seems to have an impact on the Maltese. According to the 2024 Eurobarometer, 39% of the Maltese population feel that hate speech has a big impact on their online services. This number is well above the EU average of 22%.

4 Leveraging digital transformation for a smart greening

Maltese enterprises and citizens are generally attentive to matters related to the impact of the digital devices. 45.6% of enterprises in Malta consider the environmental impact of ICT services, or ICT equipment, before selecting them and applied some measures, affecting the paper or energy consumption of the ICT equipment, which is well below the EU average of 48.7%.

The propensity of Maltese citizens to recycle old digital devices is in line or slightly above the EU average. About 9.3% of the population recycling mobile phones, 10.2% laptops and tablets and 13.6% desktop computers (10.4%, 9.7% and 12.8% respectively at EU level).

Maltese citizens attach a strong importance to digital as means to enable the green transition. According to the Eurobarometer survey 'Digital Decade 2024', 78% of respondents in Malta consider that digital technologies are important to help fighting climate change compared to the EU average of 74%. A large number of Maltese respondents (89%) also think that ensuring that digital technologies serve the green transition should be an important action for public authorities (in line with the EU average of 81%).

Malta's roadmap presents only some element on the implementation of the digital green transition.

In October 2023, the Malta Communication Authority (MCA) published a 'Discussion Paper' titled 'The Contribution of the Communications Sector and the MCA's Potential Role towards Achieving Malta's Environmental Sustainability Goals'. The MCA currently lacks a specific legal remit on environmental sustainability issues for the communication sector. However, it still sees itself contributing by supporting the communication sector's decarbonisation objectives and promoting its broader impact on the general economic landscape.

The deployment of high-quality digital infrastructure integrates sustainability objectives. The fundamental strand of the MCA's mission statement focuses on promoting and safeguarding a communication environment conducive to investment and innovation. This guiding principle underscores the deployment of high-quality digital infrastructure. The deployment of Very High-Capacity Networks (VHCNs) forms a cornerstone for achieving the 2030 Digital Decade goals and plays a pivotal role in the successful realisation of the dual objectives outlined in the Green Deal, encompassing both the digital and green transitions.

The ongoing investment by the three major providers of VHCNs in Malta signifies their commitment to moving away from energy-intensive and environmentally impactful legacy technologies, towards the adoption of more efficient and eco-friendly communication networks.

Annex I – National roadmap analysis

Malta's National Digital Decade Strategic Roadmap

Malta's roadmap highlights that digital transformation has maintained a positive trend in relation to the cardinal points set out in Article 4 of the Digital Decade Policy Programme (DDPP) 2030 - digital skills, infrastructure including connectivity, digitalisation of businesses and digital public services in the country.

The Maltese national roadmap includes 2030 targets for all KPIs except for **edge nodes**. In total, 4 of the national targets are already reached (Gigabit network coverage via VHCN, 5G coverage and Digital Public Service for Citizen and Businesses), 5 are aligned with EU 2030 targets, but 3 are slightly below (between 2 and 5%): **Basic Skills**, **ICT specialist** and **SME with at least basic level of digital intensity**. It is also important to highlight that on "AI or Cloud or Data Analytics" KPI the target is aligned with EU target, since the one on cloud is fixed to 80% (above the EU target), the country could be more ambitious in aligning the National target with the EU target also on AI and Data Analytics.

Trajectories are missing for **Edge nodes, eHealth** and **Unicorns**. On the other KPIs the trajectories have been computed on the basis of the correct KPI definitions and are quite complete in term of temporality. Most of the measures focus on Basic Digital skills and ICT specialists. Moreover, around 16% of the total measures focus on AI, Cloud and Data Analytics. The roadmap focuses especially on the enhancement of basic digital skills and ICT specialists, which are the areas attracting the highest share of measures and budget. Strong attention is, however, also placed on the uptake of digital technologies by enterprises and the further development of digital public services.

Malta's roadmap reflects the country's consideration for the recommendation provided in the Status of Digital Decade Report (SDDR) 2023 regarding efforts that should be continued in digital skills.

Digital Decade Target/objective	Budget (EUR Million)	Number of measures
Connectivity gigabit	**0.0**	**1**
Connectivity 5G	**-**	**-**
Semiconductors	**0.0**	**2**
Edge nodes	**-**	**-**
Quantum computing	**8.1**	**7**
SME take up	**7.6**	**4**
Cloud/AI/Big data uptake	**80.0**	**9**
Cloud only uptake	**-**	**-**
AI only uptake	**-**	**-**
Big data uptake	**-**	**-**
Unicorns	**70.0**	**9**
Basic digital skills	**81.8**	**15**
ICT specialists	**15.8**	**10**
eID	**0.0**	**2**
Key public services	**20.4**	**5**
e-Health	**1.2**	**2**
Objectives	**-**	**-**
Total	**284.9**	**66**

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

MCPs and EDICs

Malta is one of the observing EU countries on the Alliance for Language Technologies (ALT) proposed in December 2023, and already set up as one of the first EDICs.

The ALT-EDIC is a multi-country project, run and funded by the Member States who have agreed to join it. By pooling resources, the members should achieve the critical mass of data and other resources needed to create and finetune Large Language Models, which any single member would find difficult to do alone.

EU funding for digital policies in Malta

Malta's Recovery and Resilience Plan (RRP) commits EUR 67.6 million (26.2% of the total) to the digital transformation, of which 62 million directly contribute achieving Digital Decade targets, according to a JRC mapping study[11]. The largest digital measure of the RRP is invested into digitalisation of the public administration and public services (EUR 34 million) to strengthen the government's IT systems and enhance digital public services. A second digital measure is invested in the digitalisation of at least 360 companies, in particular SMEs (EUR 15 million).

Malta also received EUR 58 million of Digital Decade-relevant budget from cohesion policy funds with an accent given to small and medium businesses become more innovative, digital, and competitive, contributing to a smarter and low carbon economy.

[11] Based on an estimation of the possible contribution to the Digital Decade (Joint Research Centre report 'Mapping EU level funding instruments to Digital Decade targets - 2024 update' (Signorelli et al., 2024)

State of the Digital Decade 2024

The Netherlands

1 Executive summary

The Netherlands brings a very strong contribution to the EU's Digital Decade objectives and targets, in view of a successful digitalisation that fosters competitiveness, resilience, sovereignty, European values and climate action.

In 2023, The Netherlands made notable progress in rolling out its fibre network and in the area of basic digital skills, particularly with regards to strengthening knowledge of digitalisation and digital tools. However, important **challenges persist** in filling the ICT specialists' gap and close attention should also be given to companies' continued adoption of advanced technologies, such as artificial intelligence (AI) and cloud.

Digitalisation in the Netherlands is seen as an opportunity to grow, be more **competitive and resilient.** Its strategies, including the Dutch Strategy for the Digital Economy and the Dutch Value-Driven Digitalisation Work agenda, address priorities spanning digital skills and knowledge, high-performance digital infrastructure and technological innovation, but also digital trust, inclusiveness, transparency and cybersecurity. Other noteworthy strategies include the National Technology Strategy to promote technological sovereignty and the Cybersecurity Strategy for enhanced action against cyber threats.

According to the **Special Eurobarometer 'Digital Decade 2024'**[12], 83% of the Dutch population consider that the digitalisation of daily public and private services is making their lives easier. This is one of the highest scores in the EU and markedly above the EU average of 73%.

The Netherlands is involved in several **European Digital Infrastructure Consortia (EDICs).** Notably, it is expected to be the hosting Member State of the possible future **EDIC for Mobility and Logistics Data,** and with France, it is one of the potential host Member State of the possible future **Digital Commons EDIC.** The country is a member of the **Alliance for Language Technologies (ALT) EDIC –** one of the first EDICs ever set up and 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 **Cybersecurity Skills Academy EDIC** and the possible future **Genome EDIC,** both within informal Working Groups. Finally, the Netherlands is concluding membership negotiations with the **Local Digital Twins towards the CitiVERSE – EDIC**[13](already set up).

The Dutch Recovery and Resilience Plan (RRP) dedicates around 26% of its funds to digital policy (about EUR 1.2 billion)[14]. Priority is given to investments in innovative digital technologies, notably quantum and AI, the development of digital skills at different levels of the education system and the increased digitalisation of public services. Under Cohesion Policy, an additional EUR 200 million (11% of the country's total Cohesion Policy funding) is allocated to the country's digital transformation[15].

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

[13] Information last updated on 31 May 2024.

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

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

Digital Decade KPI [1]	The Netherlands			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	NL	EU
Fixed Very High Capacity Network (VHCN) coverage	97.8%	98.3%	0.5%	78.8%	7.4%	99.6%	100%
Fibre to the Premises (FTTP) coverage	63.4%	77.7%	22.6%	64.0%	13.5%	99.6%	-
Overall 5G coverage	100.0%	100.0%	0.0%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		27		1 186		x	10 000
SMEs with at least a basic level of digital intensity	75.3%	78.6%	2.2%	57.7%	2.6%	88.2%	90%
Cloud	60.2%	57.4%	-2.4%	38.9%	7.0%	82%	75%
Artificial Intelligence	13.1%	13.4%	1.1%	8.0%	2.6%	75%	75%
Data analytics	NA	48.6%	NA	33.2%	NA	40%	75%
AI or Cloud or Data analytics	NA	70.9%	NA	54.6%	NA	75%	75%
Unicorns		30		263		x	500
At least basic digital skills	78.9%	82.7%	2.4%	55.6%	1.5%	x	80%
ICT specialists	7.2%	6.9%	-4.2%	4.8%	4.3%	9.2%	~10%
eID scheme notification		Yes					
Digital public services for citizens	84.6	85.9	1.5%	79.4	3.1%	x	100
Digital public services for businesses	89.4	86.7	-3.1%	85.4	2.0%	x	100
Access to e-Health records	69.4	72.5	4.5%	79.1	10.6%	x	100

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

National Digital Decade strategic roadmap

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

The Dutch roadmap is coherent, but only partly reflects the efforts needed to achieve the Digital Decade targets. It includes 2030 targets for **9 key performance indicators (KPIs)**, but some crucial targets and trajectories like **edge nodes, unicorns, basic digital skills, digital public services for citizens and businesses and access to e-health records** are missing.

Most national targets are in line with the EU's 2030 targets, while **the take-up by enterprises of data analytics and the level of ICT specialists in employment** fall below. The Netherlands maintains in several instances that it is fully committed to realising the EU targets by 2030 and aims to include all of them in the roadmap's future revision. The roadmap covers all Digital Decade objectives, namely digital citizenship, fostering technological leadership and sovereignty and contributing to the green transition.

There are **55 measures**, corresponding to a total budget **estimated at EUR 5.4 billion** (about 0.5% of the GDP), although many measures have no indicated budget and others include approximations. The priorities are set on the digitalisation of key public services, semiconductors and quantum technologies. Some comprehensive efforts have been undertaken, particularly regarding ICT specialists and more targeted efforts for the digitalisation of enterprises, but more could still be done. Some sections, including on

creating synergies between the digital and green transitions, could benefit from being more explicit on the planned actions and expected results.

Recommendations for the roadmap

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

- **TARGETS:** (i) Propose a target and trajectory for **edge nodes, unicorns, at least basic digital skills, digitalisation of public services, and access to e-Health records**; (ii) Align the **level of ambition** of targets for **VHCN, SMEs with at least a basic level of digital intensity, the take-up of data analytics by enterprises** and **ICT specialists** with the corresponding EU targets.
- **MEASURES:** (i) Strengthen the measures contributing to targets that are the most difficult to achieve, including **on ICT specialists and the digitalisation of SMEs**; (ii) Review the budget description of all presented measures, duly highlighting EU sources such as the Recovery and Resilience Facility (RRF); (iii) Refer more concretely on actions and implementation of certain measures, particularly related to the Digital Decade objectives, as well as their expected outcomes; (iv) Provide more information on the implementation of digital rights and principles (and Digital Decade general objectives), including on contributing measures.
- **CONSULTATION:** Provide additional detail on the stakeholder consultation process of the roadmap.

Digital rights and principles

The Special Eurobarometer 'Digital Decade 2024' reveals key insights into Dutch perceptions of digital rights. Despite a 12-point decrease, 45% of Dutch respondents believe the EU protects their digital rights, aligning with the EU average. Confidence in digital privacy is at 54%, above the EU average of 51%. Concerns have risen significantly, with 63% worried about the online safety for children, up 10 points, and 58% about the control of one's digital legacy, up 8 points. Positive trends include the high importance of digital technologies for accessing public services (91%) and connecting with friends and family (87%), both above the EU average of 83%. The monitoring of the Declaration on Digital Rights and Principles shows that increasing the profile of the Declaration at national level and fostering better stakeholder engagement could help improve outcomes in the years to come[16].

A competitive, sovereign and resilient EU based on technological leadership

The Netherlands is leveraging its strong digital infrastructure, knowledge base and research community to achieve technological leadership and competitiveness. However, there is room to improve investments in research and development (R&D), apply key digital technologies and create a conducive environment for tech businesses and start-ups. Progress is manifest, as borne out by the Netherlands having achieved the Gigabit target and 100% 5G coverage in 2022, although more work is needed on high-speed broadband subscriptions and industrial 5G development. On high-speed broadband, the Netherlands has achieved only 4.13% of fixed broadband subscriptions with speeds > 1 Gbps, much lower than the EU average of 18.5%. On industrial 5G, the recent launch of the 3.6GHz auction band for 5G is a positive development, but roll-out will be essential to enable advanced applications requiring large spectrum bandwidth.

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

While indicators on the digitalisation of enterprises generally surpass the EU average, with 78.6% of SMEs reporting having at least a basic level of digital intensity, the Dutch government highlights there is a need for more public and private funds to scale up successful digital technologies like AI applications and to exceed EU levels of digital technology adoption, in line with the Netherlands' aspirations. Initiatives like Quantum Delta NL and PhotonDelta will remain pivotal for the country's long-term competitive advantage. On digital sovereignty, the Netherlands has taken the lead in analysing digital technology risks, identifying high-priority critical technologies and committing to innovation and industrial policies. On cybersecurity, the Netherlands is focusing on enhancing cyber awareness, cyber skills and upholding democratic and human rights globally.

Recommendations – The Netherlands should:

- **CONNECTIVITY INFRASTRUCTURE:** 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.
- **CYBERSECURITY:** Continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.
- **AI/CLOUD/DATA ANALYTICS:** (i) Continue to support the adoption of advanced digital technologies, with particular attention to scaling up successful AI innovations and improving access to finance, data, and computing infrastructure. (ii) Ensure the broad uptake of the next generation of cloud infrastructure and services under development in the IPCEI-CIS by companies of all sizes, including by developing a country-specific dissemination strategy; contribute to the dissemination activities led by the Cloud IPCEI Exploitation Office; consider measures specific to edge nodes deployment, supplementary to the IPCEI-CIS participation.
- **QUANTUM/SEMICONDUCTORS:** Continue to secure public funding and stimulate private investments to capitalise its competitive advantage in the areas of semiconductors and quantum technologies, while maintaining a good business environment for long-term digital innovation.

Protecting and empowering EU people and society

With a highly digitalised economy and society, the Netherlands is committed to, and progressing well towards, ensuring digital inclusion for its population and workers, strengthening knowledge of digitalisation and empowering society against disinformation. However, more can be done to address the gaps in the ICT jobs market. Efforts to improve digital skills have surpassed EU targets, with 82.7% of the population possessing at least basic digital skills, the highest score in the EU. Further national-level initiatives, such as integrating digital literacy in school curricula, could enhance skills levels and help the Netherlands achieve an even more ambitious target. On ICT specialists, the government has further developed its flagship initiative, the Action Plan on Green and Digital Jobs, while also investing in partnerships to accelerate the training, retraining, and upskilling of ICT people. Although ICT specialists account for 6.9% of the Netherlands' employed population, outpacing the EU average of 4.8%, challenges remain in meeting the needs of the market and ensuring there is a strong availability of talent. The digitalisation of public services and e-ID development are overall on track, although the Netherlands should maintain its focus to prevent future stagnation in the digitalisation of services for businesses, where it currently scores 86.7 out of 100, as well as to improve the availability of a more diverse range of medical data types for citizens online. With an overall high score (85.9 out of 100) for digital public services for citizens and with many planned measures, the Netherlands aims to enhance the interoperability, proactiveness and accessibility of these services.

Recommendations – The Netherlands should:

- **BASIC DIGITAL SKILLS:** Introduce measures to help concretise national plans to boost digital skills and awareness in schools, to complement the ongoing efforts at local and regional level to ensure digital inclusion.
- **ICT SPECIALISTS:** Closely monitor the implementation of existing measures and partnerships to upskill and retain ICT specialists, including women. Design incentive schemes to increase the attractiveness of STEM disciplines, particularly for girls, and to boost the number of young people interested in taking up ICT-related studies or careers. Further reinforce collaboration between industries, education institutions and the public administration to improve the link between vocational education and the labour market needs.
- **E-HEALTH**: Make more health data types available to citizens through the online access service and increase the supply of health data by onboarding more categories of healthcare providers.

Leveraging digital transformation for a smart greening

The Netherlands recognises the need to enhance sustainability in the ICT sector, with a focus on coordinating governmental actions to reduce energy consumption in ICT devices and infrastructure like data centres. Challenges include providing tools, cost information for sustainable choices, and reliable metrics to measure impact. An interdepartmental committee is making progress to draft a national action plan linking the digital and green transitions.

Recommendations – The Netherlands 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.
- 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.

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

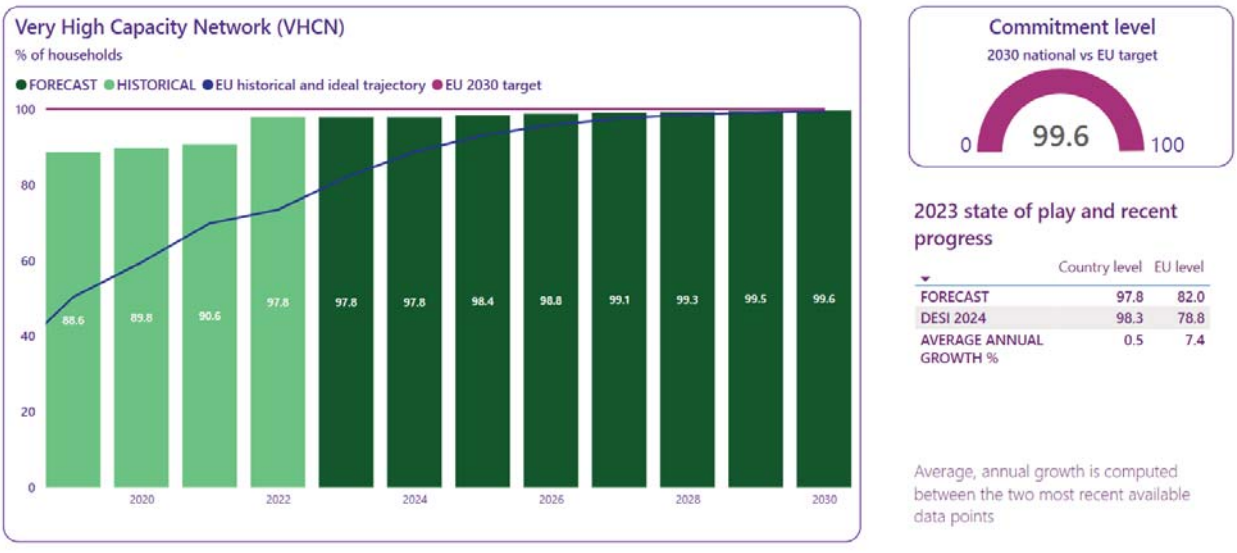
The Netherlands aims to consolidate its competitiveness and strengthen its digital autonomy. This is to be achieved through **more targeted investments in R&D in key digital technologies, protective measures where necessary to mitigate high-risk dependencies and strengthened international partnerships.** This policy framework is clearly set out by the Dutch agenda for Digital Open Strategic Autonomy (DOSA), published in October 2023. The Netherlands also recently presented a National Technology Strategy, within which the government identifies the critical technologies where the country can have a positive impact. These include AI and data science, semiconductors, quantum and cybersecurity technologies. The strategy also presents the Netherlands' current positioning and formulates policy actions for the next decade.

Overall, **the Netherlands can rely on strong digital infrastructure and high-quality scientific research community.** The country is also generally performing well on the digitalisation of businesses and governmental organisations. However, it will require **sustained efforts for it to remain above the EU average for indicators such as the take-up and application of key technologies**. In this context, the Dutch Digital Economy Strategy highlights the role of six European Digital Innovation Hubs (EDIHs), co-funded by the Digital Europe programme and national funds, in contributing both regionally and nationally to stimulating the application of digital innovation in SMEs and the public sector. EDIHs also enable SMEs and the public sector to access technical expertise and offer various opportunities for funding advice, training and testing through pilot and demonstration projects. Looking forward, cybersecurity and addressing strategic technological dependencies remain two of the country's key priorities.

2.1 Building technological leadership: digital infrastructure and technologies

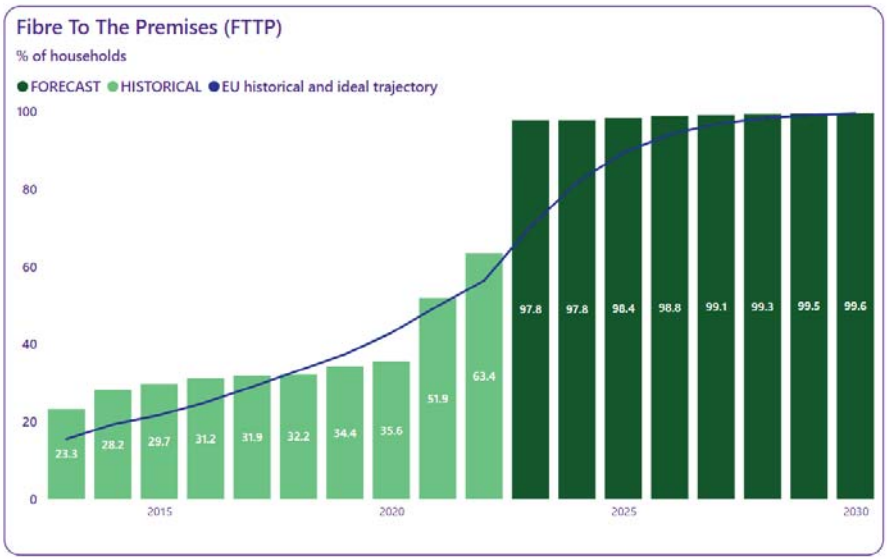
The Netherlands is actively deploying connectivity infrastructures, nearing the EU target for Very High-Capacity Networks (VHCN) coverage and having already reached 100% 5G coverage.

2.1.a Connectivity infrastructure (gigabit)[17]



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

[17] All historical values presented in the figures are sourced from the corresponding data sources and not the national roadmaps.



2023 state of play and recent progress

	Country level	EU level
FORECAST	97.8	70.3
DESI 2024	77.7	64.0
AVERAGE ANNUAL GROWTH %	22.6	13.5

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

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

The Netherlands brings a very strong contribution to the EU's Digital Decade target on Gigabit connectivity. The coverages for VHCN and Fibre-to-the-premises (FTTP) are both significantly above the EU average, at 98.3% and 77.7% respectively. While VHCN deployment seems to have stabilised, FTTP deployment has reached a double-digit annual growth rate (22.5%).

Telecom operators' **modernisation of telecoms infrastructure**, and both the incumbent and alternative telecoms operators' **continued roll-out of FTTH networks**, continue to play an important role in increasing national gigabit coverage. Up to the third quarter of 2023, according to the telecom monitor of the national regulatory authority ACM, **more than 1 million new fibre-optic connections were rolled out**, contributing to a total of about 6.7 million fibre-optic connections. This number is expected to grow even more in the coming years.

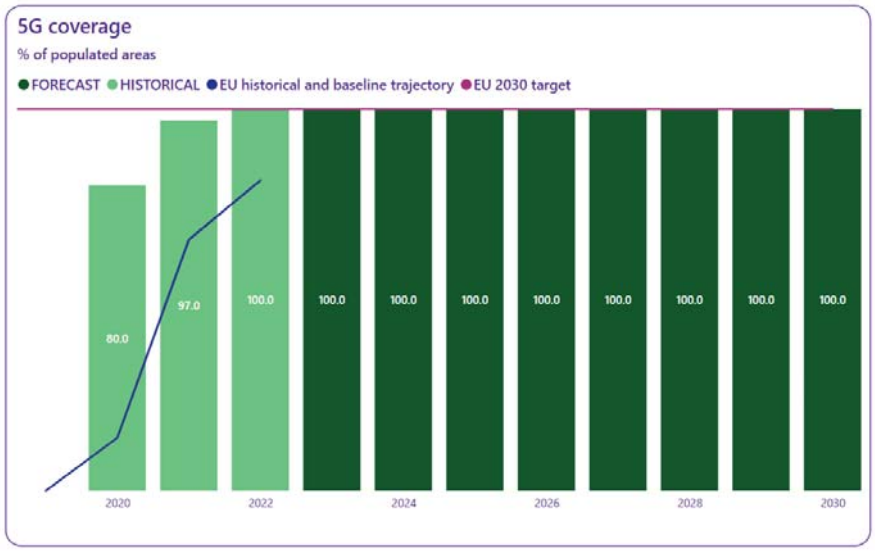
On consumer behaviour, in 2023, **the share of fixed broadband subscriptions in the Netherlands with speeds of 1Gbps or more amounted to 4.1%.** While this number doubled since 2022, it is still significantly below the EU average (18.5% in 2023). In 2023, some telecoms operators introduced multi-giga subscriptions, with one telecoms operator paving the way with an 8Gbps fibre broadband service. Such a fast internet bundle, however, is more likely to attract businesses, offices and large homes, rather than typical households. In contrast, most households and smaller businesses attach more importance to low costs when selecting a particular internet subscription, **suggesting that the high-quality infrastructure is not always used at its full potential**. ACM also reports a rise in the average price per month for mobile plans in 2023, up to EUR 18.20 compared to EUR 16.80 in 2022, placing the Netherlands in the middle bracket at European level. The prices for both fixed and converged offers remain among the most expensive in the EU.

On the issue of covering the remaining underserved areas, it is currently estimated that about 19 000 households are expected to remain without coverage from a fixed network providing at least 100 Mbps. As reported in the roadmap, the government continues to discuss with market players about connecting addresses where possible, using the available list of underserved addresses. The government will also continue to support the 12 Dutch provinces through knowledge exchange and expertise in the field of connecting underserved households in rural areas. Despite these efforts, it still appears unclear who will cover the costs to fund this gap, estimated at about EUR 195 million.

Generally, the regime for granting rights of way and access to physical infrastructure for rolling out networks is considered satisfactory, with the exception of some reported difficulties in parts of the country already covered by fibre. Overall, the Dutch telecoms market appears healthy and competitive, with three main operators ensuring good quality of service.

The Netherlands aims for 99.6% of households to be covered by FTTP and DOCSIS by 2030, which is very close to the EU target. Judging from its current level of coverage and the current dynamics, **the country's contribution** to the EU's Digital Decade target **is expected to be very significant.**

2.1.b Connectivity infrastructure (5G)



2023 state of play and recent progress

	Country level	EU level
FORECAST	100.0	
DESI 2024	100.0	89.3
AVERAGE ANNUAL GROWTH %	0.0	9.8

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

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

The Netherlands brings a very strong contribution to the EU's Digital Decade 5G target, with 5G coverage having reached 100% of populated areas already in 2022, based on the current KPI. However, higher quality of service and additional features are still needed to meet the demand for more advanced 5G services and to achieve the computing continuum that includes connectivity, cloud computing/AI and the Internet of Things (IoTs). Of critical mention in this respect is the 3.4-3.8 GHz band, which represents an essential band for enabling advanced applications requiring large spectrum bandwidth. This is particularly important given the elevated take-up of mobile broadband, with 94% of the population using the internet on a mobile device, which shows the importance of high-quality 5G.

After several delays due to legal proceedings, the Netherlands just recently (in March 2024) launched the auction of the 3.6 GHz band for the terrestrial provision of wireless broadband electronic communications services (5G). This delay reflects the low percentage of 5G pioneer bands assigned (33.3% against an EU average of 73.4%). Roll-out of 5G in the 3.6 GHz band, an essential band for enabling advanced applications requiring large spectrum bandwidth, will depend on the telecoms operators, but some stakeholders are positive it will be quick given the time available for operators to prepare in advance. The take-up of 5G by the population is clearly outpacing the EU average, with 103.5% of the population having a 5G SIM card, against 24.6% at EU level (this DESI indicator shows 5G mobile subscriptions defined as SIM cards that generated any internet traffic on a domestic 5G network in the last 90 days, with the unit of measure being the percentage of the total population). Over the past years, all three mobile network operators have been active in switching off 2G and 3G networks to free up spectrum for 5G, decreasing costs and increasing energy efficiency, and are planning to switch off the remaining 2G and 3G networks in the coming years.

In 2023, the Netherlands has also been preparing for the assignment of the 26 GHz band. The government commissioned an external consultant to conduct a detailed analysis, the results of which are expected in the first half of 2024. The technical analysis will follow, with a decision expected at the earliest in 2025.

With 100% of 5G coverage, the Netherlands is fully aligned with and contributing significantly to the EU's 2030 target. In its roadmap, the country presents one measure to make available the 3.6 GHz and 26 GHz bands for 5G, running until 2025. Looking forward, once spectrum in these bands is assigned**, it will be important to monitor and stimulate the roll-out of high-quality 5G coverage across the country.**

2.1.c Semiconductors

Dutch semiconductor companies continue to expand their activities and to lead in the production of advanced lithography technology, both at EU and international levels. The Netherlands is one of the main players in the EU's semiconductor market. The Dutch company ASML is among the world's most valuable companies by market capitalisation (about EUR 377 billion as of June 2024) and the only company in the world producing extreme ultraviolet lithography (EUV) machines. This is critical in the EU's effort to build technological capacity.

The Netherlands has also been leading initiatives like PhotonDelta, focusing on developing the photonic semiconductor industry and financing consortia like the NXTGEN HIGHTECH, which centres on producing new equipment to improve the manufacturing process for photonic chips. At EU level, the country is participating in the multi-country project on Microelectronics and Communication Technologies, with four Dutch projects involved in the industrial deployment covering microelectronics and communication technologies across the whole value chain. The Netherlands is also involved in the Chips Joint Undertaking, which aims to bridge the gap between research and industry and leave the EU less reliant on foreign semiconductors. On top of the established initiatives, the country is also investing more in security instruments and measures, such as introducing export controls of certain advanced semiconductor manufacturing equipment, while also establishing international partnerships with like-minded countries.

Despite its strong positioning, the Netherlands is still struggling to find the right balance between exploiting the full potential of the semiconductor industry and ensuring the security and resilience of the value chain in the context of growing trade restrictions and a changing geopolitical situation. In early January 2024, the government adopted the Dutch National Technology Strategy, identifying the 10 key sectors and technologies that are strategically important to ensure economic growth and international competitiveness, and where the country is well-positioned to successfully contribute at EU level. Among the key technologies mentioned are optical and lithography systems for the semiconductor industry. Shortly after, in March 2024, the central government and regional authorities committed to a substantial investment plan amounting to EUR 2.5 billion under the name of 'Project Beethoven'. This will support education, knowledge and spatial infrastructure (i.e., infrastructure for pilot, testing and production facilities) in the Brainport Eindhoven region, located in the south of the Netherlands and home to some of Europe's most innovative high-tech and IT companies. Amid this important investment, the government also plans to take a more coherent and coordinated approach to chip machines and improve the attractiveness of the financing environment through potential upcoming regulation. Looking forward, maintaining a good business and investment environment will be crucial to ensure that leading semiconductor companies do not seek to move their businesses elsewhere. As many of the key Dutch initiatives in the sector largely depend on the National Growth Fund, its continuation is also essential for the sector and for reducing the country's strategic dependencies.

In its roadmap, the Netherlands acknowledges the EU 2030 goal as a basis to start more concrete discussions on the Dutch national contribution. In this context, the government is planning to establish the Semiconductor Board NL, a platform made up of representatives of the semiconductor sector from both the

public and private domains, who will meet to discuss policy priorities, strategies and opportunities to develop the industry.

2.1.d Edge nodes

In accordance with the Digital Decade KPI, 27 edge nodes are estimated in the Netherlands, representing more than 2% of the total 1 186 estimated edge nodes at EU level, according to the Edge Deployment Data Report. Edge nodes are devices or servers processing data close to its source and are therefore crucial for reducing latency and bandwidth. **The Dutch roadmap sets no national target on edge nodes.** Despite this, several Dutch research institutions and companies are working on edge computing solutions and exploring the potential of edge nodes in sectors like smart cities, healthcare and manufacturing, particularly to increase performance and improve cybersecurity and customer experience.

At national level, the Netherlands hosts the Centre of Excellence for Data Sharing and Cloud. The centre brings together initiatives to promote data sharing activities and to help organisations realise data spaces. Such initiatives include the Data Sharing Coalition, the Data Sharing working group of the Dutch AI Coalition and the Gaia-X Hub Netherlands. Ultimately, the centre plays a key role in providing good practices, guidance and standards for integrating edge nodes into computing environments. At EU level, the Netherlands participates in the 'Next Generation Cloud Infrastructure and Services' Important Project of Common European Interest (IPCEI) through one project supporting research, development and the first industrial deployment of European innovations in cloud and edge technologies (see more in the section on cloud).

2.1.e Quantum technologies

The Netherlands plays a key role in advancing quantum computing and related technologies worldwide, with quantum technology identified as another key element in the Dutch National Technology Strategy.

Over the past year, the Netherlands further supported the **Quantum Delta NL**, the main national programme advancing quantum technologies. This is one of the main measures included in the Dutch Recovery and Resilience Plan (RRP). In late 2023, the initiative secured investments amounting to more than EUR 60 million to strengthen the European collaboration with France and Germany and to create synergies between the three national quantum programmes. **The Netherlands is home to some world-leading quantum technology research centres**, such as QuTech on the Delft Technical University campus. QuTech addresses scientific challenges and engineering issues in a joint centre of knowhow with industrial partners. It is one of the most important quantum centres at both European and global level, with active collaborations with Microsoft and Intel.

The past year has also seen growth in several start-ups and scale-ups in the quantum field, some as spin-offs from its research centres. However, funding still appears limited, particularly from private investors, who still do not see the field's long-term profitability. With an eye to cybersecurity and with a view to developing quantum computing in the coming years, in April 2023 the Dutch government published a handbook on the migration to post-quantum cryptography (PQC). The handbook features recommendations on how entities can start working on mitigating measures.

Overall, the Netherlands is contributing significantly to the field of quantum technologies, both from an academic and industrial perspective. There is still some room for improvement on ensuring a safe environment for the continuity of existing research institutions, business investments and skills in the sector. Looking forward, the Netherlands mentions in its Digital Open Strategic Autonomy action plan that it will investigate whether it can host a hybrid quantum supercomputer as part of the EuroHPC.

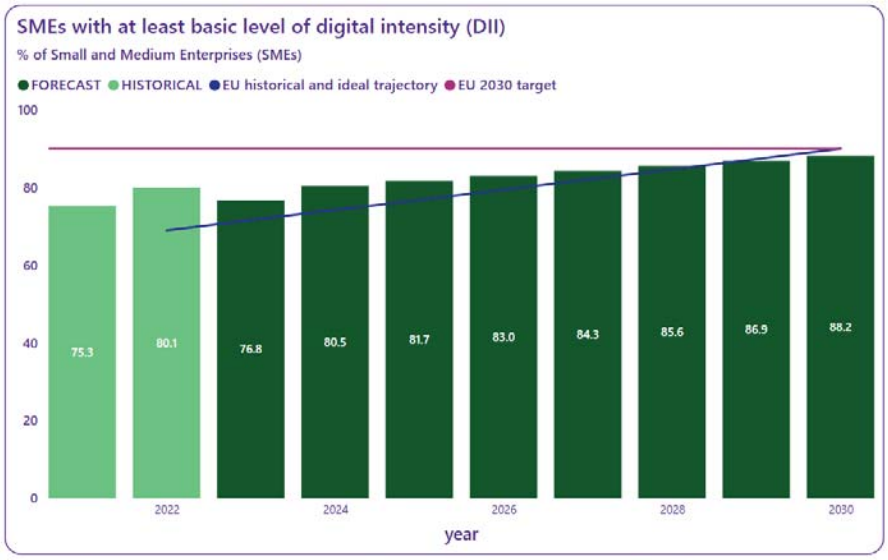
Best practice: the Dutch agenda on digital open strategic autonomy (DOSA)

In October 2023, the Dutch central government published an ambitious Action Plan on Digital Open Strategic Autonomy (DOSA). The plan identified 10 policy priorities, each representing either strategic risks or opportunities to bolster the Netherlands' position within key value chains. In the EU context, the action plan advocates enhancing the EU's capabilities across these strategic domains. Additionally, the agenda outlines five cross-cutting priorities that aim to reinforce the Dutch Open Strategic Autonomy: (i) fostering competitiveness; (ii) streamlining policy development and decision-making processes; (iii) enhancing security policy measures; (iv) promoting knowledge and skills development; and (v) fostering international cooperation. Each policy priority includes an analysis of challenges and opportunities within the European and global market landscapes, alongside a comprehensive overview of past and proposed actions. The DOSA agenda is an important milestone towards the more recent publication of the National Technology Strategy and an ambitious plan serving as an example of best practice in the EU landscape.

2.2 Supporting EU-wide digital ecosystems and scaling up of innovative enterprises

The Netherlands possesses a thriving digital ecosystem, with an innovative ecosystem of enterprises, research institutions and governmental organisations. The aims presented in the Digital Economy Strategy in November 2022 include: (i) fostering innovation by supporting start-ups, scale-ups and smaller enterprises through funding programmes, tax incentives and initiatives to facilitate access to capital and markets; and (ii) investing in R&D to increase the use of advanced digital technologies, such as cloud technology, AI and big data. **The ambition is to build a Dutch business community that is frontrunner at EU level in terms of SMEs' adoption of digital technologies.**

2.2.a SMEs with at least a basic level of digital intensity



2023 state of play and recent progress

	Country level	EU level
FORECAST	76.8	71.6
DESI 2024	78.6	57.7
AVERAGE ANNUAL GROWTH %	2.2	2.6

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

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

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

With 78.6% of SMEs having at least a basic level of digital intensity, the Netherlands brings a very strong contribution to the EU's Digital Decade target on the digital intensity of SMEs, while showing a limited dynamic compared to the 2021 figure (the last comparable year that used a similar methodology to measure the digital intensity of enterprises)**.** Moreover, 6.8% of Dutch enterprises employing 10 or more people are recognised for their very high digital intensity index, according to the 2023 Edge Deployment Data Report. Although SMEs are increasingly embracing and adopting digital technologies, **some indicators**

suggest there is still some untapped potential. For example, only 24.8% of SMEs are selling their products online.

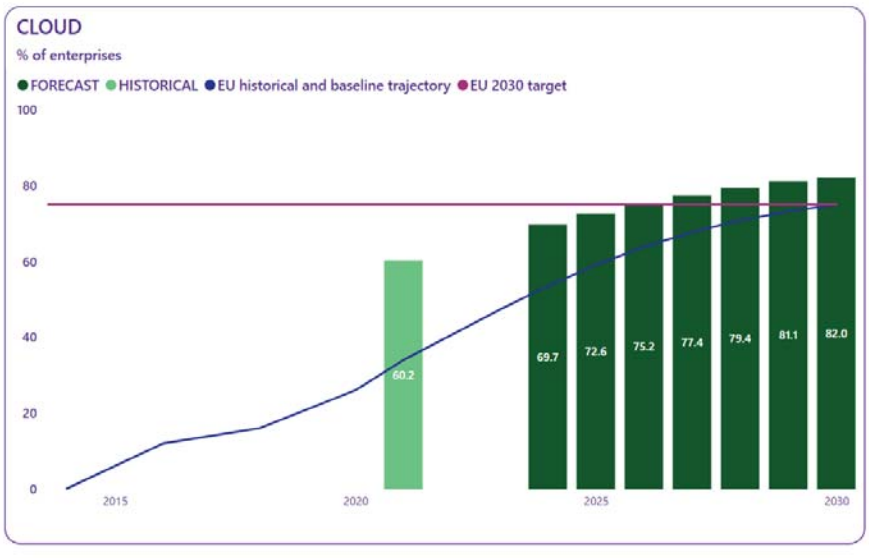
The Netherlands has already presented several funding programmes to support SMEs in the adoption and development of digital technologies. As reported already in the 2023 State of the Digital Decade Report, the Digital Workplaces regional programme financed 20 digital workplaces made up of students with EUR 7.4 million allocated for a 3-year period. Between June and December 2022, the Dutch government ran a pilot for the My Digital Business (*Mijn Digitale Zaak)* subsidy, which provided financial support for the investments of 750 SMEs. In 2023, a second pilot was launched supporting an additional 400 SMEs. The total national budget amounted to EUR 2.7 million across the two phases. Finally, the Smart Industry programme, which aims to increase manufacturing industry SMEs' implementation of digital technologies, received an additional EUR 450 000 per year for the period 2023-2025. The expected goal is to help about 1 000 SMEs in the manufacturing industry.

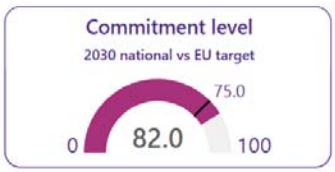
In its roadmap, the Netherlands highlights the ambition to exceed the EU target (90%) to reach 95% of SMEs with at least a basic level of digital intensity by 2030. However, this does not match the trajectory, which projects that the digital intensity index will reach only 88.2% of enterprises by the end of the decade. Considering its good starting point, **the Netherlands could envisage a higher level of ambition in its national trajectory.**

Looking forward, the main new measure presented in the Dutch roadmap to digitalise SMEs is the European Digital Innovation Hubs. The Dutch hubs started in July 2023 and will continue until 2024, with a possibility for extension. Moreover, Dutch companies, institutions and governments affirmed their joint commitment to a mission-driven innovation policy for the next 3 years (i.e., until 2027), developing a multi-year strategy for strengthened public-private cooperation on both research and market introduction of several digital technologies.

2.2.b Take-up of cloud / data analytics / AI

- **Cloud**





2023 state of play and recent progress

	Country level	EU level
FORECAST		47.3
DESI 2024	57.4	38.9
AVERAGE ANNUAL GROWTH %	-2.4	7.0

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

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

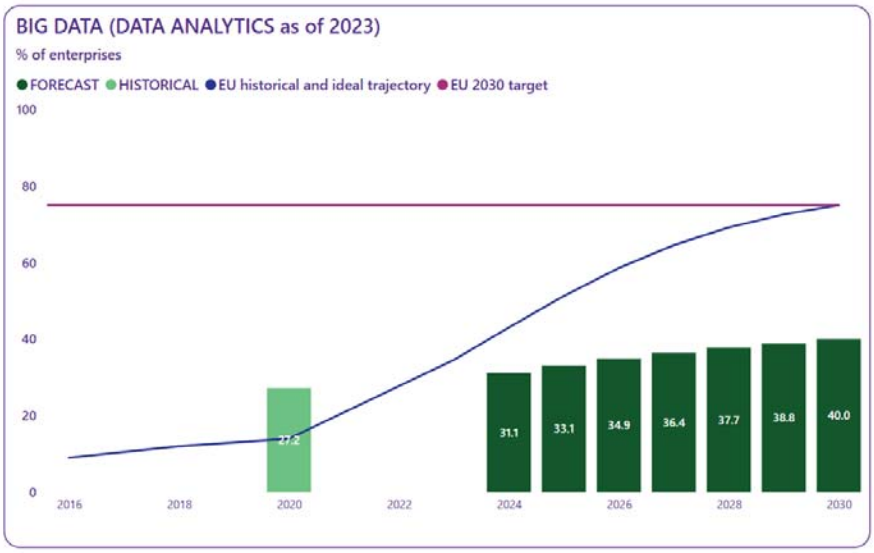
The Netherlands brings a very strong contribution to the EU's Digital Decade, with the take-up of cloud solutions by Dutch enterprises (57.4% in 2023) above the EU average (38.9%). However, **it shows a very limited dynamic possibly as a result of a recorded decrease in the cloud hosting enterprises' databases(s).**

In other words, some enterprises that bought hosting for their database(s) in the cloud considered switching from the cloud to their own facility due to cases of cloud ransomware (in March 2022 a well-known cloud service provider was hacked).

The Netherlands' roadmap displays a level of ambition (82%) above the EU's 2030 target of 75% of enterprises adopting cloud solutions. The figure is linked to the Netherlands' good starting point in this area. However, based on the current rate of progress, **reaching the target by 2030 may require an intensification of efforts.**

As mentioned earlier, **the Netherlands takes part in the Important Project of Common European Interest on Next Generation Cloud Infrastructure and Services (IPCEI-CIS)** (with one project and one direct participant), which will help accelerate the development and adoption of cloud technologies for businesses in the EU. No further measure is presented to stimulate the take-up of cloud computing in the roadmap.

- **Data analytics (Big Data)[18]**



2023 state of play and recent progress

	Country level	EU level
FORECAST		34.6
DESI 2024	48.6	33.2
AVERAGE ANNUAL GROWTH %		

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

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

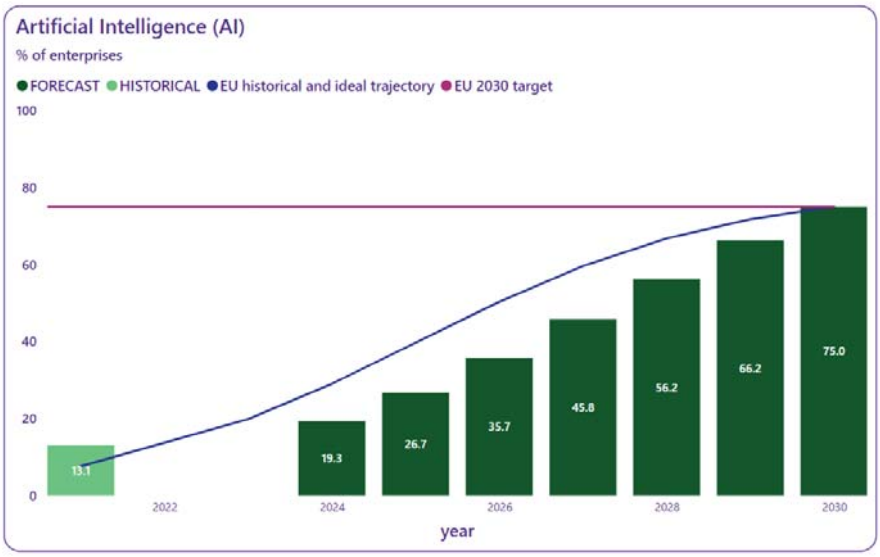
On the use of data analytics by SMEs, the Netherlands brings a very strong contribution to the EU's Digital Decade target, **with 48.6% of enterprises adopting data analytics**. Progress cannot be assessed for this target since the definition of the indicator has changed.

The Netherlands' roadmap displays a level of ambition (40%) below the EU's 2030 target of 75% of enterprises adopting big data/data analytics. With the country starting above the EU average (33.2%), **a higher level of ambition for this national target could be envisaged.** The growth rate for the indicator cannot be calculated, but nothing indicates that the Netherlands is not on track to achieve the 2030 target.

The country does not present dedicated measures to foster the adoption of data analytics in its roadmap. However, given the current average level of adoption, it could rely on existing initiatives such as the Centre of Excellence for Data Sharing and Cloud, EDIHs, sectoral initiatives such as iShare, JointData and the Digital Infrastructure Logistics programme, the latter being highlighted already in the 2023 report and planned to run until 2027.

[18] As of 2023, Eurostat changed the Big Data into a Data Analytics indicator, thus disabling comparison with previous years.

- **Artificial Intelligence**



2023 state of play and recent progress

	Country level	EU level
FORECAST		19.9
DESI 2024	13.4	8.0
AVERAGE ANNUAL GROWTH %	1.1	2.6

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

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

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

The Netherlands is bringing a very strong contribution to the EU's Digital Decade target, with 13.4% of SMEs having adopted AI. Nonetheless, **the country has demonstrated a limited dynamic (1.1%) in recent years**, compared to that of the EU (2.6%).

The Dutch research landscape is particularly strong, with good collaboration overall between public and private stakeholders on data and AI, as exemplified by networks like Commit, Commit2Data and the AI Coalition. The Civic AI Lab is also worth noting, with several doctoral researchers working with the city of Amsterdam and its university on research focused, for instance, on AI governance in the public sector.

AI solutions are already being used in several different sectors in the Netherlands, including in the technical industry, education, agri-food, medicine and health, finance and more. To boost the application of AI for businesses, the Dutch government has also been investing in knowledge, R&D, labs and pilots in all sectors of society through the National Growth Fund and the National Research Council (NWO). Despite the ongoing efforts, the Dutch government highlights there is need for more public and private funds to scale-up successful AI applications, as access to capital is currently still insufficient. Moreover, there are still some challenges over SMEs' adoption of AI because of difficulties in accessing data, talent and computing infrastructure. Overall, despite a good starting point, Dutch SMEs' uptake of AI appears slower than that of larger enterprises.

The Netherlands set a 2030 target of 75% of AI adoption in its roadmap, aligned with the EU 2030 target. Judging from the current rate of progress, **an intensification of efforts in the coming years will be needed to reach the target by 2030.**

Looking forward, the Netherlands highlights in its roadmap that SMEs' uptake of AI could be stimulated by the mission-driven innovation policy until 2027, combined with further investments in regional AI hubs and the AiNed programme, which is part of the Dutch RRP. Moreover, if developed correctly, initiatives like GPT-NL, the Netherlands' open language model funded by the Ministry of Economic Affairs with a budget of about EUR 13.5 million, can provide an excellent innovation tool for both public institutions and private companies.

- **Take-up by enterprises of cloud or AI or data analytics**

Taking the three technologies together (adoption by enterprises of either AI or cloud or data analytics), the Netherlands stands at 70.9%, well above the EU average of 54.6%. This above-average performance will need to continue to grow in the next few years if the country wants to keep contributing significantly to the EU target.

2.2.c Unicorns, scale-ups and start-ups

The Dutch tech start-up ecosystem remains strong but shows signs of stagnation. Venture capital investments for seed and start-up in the Netherlands amounted to 7% of GDP in 2022. However, as highlighted in the State of the Dutch Tech Report 2024, Dutch tech companies typically take longer to secure funding compared to other EU companies, particularly after the initial seed investment, and often depend on foreign venture capital funds for larger deals. This translates into a slower growth rate. Moreover, the report shows tech companies in the Netherlands slowed down hiring in 2023, even though open vacancies remain high, with a large proportion of talent coming from abroad.

As already reported in the 2023 State of the Digital Decade Report, techleap, the non-profit organisation funded by the Dutch Ministry of Economic Affairs and Climate Policy, continues to support the acceleration of the Netherlands' tech ecosystem. Dutch universities also continue to offer particularly fertile ground for the birth of new tech start-ups in the country, with research-based start-ups raising around 20% of the total Dutch tech funding in 2023. Scaling up, however, appears more challenging. Despite starting strong, with 30 unicorn companies in 2023, the Dutch tech start-up sector will need increased capital and investments in talent to grow further in the coming years. Looking forward, the roadmap does not present any further measure to support start-ups and unicorns.

2.3 Strengthening cybersecurity & resilience

The Netherlands values cybersecurity, both to combat cyber threats and to strengthen democratic and human rights principles online. According to the Digital Decade Eurobarometer, 92% of Dutch respondents said improved cybersecurity would significantly facilitate daily use of digital technologies against an EU average of 79%. Cybersecurity features as one of the core pillars of the Dutch Strategy for the Digital Economy. The strategy aims to (i) improve the availability of the government, companies and social organisations to reduce (relevant) risks to an acceptable level; (ii) strengthen cybersecurity of digital products and services and strengthen cybersecurity knowledge development and innovation; and (iii) develop the right digital skills necessary for people to be cyber-aware, confident and resilient when using technologies. Strengthening cybersecurity is also one of the central goals listed in the Values-Driven Digitalisation Work Agenda, where the focus is to find common ground between taking advantage of the opportunities of digitalisation and ensuring public values are protected. In this context, the Dutch International Cyber Strategy 2023-2028 is also worth highlighting, as it describes the Netherlands' willingness to strengthen democratic and human rights principles online and contribute to maintaining a globally interconnected, open, free and secure cyber domain.

Overall, the Netherlands shows good awareness and use of ICT security measures, despite the risk of exposure to cybersecurity incidents. In 2022, 30.4% of enterprises reported being insured against ICT security incidents (EU average: 25%) and 95.6% reported the use of ICT security measures (EU average: 91.8%). Nonetheless, always in 2022, 24.0% of Dutch enterprises registered ICT security incidents leading to unavailability of ICT services, destruction or corruption of data or disclosure of confidential data; this share was among the highest in the EU and clearly suggests a need for improvements to the Dutch infrastructure from a cybersecurity perspective.

Already in 2022, the Dutch government, under the coordination of the Minister for Justice and Security, presented its **ambition to improve cybersecurity and resilience at national level** in the Netherlands Cybersecurity Strategy (NLCS), with over 140 actions between 2022-2028. In 2023, a progress report was published, summarising the main achievements over the past year. Among these, the government has been actively improving the digital resilience of public authorities, businesses and organisations, for instance by integrating the government's cyber security organisations: the National Cyber Security Centre (NCSC), the Computer Security Incident Response Team for Digital Service Providers (CSIRT-DSP) and the Digital Trust Centre (DTC). The DTC is involved, among other things, in providing tools and advice to help SMEs improve their digital resilience. Efforts were also made to enhance cybersecurity partnerships, through the development of the Nationwide Network of Cybersecurity Partnerships and the Cyclotron programme, with the goal of improving information sharing. **Despite progress, the Dutch government still emphasises the difficulty of finding and developing good metrics for cyber damage, resilience and growth.**

To kickstart the implementation of important EU legislation on digital products and services, **the Netherlands has taken several actions over the past year to help both consumers and traders be informed about new directives.** The Ministry of Foreign Affairs has also significantly increased the number of cyber diplomats, while the Ministries of Interior and Kingdom Relations, Economic Affairs and Climate Policy and Justice and Security have been actively engaged in public awareness campaigns directed at Dutch citizens. The 'Do your updates' (*Doe-Je-Updates*) campaign, for instance, encourages people to update their smart devices regularly. Finally, the government established a contact point in late 2023 where people can ask questions about the security levels of all government websites. Looking forward, the Dutch government highlights the importance and challenge of shifting to a longer-term mentality, to ensure smaller efforts become fully integrated in the Dutch digital culture.

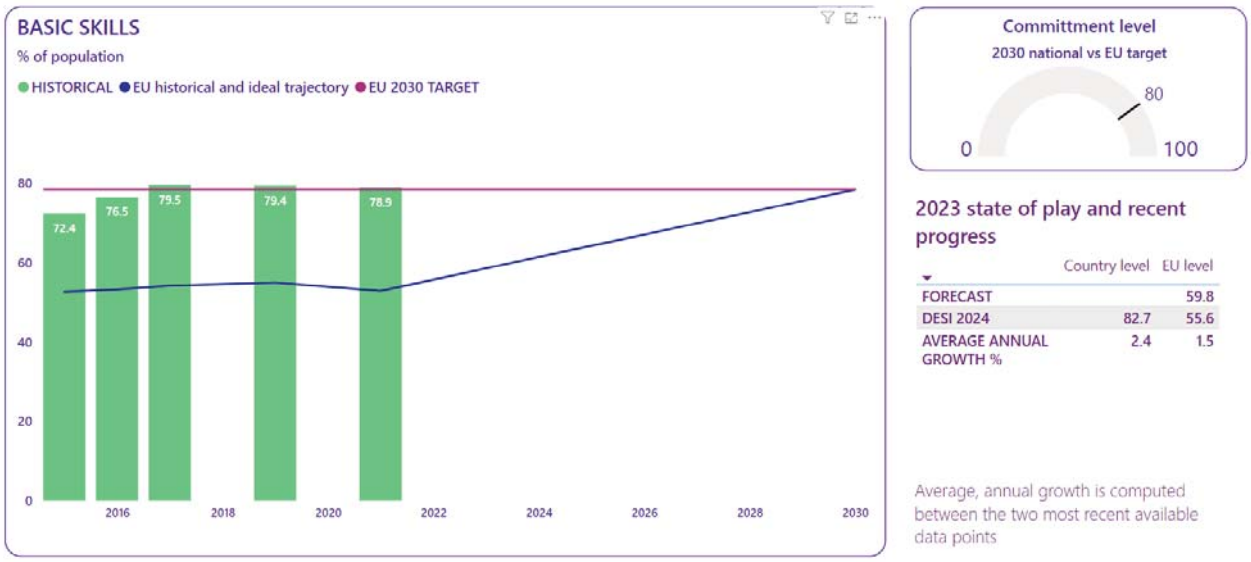
3 Protecting and empowering EU people and society

3.1 Empowering people and bringing the digital transformation closer to their needs

Digital skills are a priority for the Netherlands. This is clearly reflected in both the Dutch Strategy for the Digital Economy and the Value-Driven Digitalisation Work Agenda, which focus on improving the digital skills of both people, to ensure no one is left behind in the digital transition, and workers, to create a future-proof job market. The Netherlands gives particular attention to digital skills as a broader and necessary educational element for people to participate in the digital economy and society, as well as to better understand, trust and make use of digital technologies, while having good control over their digital lives. By improving people's skills and knowledge of all things digital, from the functioning of AI to the importance of cybersecurity, the Netherlands also aims to build a more inclusive, transparent and open digital environment.

3.1.1 Equipping people with digital skills

3.1.1.a Basic digital skills



Note 1: Data break-in-series in 2020

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

The Netherlands brings a very strong contribution to the EU's Digital Decade target on basic digital skills and has further improved its performance showing a positive dynamic. Over the last year, the country reached the EU 2030 target and even surpassed it, with 82.7% of people having at least basic digital skills, and a good age and gender balance. According to data from 2023, 82.8% of men and 82.6% of women were reported to have at least basic digital skills. The percentage of individuals remains high even for those with at least basic digital content creation skills (86%, versus 68% in the EU) and with above basic digital skills (54.5%, versus 27.3% in the EU) in each of the following dimensions: information and data literacy, communication and collaboration, problem solving, digital content creation and safety.

The Netherlands' excellent performance is linked to long-standing and sustained efforts from the Dutch authorities, including actions to improve the country's overall digital literacy and critical thinking when using technologies. One of the central measures is the Count on Skills programme (*Tel mee met Taal*), which offered subsidies for activities to improve the literacy, including digital literacy, of adults at regional level, as well as to encourage people to become more active and informed in the digital society. Through the programme, municipalities received EUR 85.5 million annually to fund courses in libraries, community centres and work settings. Since the Count on Skills programme was first launched, 14 municipalities have started to set-up their own networks of local support. The amount spent on courses focusing on digital skills has also increased, indicating an overall rise in interest and need for digital tools. The programme's work is further supported by the setting up of a network of about 700 local information points, where more than 100 000 people overall sought help on many kinds of digital questions, including the use of online public services. This reflects the overall good interest reported in the Digital Decade Eurobarometer, according to which 36% of Dutch respondents (one of the highest EU scores) believe improving human support to help access and use digital technologies and services would be very significant.

On basic digital skills, **the Netherlands gives much attention to the need for people to become increasingly independent when accessing and using both public and private online services, in the attempt to close the digital divide and improve digital inclusion**. The Digital Society Alliance *(Alliantie Digitaal Samenleven)* is a good example of a measure that develops (since 2019) various initiatives to

provide support for customers facing digital challenges. In 2023, for example, the Digital Society Alliance and the banking sector introduced banking information points that people can use to get help with their online banking services. The Netherlands intends to continue funding the project with approximately EUR 2.1 million annually until 2025. Another good example of a tool that was created to allow citizens to practice their digital skills is the Digihandig app. The app, which was completed in 2023, helps users to learn how to use all kinds of online apps in an interactive way. With more than 1 000 downloads, Digihandig has received multiple good reviews, particularly from senior citizens learning how to use mobile banking, install new apps or make safe searches on the internet.

Looking forward, the Netherlands reports in its roadmap its intention to go beyond the EU target value of 80%, aiming to have 100% of its population with at least basic digital skills. However, the national target and trajectory are not formalised in the roadmap. Based on the country's strong starting point, its current rate of progress and assuming the ongoing efforts will be sustained and produce real results, **the Netherlands' contribution to the EU target will continue to be very significant.**

The country's high level of ambition reflects its intention of reaching the highest possible level of citizens having at least basic digital skills, which is seen as a prerequisite to ensure no one is left behind. The path to further increase the level of basic digital skills is well substantiated, with a roadmap that highlights the need to continue supporting five existing measures, two of which are planned to run until 2030. The total approximate budget of EUR 347.5 million comes mostly from national resources. The focus will be on continuing to develop digital skills at different levels of the education system, taking a local-level approach with the support of the network of libraries and municipalities already in place. The goal is to enhance people's knowledge, critical thinking, control and trust of the online space. This includes raising awareness on the functioning of algorithms, on online security and on how personal data are used by websites. The plan is also to make digital literacy a permanent component of the curriculum in primary and secondary schools, although there is no precise timeline**. Actions at national level will be more than crucial to support and validate measures at local and regional level.** Finally, the Dutch government plans to ensure a balance between empowering people to use digital technologies, while keeping users, in particular children, protected from potential online threats and encouraging them to enjoy life offline. This is reflected, for instance, in the government's recent recommendation to ban cell phones, tablets and smartwatches from classrooms, to limit distractions during lessons.

3.1.1.b ICT specialists

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

On ICT specialists, the Netherlands brings a very positive contribution to the EU's Digital Decade target, nonetheless showing a very limited dynamic. In terms of share of employment, the number of ICT specialists in the Netherlands stands at 6.9%, above the EU average of 4.8%. In absolute numbers, the country hosts about 673 700 employed ICT specialists in 2023, down from the 685 000 ICT specialists reported in the previous year.

Although the share of ICT specialists in employment is above the EU average, significant shortages remain for technically skilled staff. According to a government report, only two out of three ICT professionals are employed in ICT jobs. In 2022, the ICT labour shortage resulted in 42.2% of IT companies experiencing an impediment in their business activities. Gender biases are also common in the Netherlands when it comes to choosing ICT-related careers. This results in gender imbalance in ICT specialists, with approximately 546 500 male ICT professionals and much less than half (127 100) female ICT professionals reported at the end of 2022. In 2023, women represented 18.9% of ICT specialists in 2023, down on the year before (19.4%) and below the EU average (19.4%).

To address the ICT market shortages, the government has mostly been focusing on training and awareness courses to attract more young people to study and work in ICT-related careers. In 2023 the Dutch government, together with digital stakeholders and associations, launched an action plan on Green and Digital Jobs (*Actienplan Groene en Digitale Banen)*, to address labour market shortages in sectors that are key for the climate and digital transitions. The plan focuses on: (i) increasing the inflow of workers from declining industries into digital jobs through upskilling and reskilling; (ii) strengthening labour productivity; (iii) providing incentives and subsidies for companies and individuals adopting digital practices; and (iv) reinforcing governance and countering fragmentation in the labour market. The Dutch government has also been investing in scaling up successful public-private partnerships that facilitate the connection between education and the job market, including an investment of EUR 210 million through the National Growth Fund, earmarked to amplify existing public-private partnerships. On top of this, together with the Ministry of Education, Culture and Science, the Dutch government is subsiding Co-Teach Informatica. Through this programme, several guest lectures by IT professionals were organised in upper secondary schools around the country, to introduce ICT skills and computer science to students. To help scale this up at national level, the Co-Teach Informatica pilot project was introduced by several Dutch universities, digital stakeholders,

companies and trade unions. The project supports schools and teachers across the country in shaping content of computer science and IT courses. Turning to more specific training, the Cloud IT Academy Foundation, which has approximately 2 500 hosting and cloud parties and is supported by key Dutch industry associations, has developed a dual higher vocational education programme on cybersecurity and cloud computing. The Academy is also working on software development in partnership with the University of Applied Sciences in Utrecht. These programmes focus on practice-oriented training to help prepare students for the needs of the market.

Another important measure contributing to the Netherlands' achieving of the Digital Decade target is the Human Capital Agenda ICT. The programme, in force since 2015, aims to increase the number of ICT specialists in the country. The focus will now be to continue encouraging and supporting regional collaborations, improving ownership of the business sector in upskilling and reskilling the labour force, and advancing in the building of reskilling programmes for intermediate vocational education to make ICT reskilling more accessible for the working population. To take the next step, in 2023 the Ministry of Economic Affairs mandated every region in the Netherlands to analyse their workforce and the needs of their local industries, as well as to assess the availability of educational initiatives that could help bridge the job market gaps. This analysis will give insights into the development of regional action plans, contributing to more digital professionals who can drive the regional economy through the digital transition.

The Netherlands aims to have ICT specialists account for around 9.2% of people in employment, a target close to the EU target of 10% of ICT specialists by 2030. The figure is linked to the Netherlands' good starting point in this area. The country's contribution to the EU target will continue to be very significant, **but the very limited dynamic will require a careful eye on the impacts of ongoing efforts**. Addressing tightness on the Dutch job market will remain a challenge that needs to be addressed systematically. Further improvements may be needed, particularly on connecting vocational education with the needs of the job market, and on making the ICT sector generally more attractive.

Looking forward, the Netherlands plans to encourage more public-private partnerships in digital education. On upskilling and reskilling, the Netherlands subsidised TechmeUp for use in a project that invests in retraining women for ICT jobs. TechmeUp is a tech fund that gives a zero-interest loan to those who cannot afford digital training or are facing challenges in combining work and training. The government is also helping the development of a taskforce for diversity and inclusion, which works with enterprises to increase the inflow of women into tech education and the associated job market, and to ensure that women advance and are retained in the sector. In this context, the taskforce has developed a benchmark for firms to track how diverse they are. However, as reported above, when it comes to promoting access of women to the ICT sector, the Netherlands is still far from achieving a gender-balanced ICT specialist workforce by 2030.

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

The Netherlands shows a trend of increasing digitalisation, with 95% of individuals using the internet in the last 12 months for the purpose of interacting with public authorities on websites or mobile applications. **In light of the high numbers, it is crucial that both public and private services are being guaranteed to all, regardless of their skills, experience and age.** This premise is based on three essential prerequisites: (i) all citizens should have the option of choosing whether to access key services online or offline; (ii) public services should be simpler and reflect the needs of people's everyday lives; and (iii) all services must be secure and reliable.

3.1.2.a e-ID

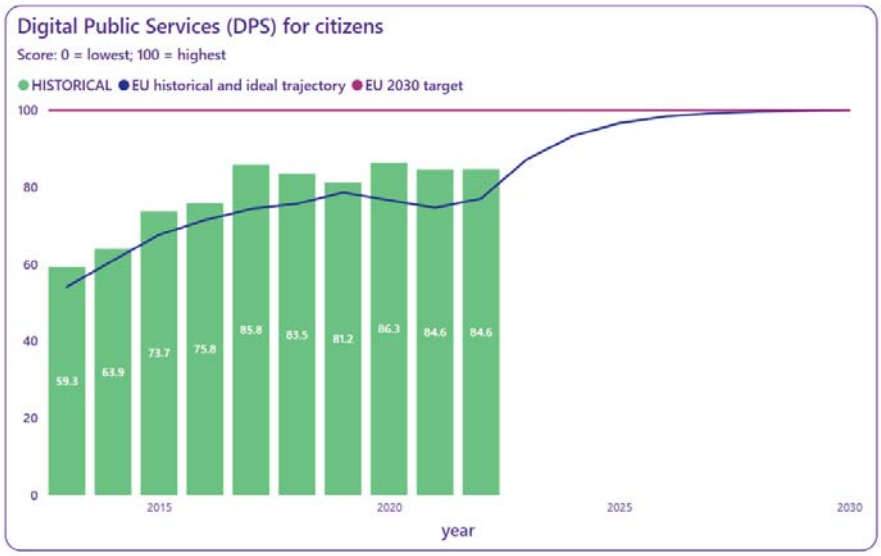
e-ID has attracted a lot of attention in the Netherlands in recent years, particularly for its potential to facilitate business operations, but also for tax, pension and education purposes. Data from Eurostat shows

that about 95% of Dutch citizens used their e-ID to access public services in the last 12 months. This recognition has translated into an increase in the availability of different kinds of electronic identifiers, in particular developed by private businesses. With greater attention and availability comes greater responsibility to ensure e-ID wallets respect the necessary standards. In this context, the Dutch government is focusing on ensuring that: (i) by 2025, both citizens and businesses will have access to at least one form of EU digital identity (if not more) recognised by the national government and in line with the EU's Digital Identity Framework Regulation; (ii) that all e-ID wallets respect public values like privacy, accessibility and security; and (iii) that e-ID wallets can be easily used by all Dutch citizens according to their free choice, both in terms of login method and of use of services offline and online.

Over the last year, the Netherlands has mainly been preparing the ground for effective implementation of e-ID and on finalising and developing new legislation on digital governance. After the official entry into force of the Digital Government Act (Wdo) in the summer of 2023, which ensures that Dutch people and businesses can log in safely to (semi-) government services online, the Netherlands has been focusing on improving and standardising accessibility to government websites and applications, while also encouraging organisations to update their online security information. The country reported that, in 2023, several public services increased their minimum level of assurance, including the Tax and Customs Administration and MyGovernment (MijnOverheid). To ensure the Dutch ID wallet remains user-friendly for all citizens, the central government has also further developed the architecture for its reference wallet, also known as NL Wallet, first presented in demo version in early 2023. App designs and source code were published on platforms including GitHub and Figma, with an active community of over 700 members participating. The first public open-source example version should be made available in 2024 for users to test before the e-ID regulation is adopted. In this pilot phase, the Netherlands highlighted that particular attention will be given to improving user experience and ensuring that people with disabilities can also send their feedback. In parallel, the country has been participating in three European pilots to test digital identity wallets in real-life; the lessons learned will be used to improve the Dutch sample wallet.

Overall, the Netherlands is advancing well on setting the groundwork for implementation of e-ID. Looking forward, the Netherlands aims to diversify and facilitate access to different approved login methods. With some potential candidates already interested in providing alterative electronic identifiers, the goal is to give Dutch people and businesses the opportunity to choose freely. **Sufficient funding and further standardisation will be crucial to ensure the wallet's proper implementation, in line with the EU Digital Identity Framework Regulation.**

3.1.2.b Digitalisation of public services for citizens and businesses



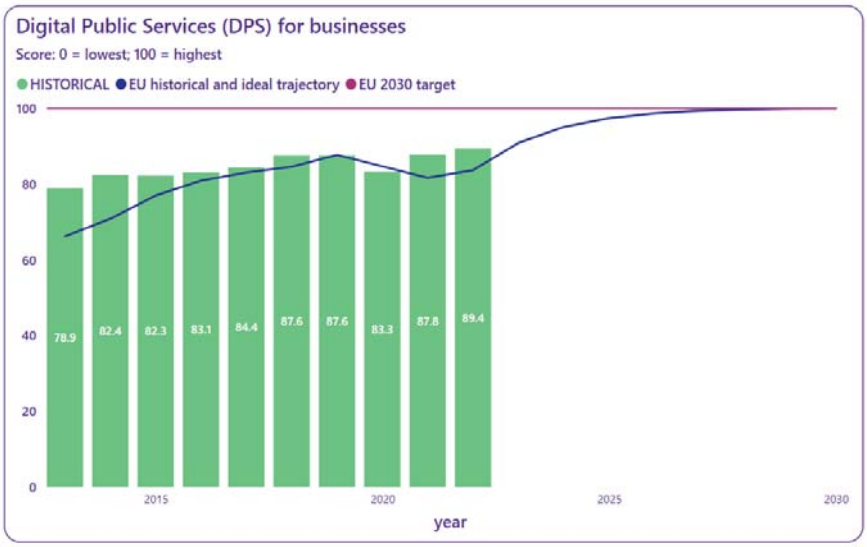
2023 state of play and recent progress

	Country level	EU level
FORECAST		87.2
DESI 2024	85.9	79.4
AVERAGE ANNUAL GROWTH %	1.5	3.1

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

Note 1: Data break-in-series in 2020

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



2023 state of play and recent progress

	Country level	EU level
FORECAST		90.9
DESI 2024	86.7	85.4
AVERAGE ANNUAL GROWTH %	-3.1	2.0

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

Note 1: Data break-in-series in 2020

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

The Netherlands brings a positive contribution to the EU's Digital Decade targets on the digitalisation of public services for citizens and businesses. For the share of public services that can be used online by citizens, it scores 85.9 out of 100, while for the share of public services needed for starting a business and conducting regular business operations available online, it scores 86.7 out of 100. While the score for the digitalisation of public services for citizens has shown a positive dynamic in the past years, the score for digitalisation of public services for businesses is coming close to stagnation.

Over the past year, the Netherlands focused its efforts on making digital public services more interoperable, proactive (and thus also more human-centric and inclusive) and accessible. These priorities are reflected in the Values-Driven Digitalisation Work Agenda. On interoperability, there is increasing awareness of the need to make different public services communicate with one another, to facilitate the

user experience of people. Particularly in a setting where more government services are being delivered online, the Netherlands wants to ensure that there is continuity between the different service providers. In this context, the Dutch central government, in collaboration with municipalities, provinces, water authorities and private service providers, is working on modernising the 'generic digital infrastructure' (Generieke Digitale Infrastructuur, GDI). This is the government's digital infrastructure, consisting in outlining a collection of standards, agreements, components and services at the basis of all digital identities and digital communication exchanges between people, businesses and the government, and defining all data exchanges, storages and monitoring. Similarly, to ensure consistency among online public services at European level, the Dutch competent authorities have since 2019 continued to work on implementing the Single Digital Gateway, under the guidance of a temporary office put in place by the Ministry of the Interior and Kingdom Relations. As a result, in December 2023, more than 500 Dutch webpages were made available in the 'Your Europe' search engine.

On proactivity, the Netherlands has been focusing on implementing a more human-centric, dynamic, 'life-events approach' to e-government. For example, the 'Posts about your Neighbourhood' (Berichten over uw Buurt) system was introduced, thanks to which more than 9 million citizens who are 25+ years old and have registered to a DigiD receive email notifications to stay up-to-date on public announcements that concern their neighbourhood. People can always opt out, but the intention is to facilitate involvement with important public information, ensuring all have access to the same information. When it comes to supporting businesses, the Dutch government plans to continue feeding and improving Business Gov.nl, an information site where entrepreneurs operating in the country can find all the key information needed to start or develop their businesses. Operating since 2014 as a collaboration of different governmental organisations, the intention now is to include a more complete picture of services offered at government level for the benefit of entrepreneurs**.** Regardless of all the efforts taken to improve public services online, **the Netherlands still values an omni-channel approach to digital public services, which gives the opportunity to those who still want to access services physically to do so without obstacles.**

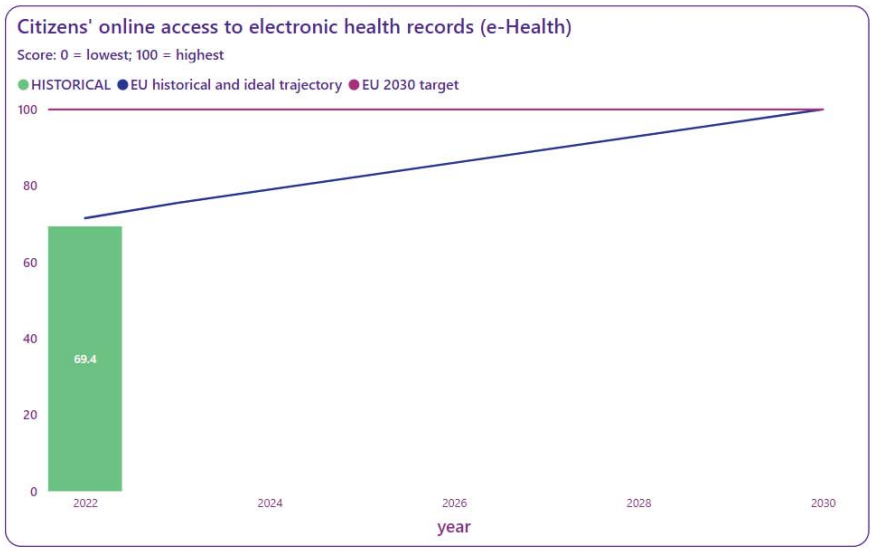
Finally, on accessibility, the DigiAccessible Supervision and Support Programme (*DigiAccessible TOP*) was set-up to help creators of websites and apps. The programme provides a technical support scheme, including specialised webinars, a knowledge base and helpdesk to improve accessibility and user-friendliness. According to the DigiAccessible Dashboard, which is being used to monitor accessibility across a number of Dutch websites, among the 9 000+ websites under the remit of the Dutch government, only about 470 fully comply with accessibility requirements and 41% comply with the legal obligation of the Digital Accessibility Act. In March 2024, the Ministry of the Interior and Kingdom Relations sent a letter to government organisations websites and applications at risk of not complying with the Digital Accessibility Act, encouraging them to improve this aspect. This prepares the ground for the Act's entry into force, planned for 2025. **When it comes to the accessibility of mobile apps, the Netherlands admits having encountered some difficulties and would like to learn from the experience of other Member States.**

Over the past year, the Netherlands has also focused its efforts on allocating funds to enhance digital public services, in particular through the Digital Government Innovation Budget. An initiative of the Ministry of Interior and Kingdom Relations, this allows public entities to apply for funding for projects to improve online services. In 2023, 14 projects were granted co-financing worth a total of EUR 3 million. These include a project to develop a centralised platform for all online services at city level and a project to develop and test an integrated approach for digital inclusion. More funding is planned to become available in 2024.

The Netherlands does not explicitly commit to any target or trajectory for the digitalisation of public services in its roadmap, despite referring to the EU target multiple times. Based on the country's current performance and recent annual growth, **the Netherlands is nonetheless expected to contribute**

significantly to the EU's Digital Decade target. The Dutch roadmap allocates the highest number of measures and budget for the digitalisation of key public services, with about 12 measures, including both new and old measures, and a planned national budget of EUR 2.22 billion. There are three new measures planned, focusing mostly on preparing the ground for the correct implementation of legislation, while always protecting citizens and businesses and improving their online experience. **Overall, the Netherlands is demonstrating a commitment to the implementation of its policies to digitalise public services and businesses.** Achieving a successful result, with more accessible, secure and user-friendly public services available online, will depend on an effective collaboration among different public authorities, including municipalities, and between public authorities and private entities.

3.1.2.c e-Health



2023 state of play and recent progress

	Country level	EU level
FORECAST		75.5
DESI 2024	72.5	79.1
AVERAGE ANNUAL GROWTH %	4.5	10.6

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

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

With an overall e-health maturity score of 72.5 out of 100 in 2023, compared to an EU average of 79.1, the Netherlands has scope to improve its performance to contribute to the Digital Decade target concerning the access to e-health records. A centralised, nationwide access service is technically available in the country, with 80-100% of the national population being able to access e-health records through online portal(s) - like, for instance, the 'personal health environment' (PGO) - and a mobile application. Both solutions are based on a log-in system through the use of the Dutch e-ID, which is compliant with the eIDAS Regulation (level of assurance: substantial). Regarding the availability of health data categories, the Netherlands scores only 23 out of 100 on categories of health data, compared to an EU average of 74, with only half (3 out of 6) of the applicable categories of healthcare providers supplying relevant data. Although data about procedures and operations have newly been added to the access service, just over half of the data categories investigated in this framework are made available to Dutch people, which is one of the main gaps in the Netherlands' e-health maturity. On accessibility, the Dutch online portal provides a functionality that reduces barriers to access the service, such as following web accessibility guidelines and the ability to grant legal guardians and authorised persons access to electronic health records on behalf of others. Finally, regarding access opportunities for certain categories of people, the Netherlands scores quite high (88 out of 100, compared to an EU average of 77.

Overall, access to e-health records is considered important by Dutch citizens. In 2023, 78.8% of them sought health information online, above the EU average of 56%. According to the Digital Decade Eurobarometer, 86% of Dutch believe that by 2030 digital technologies will be important for accessing and

receiving health services. This is among the highest scores in the EU and above the EU average (79%). Moreover, according to what is reported in the national roadmap, in 2023 there were almost 500 000 unique users accessing the PGO, up from 90 000 reported in 2022. This has also been possible thanks to communication activities supported by the Ministry of Health, Welfare and Sport to increase public awareness. Aside from increasing usage, the Netherlands has also worked on improving the user-friendliness, security and privacy of the PGO and other medical record systems certified under the MedMij through additional national subsidies. Overall, as reported in the roadmap, 62% of users reported the PGO to be easy to employ, compared to 58% in 2022. Finally, an important milestone to improve security was reached in the country in 2023: with the coming into force of the Electronic Data Exchange in Healthcare Act, medical health providers will need to exchange certain types of data only electronically, reducing the chance of errors and reducing costs.

The Netherlands does not explicitly refer to a national target or trajectory regarding access to e-health records. The country has still not caught up with the EU average and has recently posted limited progress. However, if some aspects are improved, there is no reason why it will not reach the EU target by 2030.

The Netherlands' aim in the next year is to increase the amount of data included in the PGO and to focus on improving user-friendliness even further. Some medical sectors, like mental healthcare and dentistry sectors, are still not easy to find in the PGO. From now until 2027, the Ministry of Health, Welfare and Sport aims to help more care providers to send data to the PGO with a national budget of about EUR 49.7 million. The Netherlands also plans to make it easier to access public health data in areas such as vaccination, with an already allocated national budget of EUR 10.6 million until 2026. With the start of the MedMij scheme, the Netherlands also highlights in its roadmap that the Ministry of Health, Welfare and Sport will issue a tender in 2024 and select three healthcare providers that would receive compensation for the cost of their online records development.

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

Building a safe and human-centric digital environment is a priority for the Netherlands. The Value-Driven Digitalisation Work Agenda gives particular attention to preventing hate speech and incitement online, as well as to boosting transparency over algorithmic decision-making and the uses of AI in the public domain. However, as reported in the Digital Decade Eurobarometer, **the Dutch population remains quite critical with regards to how well they think digital rights and principles are respected in the country**. For example, 55% of Dutch respondents believe that digital rights and principles are not very well applied in the country when it comes to having control over how one's data are used and shared online, while 44% think digital rights and principles are not very well applied when it comes to getting effective freedom of choice online, including when interacting with AI. Both percentages are among the highest in the EU.

Hate speech is an issue of concern in the Netherlands. 48.4% of the population encountered messages online that were considered hostile or degrading in the last 3 months, as shown in a Eurostat survey, placing the country significantly above the EU average of 34%. In the past year, Dutch internet companies and the government have continued to work on the public-private partnership on online content moderation. This is an initiative established in 2019 to facilitate exchanges of best practices and agreements between internet providers, online platforms, public authorities and other stakeholders in the context of online content moderation. The Netherlands also has in place a number of instruments to help local representatives prevent hate speech online, including a virtual assistant where local administrators can seek tailored legal advice on online disturbances of public order. Over the past year, the Dutch government has also continued to organise forums on online hate speech, encouraging municipalities to share their experiences and propose solutions to prevent and manage hate speech online. Finally, the Netherlands is supporting research programmes focusing on studying human behaviours in the online environment.

On the promotion of responsible and human-centric AI systems, in 2023 the Netherlands focused on launching the national algorithm and AI register for the public sector (see more details in the best practice box). The country also completed preparatory research to prepare the ground for establishing of the AI Act regulatory sandboxes, while the public sector continued to use the Dutch impact assessment fundamental rights and algorithms (FRAIA) to assess their algorithms and AI applications. In 2023, about 18 public sector organisations were reported to be using FRAIA. Last year, the Dutch government also put in place a special directorate, called the Algorithms Coordination Directorate, within the Dutch Privacy Authority. Its aim is to protect public values and fundamental rights online, preventing discrimination, arbitrariness and deception, while also encouraging more transparency and fairness in the use of AI and algorithms through risk signalling, providing advice and periodic reporting. Looking to the future, the country published its government-wide vision on generative AI in January 2024, describing its potential for Dutch society and outlining strategies and investments. The document was written by a government-wide working group, with the input of expert groups representing Dutch civil society.

Best practice: national algorithm & AI register for the public sector

The Dutch government launched a centralised database showcasing (at the time of writing i.e., 11 June 2024) about 389 algorithms and AI systems used by the public sector, highlighting their purpose in decision-making processes, functions, potential biases and societal impacts, the goal being to enhance transparency and accountability. In 2024, the intention is to grow the number of published algorithms and AI systems. The register is complemented by the recent publication of the algorithm and AI framework for the public sector, which provides an overview of applicable norms, laws and regulations related to the use of responsible algorithms and AI. The goal is not only to help public organisations with a list of rules, but also to provide toolkits and good practices which are being constantly updated and developed, through an open-source website, thanks to the contributions of public organisations and representatives from different sectors. Overall, the algorithm and AI register is an attempt to proactively promote human-centred, transparent, and open algorithmic and AI governance. This will contribute to achieving an important Digital Decade objective listed in Article 3(1)(a) of the Digital Decade Policy Programme. Ultimately, the commitment is intended to address the principle on interactions with algorithms and AI systems to reinforce public trust in the use of these technologies. No specific details are given in the national roadmap and questionnaire regarding the amount of funding allocated to this initiative.

4 Leveraging digital transformation for a smart greening

The need to have a sustainable environment is one of the Netherlands' priorities. It is recognised as the basis of the country's wellbeing and an opportunity for increasing competitiveness. In this context, the Netherlands shows an overall commitment to a sustainable digital economy, that makes responsible choices while respecting public interests.

Dutch consumers are paying increasing attention **to the issue of sustainability and generally show high awareness levels with regard to the social responsibility of brands**. On recycling and reusing ICT devices, 14.1% of Dutch using the internet in the last three months recycled their old laptop or tablet and 28.6% their desktop computers in 2022, as opposed to EU averages of about 10.8% and 14.2% respectively. On the other hand, only 44.6% of Dutch enterprises of 10 employees or more considered the environmental impact of ICT services and devices before selecting them and applying some measures, affecting the paper or energy consumption of the ICT equipment. This is below the EU average of 48.7% of enterprises.

Over the past year, the Dutch government has worked to improve coordination and alignment at national level to limit the energy consumption of ICT devices and digital infrastructure. The Dutch roadmap presents two measures contributing to twinning the green and digital transitions. The central government has already started to introduce an initiative to limit the environmental impact of government digital devices and infrastructure at different levels: (i) by greening IT devices and infrastructure, including its four data centres; (ii) by prolonging the lifespan of end-user devices; and (iii) by lowering the energy usage of their software. A designated inter-departmental committee has been set-up to work on an action plan for sustainable digitalisation for the next 2 years; the plan will establish a framework for government-wide action involving the environmental impact of the ICT sector. Moreover, the National Coalition of Sustainable Digitalisation was launched in 2023 as a public-private partnership between government, industry, research and education institutions and civil society organisations. The coalition's goal is to: (i) raise awareness of digital systems' potential to help limit the Netherlands' energy consumption; (ii) encourage the development of sustainable digitalisation skills; and (iii) push for more clear laws and regulations at the intersection of the two sectors (for instance, the need for standardisation of sustainability parameters in datacentres). The coalition identified four strands of action on which different working groups will focus to develop concrete projects. These are the digital system, the IT end user, preconditions and the energy transition, and the relationship between the energy system and the digital system.

The Netherlands is also taking advantage of the complementary support that the digital and green transitions can give to one another. Firstly, telecoms operators are attempting to find greener solutions for their digital services. For example, work is ongoing to build wind farms to provide more green electricity on which fixed and mobile networks can run. Secondly, some data centre companies in the Netherlands are using the excess heat generated from cooling data centres to provide heat in homes and offices.

Looking ahead, one of the biggest challenges identified by the Netherlands is that, despite a willingness to make more sustainable choices, the tools and information on costs are often lacking. Some Dutch stakeholders mentioned that in the near future AI could be used for more effective predictions and to guide more sustainable choices. Tools will also be important to ensure the right metrics are used to measure the real impact of initiatives, like the government initiatives mentioned earlier to limit the environmental impact of government digital devices and infrastructure.

Annex I – National roadmap analysis

The Netherlands national Digital Decade strategic roadmap

The Dutch national strategic roadmap, which is 78 pages long, was sent to the European Commission on 15 December 2023 after having been adopted at political level. At the time of writing, the national roadmap was still due to publication online.

The national roadmap includes **9 national target value**s, with corresponding trajectories until 2030, except for the 5G coverage trajectory which includes data points only until 2022, when the Netherlands reached full coverage. No value is assumed for **edge nodes, unicorns, basic digital skills, digital public services for citizens and businesses and access to e-health records**. The corresponding trajectories are also not provided. Most of the national targets match the 2030 EU targets, with the notable commitment of 100% of 5G coverage, which has already been reached, and 82% of SMEs adopting cloud services by 2030. The target on the adoption by enterprises of data analytics is set below the 75% target (at 40%), while the one on the digital intensity of enterprises is close to the 90% EU target (at 88.2%). The target for ICT specialists (9.2%) and VHCN coverage (99.6%) are also slightly below but broadly in line with the EU target, probably for reasons connected with calculating the trajectories.

The below table reflects a best-effort attempt at categorising the measures and budget as presented in the Dutch roadmap.

Digital Decade Target/objective	Budget (EUR Million)	Number of measures
Connectivity Gigabit	0.0	1
Connectivity 5G	0.0	1
Semiconductors	1 199.2	4
Edge nodes	70.0	1
Quantum computing	690.0	2
SME take up	247.0	4
Cloud/AI/Big Data uptake	214.0	1
Cloud only uptake	-	-
AI only uptake	204.5	2
Big data uptake	-	-
Unicorns	-	-
Basic Digital Skills	347.8	5
ICT Specialists	0.0	4
eID	0.0	1
Key Public Services	2 225.1	12
e-Health	191.1	5
Objectives	0.0	12
Total	**5 388.7**	**55**

The Netherlands presents a non-exhaustive selection of the main policies and measures contributing to the achievement of the Digital Decade targets. The measures also cover objectives, notably fostering sovereignty and leadership and twinning the green and digital transition. In total, there are **55 measures amounting to about EUR 5.4 billion –** although many measures do not indicate a budget or provide estimates. While the vision set out in the roadmap is quite comprehensive, a substantial share of the budget is planned to contribute to improving the digitalisation of key public services (about 41% of the total budget with 12 measures) and developing semiconductors (about 22% of the total budget with 4

measures). The roadmap lists 10 measures to support sovereignty and leadership and 2 for the twinning of the green and digital transition. The level of detail and descriptions for these measures are varied and often remain quite vague. For some, it appears unclear what the concrete actions taken will be, or what their associated timeline will be. The source of the funding is also not always obvious, along with the indication of whether the budget is already allocated or just planned. There is a good number of new measures (15 out of the 55 total measures), with most of these targeting semiconductors. Overall, the roadmap is **coherent with efforts shown in all the dimensions of digitalisation**. However, some aspects might require more action. For example, the skills elements could benefit from more focus given the ambitious targets at EU and national levels. Also, the resources dedicated to the digitalisation of enterprises (both to achieve a higher level of ambition for enterprises' basic level of intensity and to accelerate the adoption of advanced technologies) could be increased.

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

MCPs and EDICs

In its roadmap, the Netherlands reported participating in the **multi-country projects** on **Next Generation Cloud Infrastructure and Services** and on **Microelectronics and Communication Technologies** (see more information in the respective sections above).

The Netherlands is involved in several **European Digital Infrastructure Consortia (EDICs).** Notably, it is expected to be the hosting Member State of the possible future **EDIC for Mobility and Logistics Data** and, with France, it is one of the potential host Member State of the possible future **Digital Commons EDIC.** The country is a member of the **Alliance for Language Technologies (ALT) EDIC –** one of the first EDICs ever set up and 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 **Cybersecurity Skills Academy** and the **Genome EDICs,** both withing informal Working Groups. Finally, the Netherlands is concluding membership negotiations with the established **Local Digital Twins towards the CitiVERSE - EDIC[19].**

EU funding for digital policies in The Netherlands

EU funds support the digitalisation efforts in Member States. The Dutch Recovery and Resilience plan devotes EUR 1.2 billion (26% of the total budget) to the digital transformation[20]. According to a Joint Research Centre's study[21], EUR 834.4 million of the Dutch Recovery and Resilience Plan directly contribute to achieving Digital Decade targets. Out of the Cohesion Policy funds received by the Netherlands, EUR 57.9 million contribute directly to Digital Decade targets according to the same mapping study. The largest digital measures in the RRP are dedicated to investments in innovative digital technologies, notably quantum technologies (EUR 263.9 million) and AI (EUR 60 million); the development of digital skills at different levels of the education system, including making education more inclusive (EUR 329 million) and investing in ICT infrastructure and sectoral knowledge in the education system (EUR 209 million); and the digitalisation of key public services (EUR 169.3 million), including making digital services more transparent and accessible. The digital component in the Dutch RRP plan further contributes to addressing the country-specific recommendations, in particular to focus investments for the reduction of transport bottlenecks and for the promotion of the digital transition.

[19] Information updated on 31 May 2024.

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

[21] Based on an estimation of the possible contribution to the Digital Decade (Joint Research Centre report 'Mapping EU level funding instruments to Digital Decade targets - 2024 update' (Signorelli et al., 2024)).

State of the Digital Decade 2024

Poland

1 Executive summary

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

In 2023, Poland made notable progress in the area of gigabit connectivity and digitalisation of SMEs. However, **challenges persist** in the area of digital skills and adoption of advanced technologies, such as AI and data analytics, by enterprises.

Significant resources are dedicated to improving connectivity, **enhancing enterprises' use of digital technologies**, and developing **digital public services** that should improve the competitiveness of the Polish economy and boost the whole society's use of digital technology. Poland will also invest in the **production of semiconductors** and participate in **projects to build quantum computers**.

The Polish population recognises importance of digitalisation: according to the Special Eurobarometer 'Digital Decade 2024'[22], **81% of Poles consider that the digitalisation of daily public and private services is making their lives easier**. This is one of the highest scores in the EU and markedly above the EU average of 73%.

Poland is a member of the **Alliance for Language Technologies European Digital Infrastructure Consortium** (ALT-EDIC) and applied to join the **European Digital Infrastructure Consortium for European Blockchain Partnership and European Blockchain Service Infrastructure** (EUROPEUM EDIC). It also participates in the **Important Projects of Common European Interest on Next Generation Cloud Infrastructure and Services** (IPCEI-CIS) and **on Microelectronics and Communication Technologies** (IPCEI-ME/CT)[23].

Poland's **recovery and resilience plan dedicates 21% to digital policy (EUR 7.4 billion)[24]**, with the bulk of the investment going to broadband deployment, improving digital skills, digitalisation of public services, and to e-health and cybersecurity. Under cohesion policy programmes, an additional EUR 5.7 billion (8% of the country's total cohesion policy funding) is allocated to the country's digital transformation[25].

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

[23] Information last updated on 31 May 2024.

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

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

Digital Decade KPI [1]	Poland			EU		Digital Decade target by 2030	
	DESI 2023	DESI 2024 (year 2023)	Annual progress	DESI 2024 (year 2023)	Annual progress	PL	EU
Fixed Very High Capacity Network (VHCN) coverage	70.7%	81.1%	14.6%	78.8%	7.4%	100%	100%
Fibre to the Premises (FTTP) coverage	59.5%	75.4%	26.7%	64.0%	13.5%	100%	-
Overall 5G coverage	63.4%	71.9%	13.4%	89.3%	9.8%	100%	100%
Semiconductors		NA					
Edge Nodes		44		1 186		370	10 000
SMEs with at least a basic level of digital intensity	39.8%	50.0%	12.1%	57.7%	2.6%	90%	90%
Cloud	19.2%	46.5%	55.6%	38.9%	7.0%	75%	75%
Artificial Intelligence	2.9%	3.7%	13.0%	8.0%	2.6%	10%	75%
Data analytics	NA	19.3%	NA	33.2%	NA	35%	75%
AI or Cloud or Data analytics	NA	51.8%	NA	54.6%	NA		75%
Unicorns		11		263		20	500
At least basic digital skills	42.9%	44.3%	1.6%	55.6%	1.5%	80%	80%
ICT specialists	3.7%	4.3%	16.2%	4.8%	4.3%	6%	~10%
eID scheme notification		Yes					
Digital public services for citizens	59.9	63.7	6.4%	79.4	3.1%	100	100
Digital public services for businesses	72.7	72.9	0.2%	85.4	2.0%	100	100
Access to e-Health records	86.4	90.0	4.2%	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 **Poland's** contribution to the Digital Decade reflected in its roadmap, it is demonstrating **a very high ambition** and, based on this document, intends to allocate **significant effort** to achieve the Digital Decade objectives and targets. 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.**

Poland's draft roadmap[26] **is ambitious and coherent, though there are some weaknesses regarding digital competences and digitalisation of enterprises.** It includes trajectories and national-level targets for all key performance indicators **except for VHCN**.[27] The national targets are mostly aligned with the EU's 2030 targets, except for **ICT specialists, take-up of data analytics** and **take-up of AI**, where they are lower.

The roadmap identifies key challenges for Poland and covers all Digital Decade objectives, with a high level of ambition for sovereignty and competitiveness, integration of new technologies, inclusive public services, and cybersecurity. Other dimensions like enhancing digital competences and the green transition could be further developed. It contains also general presentation of expected impacts.

[26] On 30 January 2024, the Polish authorities shared with the Commission a draft roadmap, which has yet to be formally endorsed by the Council of Ministers. At the time of writing, this formal endorsement has yet to take place, hence this report relies on the draft provided in January, which may differ slightly from the final roadmap currently in the adoption process.

[27] However, it provides a trajectory for FTTB, with target of 100% by 2030, which implies the target for VHCN will also be achieved by that time.

There are **52 measures,** and their **total budget is estimated at EUR 12.4 billion** (about 1.6% of GDP), with priorities set on gigabit connectivity, digitalisation of enterprises, semiconductors, and e-health. Some aspects require more effort, especially on basic digital skills and ICT specialists and adoption of advanced technologies, such as AI and data analytics, by enterprises.

Recommendations for the roadmap

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

- **TARGETS**: (i) Consider aligning with EU targets **the level of ambition of targets** for the number of **ICT specialists** and for **enterprises' take-up of AI and data analytics**.
- **MEASURES**: (i) Strengthen measures contributing to the targets that are the most difficult to achieve in particular for **digital skills**. (ii) Review the description of measures on the **digitalisation of businesses and connectivity** to clarify their contribution to specific KPI. (iii) Provide **information on relevant measures at regional level**, including regional operational programmes funded from the cohesion policy. (iv) Provide information about the **estimated investment gap, where this was not available** (i.e., on digital skills, ICT specialists, semiconductors, edge nodes, implementation of key digital online public services, e-health and e-ID). (v) Provide **more information on the implementation of digital rights and principles** (and Digital Decade general objectives), including what national measures contribute to it.

Digital rights and principles

The Digital Decade Eurobarometer reveals key insights into Polish perceptions of digital rights. 66% of Poles believe the EU protects their digital rights, significantly above the EU average of 45%. Confidence in digital privacy is at 68%, higher than the EU average of 51%. Despite rising EU-wide concerns about online safety for children (up 10 points) and control over personal data (up 5 points), 59% and 64% of Poles, respectively, remain confident. Positive trends include the high importance of digital technologies for connecting with friends and family (82%) and accessing public services (82%), both aligning with the EU average of 83%. 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[28].

A competitive, sovereign and resilient EU based on technological leadership

To enhance its competitiveness, Poland needs to reach complete coverage of gigabit connectivity and boost the digitalisation of businesses. It must also overcome delays in deployment of the 5G network.

Poland appears to be on track to reach 100% VHCN coverage by 2030, although the last deployments might prove more difficult to achieve. The development of 5G is late, primarily due to the delayed authorisation of the 5G pioneer bands; only the 3.4-3.8 GHz band has been assigned so far. As a result, industrial 5G is yet to be developed. Moreover, the European Electronic Communications Code (Directive (EU) 2018/1972) has still to be transposed into national law, making Poland the last country in the EU that had not adjusted its electronic communications framework.

[28] 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.

All the KPIs on the digitalisation of enterprises, except for the use of cloud services, attest to Poland's performance being below the EU average. Polish start-ups have a very large growth potential, but the country's start-up ecosystem has yet to deliver on its promise. With 20 unicorns, Poland's target for 2030 is in line with the goal of doubling their number but appears modest given the country's potential for innovation.

To contribute to EU sovereignty, Poland aims to: (i) boost its share in global microelectronics production value chains from minimal at present to 0.5% by 2030; (ii) deploy 370 edge nodes by 2030; and (iii) host one quantum computer by 2025.

The current national cybersecurity strategy was adopted in 2019. As the strategy runs for five years, it may have to be amended or replaced this year, while the NIS2 Directive has yet to be transposed.

Recommendations – Poland should:

- **CONNECTIVITY INFRASTRUCTURE:** (i) Proceed with the allocation of remaining 5G pioneer bands. (ii) Transpose the European Electronic Communications Code into national law. (iii) Strengthen measures on 5G deployment, including those alongside the main transport corridors. (iv) 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.
- **AI/CLOUD/DATA ANALYTICS:** (i) Review the mix of measures to support the adoption of advanced digital technologies (with a particular attention to AI and data analytics). (ii) Ensure the broad uptake of the next generation of cloud infrastructure and services under development in the IPCEI-CIS by companies of all sizes, including by developing a country-specific dissemination strategy (complementing what has already been committed under IPCEI-CIS); contributing to the additional dissemination activities led by the Cloud IPCEI Exploitation Office.

Protecting and empowering EU people and society

To ensure that digital transformation is inclusive, Poland needs to improve the digital skills of the population and the share of ICT specialists in the workforce at a much faster pace than in previous years.

The share of the Polish population with at least **basic digital skills** is below the EU average; to achieve the target of 80% of the population with at least basic digital skills by 2030, the pace of growth until then would have to be more than five times higher than the average observed in recent years. For **ICT specialists** also, the 2023 value is below the EU average, but Poland does not plan to equal the EU target (of 10%) proposing instead a national target of 6%. Even so, the measures announced in the draft roadmap do not promise results that would be sufficient to achieve the expected increase by 2030.

Poland has made strides in its electronic identification scheme, with one notification submitted to the European Commission in 2023 and another in preparation. 36.5% of Poles used e-ID to access public services in Poland (EU average: 36.1%), a good result most likely related to the widespread use of the mObywatel application and e-ID means – the personal profile (*profil osobisty*) that is available in the ID card. **Poland ranks below the EU average on the availability of public services for citizens and businesses online and the use of e-government in the last 12 months**, but the average rate of growth and efforts to improve

available services or offer new ones should, if sustained, enable Poland to close the gap by 2030. **Poland's score for online access to e-health records is much higher than for the whole EU** and its actions in this area suggest the target score of 100 is within reach.

Recommendations – Poland should:

- **BASIC DIGITAL SKILLS:** Include in the roadmap measures to improve the basic skills of younger population (e.g., actions to improve digital equipment in schools, qualifications of ICT teachers, changes to programmes to increase the attractiveness of STEM disciplines)
- **ICT SPECIALISTS:** Take measures to increase the number of ICT specialists (e.g., improved visibility and accessibility of training and reskilling options; incentive schemes to attract new / retain current ICT specialists) and promote ICT studies and careers to women and girls.
- **PUBLIC SERVICES:** Ensure coordinated implementation of public service and work towards integration of public records with a view to implement the 'once-only' principle.
- **E-HEALTH:** (i) Make the data types of current problems and medical images available to citizens through the online access service. (ii) Ensure that all data types are made available in a timely manner.

Leveraging digital transformation for a smart greening

Polish public authorities and businesses consider the energy- and resource-efficient digital infrastructure and technologies in their daily operations and investments, particularly where EU resources are concerned. However, these efforts seem to be driven mostly by regulatory compliance or cost reduction. There is no system to monitor digital impacts on the environment, nor any comprehensive reflection on the opportunities offered by synergies between green and digital technologies.

Recommendations – Poland should:

- Mainstream considerations for the impact on the environment, including potential synergies, in the strategical reflection on national digital policy and 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.

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

To enhance its competitiveness, Poland strives to ensure full coverage of Gigabit connectivity and overcome delays in deployment of the 5G network, recognising that modern connectivity is a critical factor for digital innovation and development of business. To help enterprises fully profit from the opportunities afforded by digital transformation, the Polish authorities deploy programmes co-funded from the EU resources, stressing the need to adjust the support to businesses' needs and capacities. Focusing on adopting advanced technologies (AI, cloud computing) should contribute to increasing their use among enterprises. The share of the ICT sector in Polish Gross Value Added was 3.99% in the latest available data (2021), while for EU27 it was 5.49%.

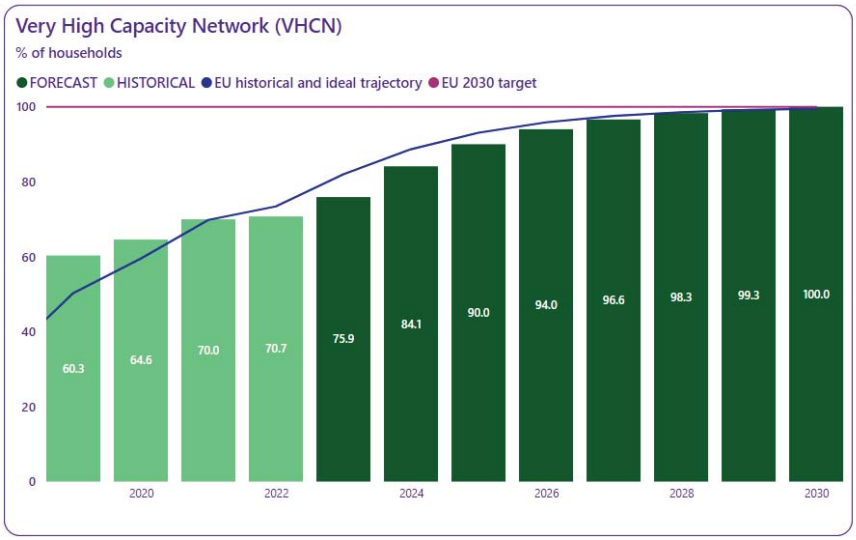
Digital technologies in the economy and society are included among the priorities of the state science policy (*Polityka Naukowa Państwa*) adopted in 2022. In line with this document, the higher education system in Poland should support digital transformation in Poland by training ICT specialists for the economy and science. Among digital technologies, quantum computing and AI are singled out, as areas of particular interest. The roadmap includes measures corresponding to these priorities (support for adoption of AI among enterprises; participation in the EuroHPC Joint Undertaking).

2.1 Building technological leadership: digital infrastructure and technologies

Poland scores above the EU average for gigabit connectivity, but still will require efforts to ensure 100% coverage, especially since the last remaining white spots will be the most expensive and challenging to fill. **In terms of 5G coverage, Poland is behind the EU average, but its performance on this indicator has improved significantly in the last year.** Poland also managed to finalise the auction of the primary 5G pioneer band (3.4-3.8 GHz). The trajectory presented in the Polish roadmap envisages full 5G coverage being achieved in 2027 (with the use of all EU-harmonised bands).

Poland's share in the value of semiconductor production is currently minimal; its aim by 2030 is to account for 0.5% of this value. To further this goal, the government adopted in 2023 a support framework with a budget of USD 1.8 billion over 3 years. **The number of edge nodes is also low and expected to represent less than 4% of the EU overall target by 2030**. **On the other hand, Poland has quite ambitious plans for quantum computing, expecting to have one functioning quantum computer in the country and access to another in Czechia by the end of 2030.**

2.1.a Connectivity infrastructure (gigabit)

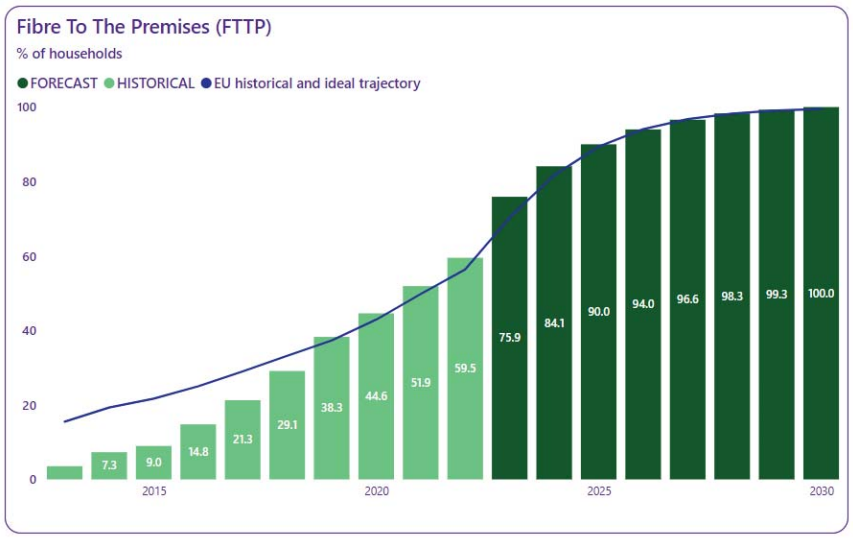


2023 state of play and recent progress

	Country level	EU level
FORECAST	75.9	82.0
DESI 2024	81.1	78.8
AVERAGE ANNUAL GROWTH %	14.6	7.4

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

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



2023 state of play and recent progress

	Country level	EU level
FORECAST	75.9	70.3
DESI 2024	75.4	64.0
AVERAGE ANNUAL GROWTH %	26.7	13.5

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

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

Poland brings a positive contribution to the EU's Digital Decade VHCN target and shows a very strong dynamic in general. Coverage (81.1%) is above the EU average (78.8%), and the average annual rate of growth reaches double digits (14.6%). This performance is mostly due to the deployment of fibre, as in terms of FTTP coverage Poland is ahead of the EU in general (75.4% vs 64%), showing a strong dynamic. While VHCN rural coverage in Poland (57.2%) is above the EU average (55.6%), the urban/rural divide remains very significant, limiting access to the digital world. Moreover, subscriptions to fixed broadband with speeds equal or higher than 1 Gbps in Poland were 5.3% in 2023, compared to 18.5% for the EU as a whole.

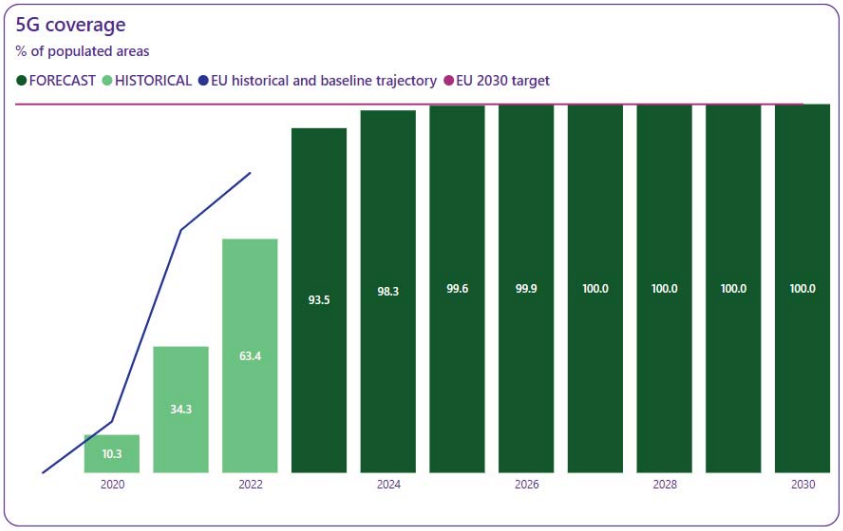
To improve fixed broadband network coverage by in areas where access to high-speed internet is difficult (white Next Generation Access areas)**, Poland relied in 2023 on investments under the Recovery and Resilience Facility and cohesion policy**. Operators could apply for funding to build broadband networks in

white NGA areas via: (i) two calls for proposals under the RRF[29], which by June 2026 should extend fixed broadband network coverage by 931 000 households; and (ii) one call for proposals under the European Funds for Digital Development (*Fundusze Europejskie na Rozwój Cyfrowy, FERC*), which should extend fixed broadband network coverage by 695 000 households.

Poland's target for gigabit connectivity[30] is the same as the one for the whole EU – 100% – and this value is linked to a strong starting point. Moreover, based on the current rate of progress, and assuming ongoing efforts will continue at the same pace, its contribution to this EU target will remain very significant. However, the last deployments might prove more difficult to achieve.

The roadmap includes seven measures linked to the gigabit target. Three of them are investments, including the ones funded under the Recovery and Resilience Facility and Cohesion Policy and already mentioned above, as well as the measure funded from the National Broadband Fund. Another measure relates to the online system to provide information on where fixed-line broadband internet is available. There are also three measures, which are relevant both for the gigabit and 5G connectivity indicators. Two of them concern the implementation of the National Broadband Plan 2020-2025 and its successor. The plan has no separate budget and relies on resources from cohesion policy, the RRF, and the National Broadband Fund. It sets the goals for improving access to fast internet in Poland, covering both fixed and mobile access, including 5G. The third measure focuses on transposition of the European Electronic Communications Code.

2.1.b Connectivity Infrastructure (5G)



2023 state of play and recent progress

	Country level	EU level
FORECAST	93.5	
DESI 2024	71.9	89.3
AVERAGE ANNUAL GROWTH %	13.4	9.8

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

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

Poland has scope to improve its performance to contribute to the EU's Digital Decade 5G target but has demonstrated a positive dynamic. 5G coverage in Poland (71.9%) remains below the EU average (89.3%), but Poladn's performance for this indicator in 2023 increased at a higher rate (13.4%) than in the EU (around 10% annual growth). However, this progress has been mostly achieved before any of the three EU 5G pioneer bands have been awarded. The mobile broadband take-up (85.7%) is close to the EU average (89.9%) and so is the specific take-up of 5G by the population (23.7% compared to 24.6% at the EU level).

[29] Third call under RRF was published on 3 June 2024.

[30] The draft roadmap provides a trajectory for FTTB (Fibre to the Building), with a target of 100% by 2030, which implies the target for VHCN will also be achieved by that time.

The action taken in 2023 partially address the Commission's recommendations in the 2023 Digital Decade report. Following a spectrum auction that concluded in October 2023, the President of the Office of Electronic Communications (*Urząd Komunikacji Elektronicznej*) issued in December decisions granting spectrum rights of use (to four holders) in the 3.4-3.8 GHz band, the first of the 5G pioneer bands to be used in Poland. Mobile operators are obliged – under their 5G-spectrum licenses acquired at the end of 2023 – to provide 5G coverage along almost all transport corridors in Poland.

However, the launch of the selection procedure to assign the 700 MHz band, expected in 2024, has yet to be announced. Moreover, in reaction to the public consultation on the 26 GHz band, opened by the Office of Electronic Communications in early 2024, the interested entities indicated that the allocation of this band should not take place before 2026 due to the lack of availability of end devices operating in this band, as well as minimal availability of devices on the side of operators.

Still, **Poland remains ambitious on 5G deployment, aiming to achieve 100% coverage already in 2027. This would require significant effort, given the starting point and the postponement of the 700 MHz auction and uncertainty over the 26 GHz band**. However, if the current rate of progress is sustained, 100% coverage is not excluded.

On the other hand, the European Electronic Communications Code (Directive 2018/1972) has yet to be transposed into national law, making Poland the last EU Member State not to have adjusted its legal framework in this respect. As a result, the Commission took Poland to the Court of Justice of the European Union (CJEU) in April 2022. The government brought a draft law transposing the Code before the Parliament in late 2022, but withdrew it in April 2023 following concerns raised by the opposition and various stakeholders. Adoption of the relevant legislation was recommended to Poland in the previous Digital Decade report and is one of the 2024 priorities for the new government, that took office in December 2023, also in the light of the CJEU judgment in March 2024 confirming Poland's failure to transpose the Code and imposing fines. Consequently, the government adopted in May 2024 the draft act and submitted it to the Parliament.

The draft roadmap includes five measures linked to this target. One of them refers to allocating all pioneer bands by the end of 2026, while the other relates to the online system to provide reliable information about electro-magnetic field measurements to counteract disinformation about 5G technology. There are also three measures, relevant both for the gigabit and 5G connectivity indicators (see section above for more detail).

2.1.c Semiconductors

Poland share of global microelectronics production value chains is minimal, except for a few photonics branches. Production is carried out on a pilot scale, or at most in small batches. Polish production consists mainly of chips for special applications produced in the Łukasiewicz network - Institute of Microelectronics and Photonics. However, Poland is participating in international research to develop semiconductors. One such example is the participation by Polish company Vigo Photonics in the Important Project of Common European Interest on Microelectronics and Communication Technologies (IPCEI ME/CT).

The Polish State will support projects developing production of semiconductors in Poland. In late 2023, the government adopted a resolution establishing the National Framework for Supporting Strategic Investments in Semiconductors. The programme provides for spending of more than USD 1.8 billion between 2024 and 2026 to assist investors wishing to undertake significant international projects to increase the EU's economy competitiveness, support sustainable economic growth, and create new specialised jobs.

Even before the programme was adopted, in June 2023, Intel selected a location near the Polish city of Wrocław for a new semiconductor assembly and test facility. The facility is expected to address the growing demand for assembly and test capacity by 2027. Intel has announced plans to invest up to USD 4.6 billion in the facility, which will have expandable capacity. Intel's investment in Poland, along with its existing wafer fabrication facility in Leixlip, Ireland, and planned facility in Magdeburg, Germany, is expected to create a unique end-to-end semiconductor manufacturing value chain in Europe.

This will be a significant contribution towards reaching the EU goal of regaining 20% of global semiconductor production capacity by 2030 and investing in the global semiconductor supply chain, given that the plants associated with the last link in the value chain are generally located outside Europe. This investment alone, according to the Polish administration, should increase Poland's share in the global microelectronics production value chains by 2030 to 0.5%.

The State of the Digital Decade report 2023 encouraged Poland to continue its activities in the field of semiconductors to help the EU become a strong market player in this area. The ambition and the actions presented in the draft roadmap largely contribute to addressing this recommendation.

2.1.d Edge nodes

According to the draft roadmap, in 2023 there were no edge nodes in Poland meeting the criteria set for this kind of infrastructure in the Digital Decade Policy Programme. However, the draft roadmap envisages that by 2026 the number of edge nodes will grow to 32. This should happen thanks to the 'EdgePL' pilot measure, which will enable more effective integration of national data processing infrastructure resources with cloud resources in Poland, translating into a better opportunity to develop intelligent IT infrastructure. Once the pilot has been implemented, telecommunication operators will be able to set up similar infrastructure, leading to an estimated 370 edge nodes by 2030. This will, however, represent only 4% of the total target for the EU, and is low given the size of the Polish economy.

At the EU level, Poland participates (3 projects of 3 companies as direct participants) **in the Important Project of Common European Interest on Next Generation Cloud Infrastructure and Services** (IPCEI-CIS). The project's aim is to support the development and first industrial implementation of an advanced research and development project focused on the future of cloud computing and the edge continuum. Projects for next-generation cloud solutions will be selected as part of this project, and at least five contracts will be signed after the call for project applications to support the development of Next Generation Cloud solutions in Poland is announced.

2.1.e Quantum technologies

High performance computing and quantum computing are among the main priorities for Polish science. In 2023, **Poland did not have a quantum computer at its disposal, but Polish researchers could use the resources of the IBM Quantum Innovation Centre**, set up in 2022 in Poznań, to develop innovative technologies for quantum computations and work on their practical applications in different domains.

Moreover, **Poland participates in projects concerning two out of six quantum computers** planned under the European High Performance Computing Joint Undertaking (EuroHPC JU). **The EuroQCS-Poland project,** the first quantum computer integrated with supercomputing resources in Poland **should be ready for use in 2025**. Poland also participates in the international consortium on the **LUMI-Q project**, which involves providing academic and industrial users with a quantum computer based on superconducting qubits with a star topology. In June 2023, an agreement was signed in Luxembourg for the purchase and operation of a quantum computer to be installed in the Czechia.

The initiative will enable Polish entrepreneurs to gain direct access to quantum computing resources. To raise their level of awareness, including by providing information on the opportunities offered by quantum computers, Poland is participating in the EuroCC 2 project on the functioning of the European HPC Competence Centre – the National HPC Competence Centre in Poland is operated by the PL Grid Consortium.

The State of the Digital Decade report 2023 encouraged Poland to continue its quantum computing activities. The ambition and the actions presented in the roadmap in this regard largely contribute to addressing this recommendation.

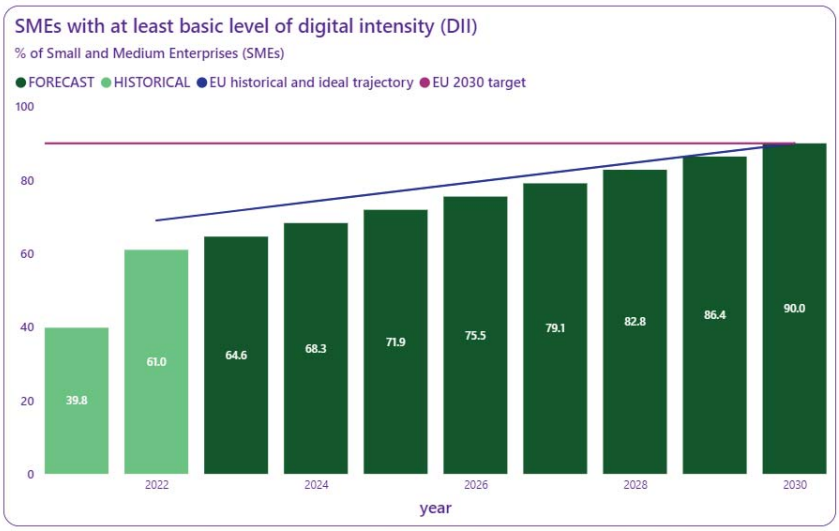
Best practice: *https://internet.gov.pl*

The **Internet.gov.pl** database opened for all users at the beginning of 2023 and relies on regularly updated data provided by telecommunications operators and other obliged entities. By clicking on any address point on the map, users can learn about the services currently available in the selected building and those about to be made available by the relevant providers. People can also use the database to inform operators about their needs for access to internet services and report vacant buildings, helping providers to plan investments and adapt their offer. The system has already recorded more than 20 million visits by over 470 000 users, demonstrating its popularity. Over 54 000 requests for broadband connections have also been submitted. The Internet.gov.pl is also a finalist in the prestigious European Broadband Awards competition (2023 edition) in the category 'Demand Generation and take-up of connectivity'.

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

Except for the indicator on the enterprises' use of cloud, Poland is behind the EU average in terms of SMEs digitalisation and the use of more advanced technologies. Polish start-ups have a very large growth potential, but the country's start-up ecosystem has yet to deliver on its promise. By improving the digitalisation of its enterprises, Poland could increase competitiveness. This change could also contribute to a fair digital environment, as enshrined in the Digital Rights and Principles while ensuring the principle of freedom of choice for the consumer.

2.2.a SME with at least a basic digital intensity



2023 state of play and recent progress

	Country level	EU level
FORECAST	64.6	71.6
DESI 2024	50.0	57.7
AVERAGE ANNUAL GROWTH %	12.1	2.6

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

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

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

Poland has untapped potential to contribute to EU's Digital Decade target on digitalisation of SMEs while showing a very strong dynamic. Poland's performance – 50% of the SMEs with at least a basic level of digital intensity – is lower than the 2023 figure for the whole EU (57.7%). The average annual growth observed in Poland between 2021 and 2023 was 12%, markedly above the one observed on average in the EU (2.6%). This is an improvement in the situation, albeit from a low starting point.

Some Polish enterprises are taking advantage of the digital opportunities and are involved in online commerce, with 14% of SMEs selling online (at least 1% of turnover). According to Digitalisation in SMEs' sector – opportunities and limitations, a study published by the Polish development bank *Bank Gospodarstwa Krajowego* in February 2024, the key digital technologies used by the SMEs are the basic tools, such as social media used to promote business, sell online, or recruit new employees (19%). The next most often used technology is cloud computing (see next section for more details), followed by systems to manage different processes within companies.

The main barriers for digitalisation indicated by Polish SMEs are the shortage of qualified ICT specialists on the market and high costs coupled with the lack of adapted financing. The above-mentioned Polish development bank study, as well as the Digitalisation of SMEs' sector in Poland, a study published in October 2023 by the Association of Entrepreneurs and Employers (*Związek Przedsiębiorców I Pracodawców*) are consistent regarding costs and financing (46% and 41% of polled SMEs). The more recent study identifies the lack of qualified ICT specialists as equally important as the other factors mentioned above and cites as a third factor concerns about cybersecurity.

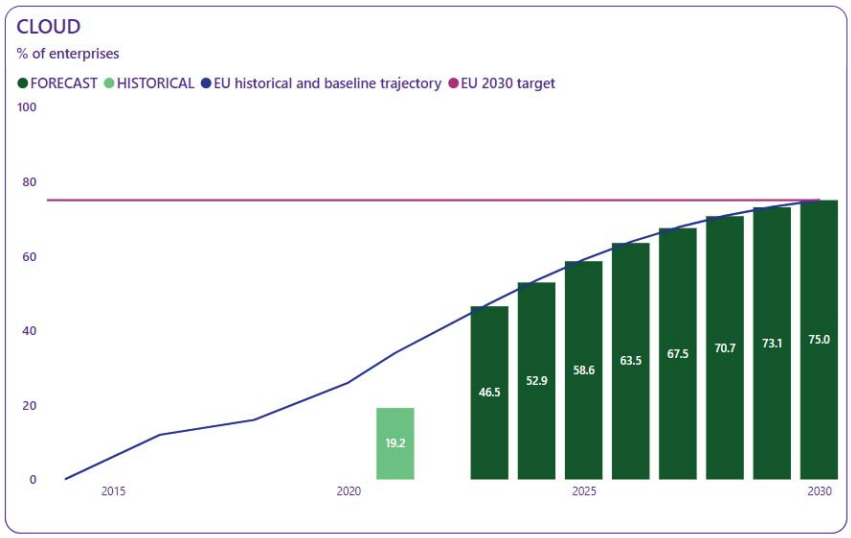
In 2023, various governmental bodies have supported digitalisation of SMEs using public funding, (mainly EU funds). Under the SME Manager Academy competition project, financed from 2014-2020 cohesion policy resources, government bodies could diagnose their digital transformation management needs, determine the competence gap, and use consulting services and train employees in digital competences. The project ended in 2023, but in early 2023 a call for proposals was launched under the European Funds for a Modern Economy (*Fundusze Europejskie dla Nowoczesnej Gospodarki*, *FENG*) to award grants to SMEs to purchase and implement IT solutions. Moreover, throughout 2023 businesses of all sizes could use the Digital Kit for Companies (*Cyfrowa wyprawka dla firm*) to receive comprehensive digitalisation advice in one place or Biznes.gov.pl to get information on business start-up funding.

Poland's roadmap displays a level of ambition in line with the 2030 target for the EU of 90% of digitalised SMEs. This value is high compared to Poland's starting point but given the current observed growth rate for the indicator, achieving it by the deadline may be possible. However, while the growth rate may suggest that Poland has applied the recommendation in 2023 State of the Digital Decade to significantly step up its efforts on the digitalisation of businesses, it will need to maintain strong efforts in the coming years to improve SMEs' rate of digitalisation.

The Polish roadmap does not clearly distinguish between measures to improve digital intensity of SMEs, to enhance the use of three more advanced technologies by the enterprise or to increase the number of unicorns. The authorities argue that majority of them will contribute to more than one target. The measures most clearly benefitting SMEs are the Cybersecurity Certification Programme for Business (which aims to strengthen awareness and increase digital competences among owners and employees of SMEs; there is a pilot phase for 2 000 SMEs with the possibility to expand afterwards), and actions already mentioned earlier. The measures described in the next section may also contribute.

2.2.b Take up of cloud / data analytics / AI

- **Cloud**



2023 state of play and recent progress

	Country level	EU level
FORECAST	46.5	47.3
DESI 2024	46.5	38.9
AVERAGE ANNUAL GROWTH %	55.6	7.0

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

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

Poland brings a positive contribution to the EU's Digital Decade target, while showing a very strong dynamic. The take-up of cloud solutions by Polish enterprises (46.5% in 2023) is above the EU average (39%). Moreover, the value for this indicator increased markedly since 2021 and the average annual growth rate for Poland (55.6%) significantly exceeds the rate calculated for the whole EU (7% per year on average).

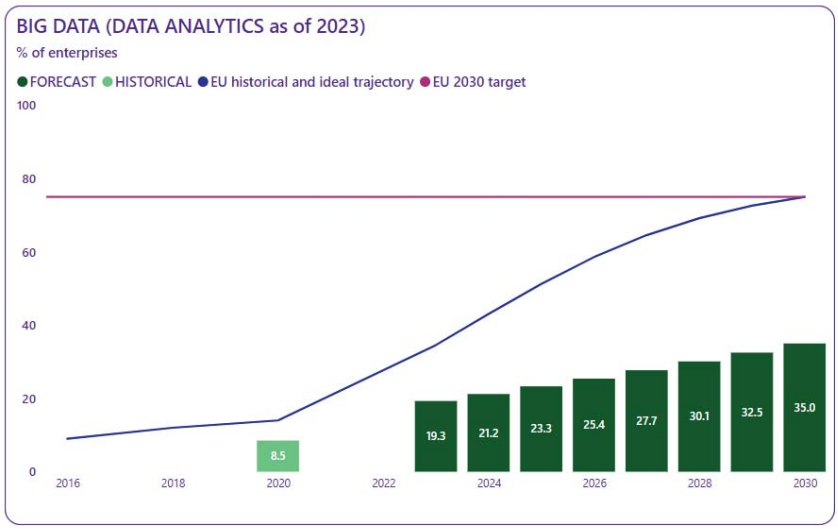
Set at 75% of enterprises, the target for this indicator in the Polish draft roadmap is in line with the 2030 target for the EU. Given that Poland's score for this indicator already exceeded the EU average in 2023 and cloud solutions were already reported as one of the digital technologies most widely used by Polish SMEs (see above), achieving the target by the deadline should be possible.

However, while the rate of growth may suggest that Poland has applied the recommendation given in 2023 State of the Digital Decade to significantly step up its efforts on the digitalisation of businesses, maintaining its efforts in the coming years would also be required.

The Polish roadmap presents several measures contributing to more than one target under digitalisation of businesses. The only initiative focusing on development of cloud computing will, between 2024 and 2026, provide SMEs with loans to purchase of cloud infrastructure and services, and adopt other related solutions (Internet of Things, AI, Virtual Reality / Augmented Reality, blockchain, edge computing, etc.). However, such measures as the Cybersecurity Certification Program for Business (cloud as a mean to increase cybersecurity) and the Digital Kit for Companies (advice on use of cloud by enterprises) are also contributing to this target.

At the EU level, Poland participates to the IPCEI Next Generation Cloud Infrastructure and Services (IPCEI CIS). The project supports the development of software technologies useful for the exploitation of edge nodes, notably industrial 5G.

- **Data analytics (Big Data)**[31]



2023 state of play and recent progress

	Country level	EU level
FORECAST	19.3	34.6
DESI 2024	19.3	33.2
AVERAGE ANNUAL GROWTH %		

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

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

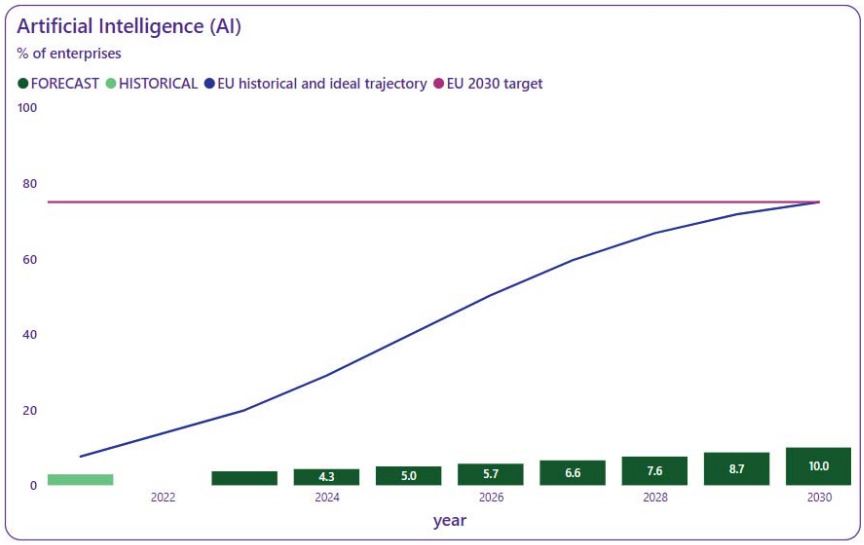
On the use of data analytics by enterprises, Poland has scope to improve its performance to contribute to EU's Digital Decade target. The value observed for the relevant indicator in 2023 in Poland (19.3%) is markedly lower than the EU average (33.2%). However, progress cannot be assessed since the indicator's definition has changed.

Poland's roadmap displays a level of ambition (35%) below the 2030 target for the EU of 75% of enterprises adopting Data analytics (Big Data). The Poland's growth rate in relation to the indicator cannot be calculated, but nothing indicates that Poland is not on track for this target. The target value is linked to a modest starting point but given that the distance between the national and EU values observed in 2023 is smaller than the distance forecasted for 2030, Poland's relative position may deteriorate over time, and a higher level of ambition for this national target could be envisaged.

The Polish roadmap does not present dedicated measures to foster the adoption of data analytics. However, it implies that a contribution to this target will come form such measures as the Digital Kit for Companies (see above) and support provided for under priority 1 of the European Funds for a Modern Economy (*Fundusze Europejskie dla Nowoczesnej Gospodarki, FENG*), where entrepreneurs could prepare a project consisting of R&D works or innovation implementation and optional digitisation. The same is expected of the European Digital Innovation Hubs (EDIH), whose activities will be financed under FENG. The services offered by EDIHs are intended to enable a business to create a digital transition plan, to provide access to up-to-date expertise, and to provide an environment for testing solutions or experimenting with the latest technologies that are potentially crucial to the products the company produces.

[31] As of 2023, Eurostat changed the big data into a data analytics indicator. For this reason, comparison is not possible with previous years.

- **Artificial Intelligence**



2023 state of play and recent progress

	Country level	EU level
FORECAST	3.7	19.9
DESI 2024	3.7	8.0
AVERAGE ANNUAL GROWTH %	13.0	2.6

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

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

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

Poland has scope to improve its performance to contribute to EU's Digital Decade target, as a very small fraction of Polish enterprises (3.7% in 2023) declared having adopted AI solutions, below the EU average of 8.0%. On the other hand, Poland's performance on this indicator increased by 13% per year on average between 2021 and 2023, which is more than 2.6% average annual rate observed in the EU **and shows positive dynamic**.

Poland sets a 2030 target of 10% of AI adoption in its roadmap, well below the EU-level target of 75%. The value reflects Poland's modest starting point. Based on the current rate of progress, it appears that without intensified efforts over the coming years, Poland's contribution to the EU target will remain very limited. Moreover, revision of the current strategic framework (Policy for development of artificial intelligence in Poland after 2020, *Polityka dla rozwoju sztucznej inteligencji w Polsce od roku 2020*) would help to ensure the national priorities take into account the latest developments.

The Polish roadmap includes two dedicated measures to improve businesses' adoption of AI. One measure is the AI programme for companies (*Program AI dla firm*), a pilot training and consulting programme to increase entrepreneurs' awareness and skills in the field of artificial intelligence and the possibility of using it in their business activities. Another is the Testing and Experimentation Facility of Artificial Intelligence, set-up under the new Testing and Experimentation Facilities (TEF) instrument and funded both from the Digital Europe Programme and the cohesion policy funds (FENG). The services offered by TEF AI will enable entrepreneurs to experiment, test and validate AI solutions in both virtual and real environments.

Moreover, the services offered by EDIHs (see above) will include training and consulting also in the field of AI, while in the context of the initiative focusing on development of cloud (see above) it is also possible to receive funding for AI.

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

Taking the three technologies together (adoption of AI or cloud or data analytics), Poland stands at 51.8%, below the EU average of 54.6%. Poland's below-average performance despite above-average adoption of Cloud appears due to very low adoption of data analytics and AI.

2.2.c Unicorns, scale-ups and start-ups

In 2023, there were 11 unicorns in Poland, representing 4.2% of all such companies in the EU. Poland expects to have 20 unicorns by 2030, which would mean almost doubling the baseline value in line with the target for the whole EU.

Poland took 33rd place in the world in the Global Start-up Ecosystem Index 2023 ranking**, which examines start-up ecosystems in 100 countries and 1 000 cities. In the EU itself, it took 15th place**. The report noted that Polish start-ups have a very large growth potential, but the country's start-up ecosystem has yet to achieve its true potential. According to the report published by the Start-up Poland foundation, Polish start-ups 2023 (*Polskie Start-upy 2023*), in 2023 Polish start-ups most often described their products or activities as related to AI / deep tech / Internet of Things.

In 2023, young, innovative companies (start-ups) developing business in Poland could count on public support from EU cohesion policy (FENG). The funds were channelled by: (i) the Polish Development Fund (a fund-of-funds manager that invests in venture capital and private equity funds together with private investors, business angels and corporations); (ii) the Polish Agency for Enterprise Development (gas pedal and post-accelerator development programmes) and (iii) the National Centre for Research and Development (focusing on supporting R&D projects carried out by newly established technology companies). Moreover, the cohesion policy resources, from the Smart Growth Operational Programme 2014-2020 were used to help venture capital firms to invest in technology companies.

Results of the Digital Decade Eurobarometer suggest that public intervention in this area may enjoy stronger support in Poland than in the EU on average, because 86% of Poles agree that is it is important for the public authorities to ensure that European companies can grow and become European Champions able to compete globally, compared to 82% at the level of the EU.

The Polish roadmap does not include any measure dedicated only to increasing the number of unicorns. However, it implies that all measures listed in relation to the digitalisation of businesses contribute to more than one of the related targets (for example, AI programme for companies training SME employees and managers, investment related to the application of digitalisation solutions in the enterprise or activities of EDIHs).

2.3 Strengthening cybersecurity & resilience

With increased use of digital technologies in different aspects of life in Poland, the risk of cybersecurity incidents is also growing. In 2023, the Computer Emergency Response Team (CERT) Polska registered 80 267 incidents, more than twice as many as in the previous year (39 683). While most of them concerned economic actors, in 2023 there were also 2 184 incidents concerning public entities, also more than twice as many as registered in 2022 (937).

The increase in number of incidents is also reflected in the Cybersecurity Barometer (*Barometr cyberbezpieczeństwa*), published annually by KPMG Poland **and in the Report on Cybersecurity in Polish companies** (*Raport Cyberbezpieczeństwo w polskich firmach*), prepared on yearly basis by Vecto. In 2023, the percentage of companies registering at least one cyber incident increased by 8 pps to 66% according to the first study and by 5 pps to 68.9% according to the second report.

Companies indicate cybersecurity as the third most important barrier for digitalisation of SMEs (the Cybersecurity Barometer) and 82.8% of those interviewed for the Report on the Cybersecurity in Polish companies replied that data security is important. However, this risk does not necessarily register so strongly with businesses as to lead them to insure against possible losses. In 2022, 14.4% of enterprises in Poland employing 10 people or more had insurance against ICT security incidents compared to 25% for the

whole EU and between 40% and 70% enterprises in the three EU Member States, where the value for this indicator was the highest. Moreover, according to the Report on the Cybersecurity in Polish companies, more than ¼ of enterprises interviewed for this study did not employ any specialist for data security.

In 2023, to improve cybersecurity in public administration, a large-scale grant project was launched with cohesion policy funding under the European Funds for Digital Development (*Fundusze Europejskie na Rozwój Cyfrowy, FERC*). With a budget of approximately PLN 1.9 billion (EUR 430 million), the initiative aims to increase the level of information security of local government units and is open for all 2 807 such units in Poland. Moreover, the NASK[32] research institute continued information and education campaigns including training for representatives of legislative and executive authorities, representatives of local government units and employees of primary health care facilities. The public-private partnership to enhance the national cybersecurity system (PWCyber) also continued its operations in 2023.

To improve cybersecurity and resilience in the future, the Polish draft roadmap includes several measures aimed at enterprises, the public, and public entities. These relate to: (i) the digitalisation of businesses (Cybersecurity Certification Programme, and support for digitalisation under FENG); (ii) enhancing the public's digital competences (cybersecurity awareness campaign funded under FERC); (iii) digitalising public administration (support in creating e-services and adopting solutions to optimise its activity funded under FERC). Moreover, the roadmap recalls the need to implement Poland's 2019-2024 Cybersecurity Strategy and the implementation of the NIS2 Directive, whose transposition is expected in 2024.

3 Protecting and empowering EU people and society

3.1 Empowering people and bringing the digital transformation closer to their needs

To ensure that digital transformation is inclusive, Poland will need to increase the level of digital skills of the population and the share of ICT specialists in the workforce at a much faster pace than in the previous years.

The population's level of digital skills is markedly below the EU average. Moreover, to make sure 80% of population has at least basic digital skills, the pace of growth until 2030 would have to be more than 5 times faster than the average observed in recent years. In the case of ICT specialists, the 2023 value is also below the EU average, but Poland's draft roadmap does not envisage matching the EU target of 10% and proposed national target of 6%. In any case, the measures announced in the draft roadmap seem insufficient to achieve the expected increase by 2030 and the resources allocated for this action are markedly lower than for other aspects of the Digital Decade.

Poland has made strides in its electronic identification scheme, notifying one to the European Commission in 2023 and preparing another notification. 36.5% of Poles used e-ID to access public services in Poland (EU average: 36.1%); this good result is most likely due to the widespread use the mObywatel application and eID means - the personal profile (*profil osobisty*) that is available in the ID card. **Poland ranks below the EU average on accessibility of public services both for citizens and businesses and the use of e-government in the last 12 months.** However, it should close the gap by 2030 if it maintains its average rate of growth and efforts to enhance available services or offer new ones. On the other hand, **Poland's**

[32] NASK is a national research institute, supervised by the Ministry of Digital Affairs. It focuses on ensuring that the internet is a secure place for its users (e.g., cybersecurity, disinformation, fraud) and aims to increase network efficiency, reliability, and security.

score for accessibility of e-health records in Poland is much higher than for the whole EU; the country's actions in this area suggest the target score of 100 is within reach.

3.1.1 Equipping people with digital skills

3.1.1.a Basic digital skills

2023 state of play and recent progress

	Country level	EU level
FORECAST	44.3	59.8
DESI 2024	44.3	55.6
AVERAGE ANNUAL GROWTH %	1.6	1.5

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

Note 1: Data break-in-series in 2020

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

Poland has scope to improve its performance to contribute to the EU's digital decade target on basic digital skills and demonstrates a limited dynamic. In 2023, 44.3% of the Polish population had at least basic digital skills. This puts Poland well behind not only the EU front-runners, but also the EU average of 55.6%. The average annual growth rate for this indicator in Poland is comparable with the rate for the EU. Other digital skills indicators such as internet use and above basic digital skills point to a similar performance below the EU average.

The key national policy document is the Digital Competence Development Programme (DCDP), adopted by the Council of Ministers of Poland in February 2023. The programme's goals for 2030 are: 80% of the population has at least basic digital skills; 40% of the population has more advanced digital skills; 29% of ICT specialists are women; ICT specialists represent 6% of people employed; establishing a mechanism for coordinating and monitoring activities supporting the development of digital competences at government level.

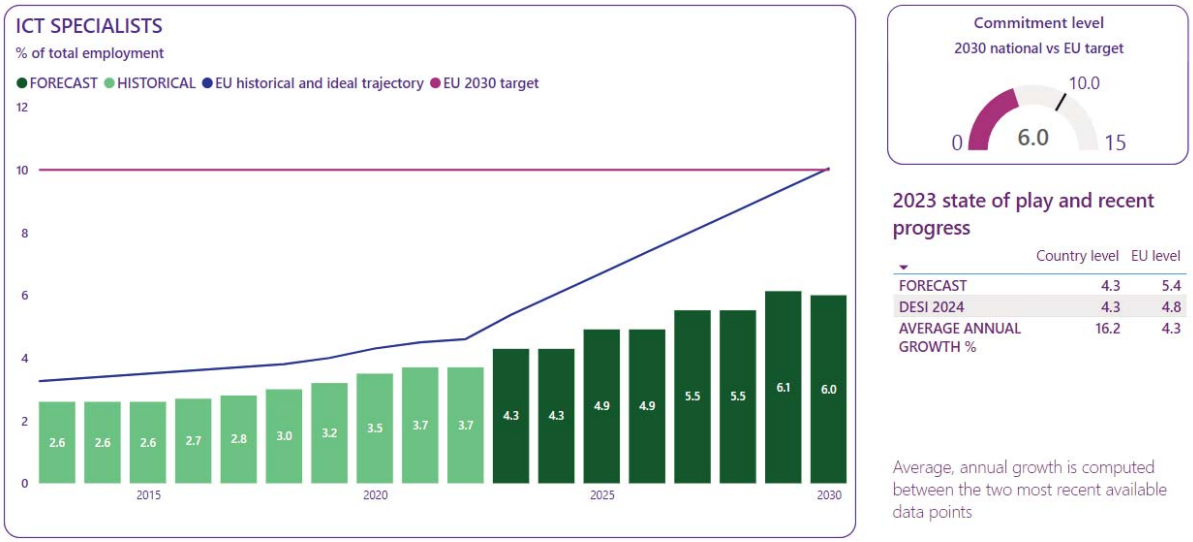
In 2023, the public employment services in Poland continued support for employers investing in development of their employees' skills, with particular emphasis on digital skills. Another measure continuing from 2022, was the 'Lekcja: Enter' project to help primary and secondary schools' teachers to use modern technologies during regular lessons on non-IT subjects. Another measure focusing on basic digital skills was the work by the NGOs to improve the digital competences of senior citizens; these activities were financed under the 'Aktywni+' multiannual programme for older people.

The level of ambition presented in the Polish roadmap is on a par with the EU's 2030 target of 80% of the population having at least basic digital skills. However, this value is high given Poland's starting point; at its current average annual rate of growth, achieving the target by the deadline will not be possible.

The draft roadmap includes eleven measures linked to this target. One of them, financed under the European Fund for Social Development (*Fundusze Europejskie dla Rozwoju Społecznego - FERS*) foresees

opening of Digital Development Clubs (*Kluby Rozwoju Cyfrowego*) in most municipalities in Poland. The action will allow to raise the digital skills of citizens (including especially digitally excluded people). There are also other measures to enhance digital competences of the citizens in general and those at risk of digital exclusion, as well as specific professional groups (competences for Industry 4.0, public administration, health professionals, teachers, and cultural workers) funded from RRF and cohesion policy resources.

3.1.1.b ICT specialists



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

Poland has untapped potential to contribute to the EU's Digital Decade target for ICT specialists, while showing a very strong dynamic. ICT specialists in Poland in 2023 accounted for 4.3% of people employed, the highest share observed so far, but still below the EU average of 4.8%. In absolute terms, Poland in 2023 had 744 100 ICT specialists, 99 500 more than in the previous year. Women accounted for 19.1% of this number, a significant increase on the previous year (16.7%), but still slightly below the EU average (19.4%) and considerable distance from the target Poland set for itself in the draft roadmap (29.0%).

One of the activities contributing to this result in 2023 was the initiative entitled 'Educating high-class ICT specialists in the model developed in the AI Tech project'. Its aim was to educate high-class specialists in artificial intelligence, machine learning and cybersecurity. As a result, 478 students completed second-cycle studies at five selected universities, increasing the supply of ICT specialists.

Poland demonstrated in its draft roadmap a level of ambition markedly lower than the 2030 target for the whole EU (6%, versus 10% for the EU). If the current average annual rate of increase is maintained, achieving this lower target should be possible. However, if the number of ICT specialists in Poland is to reach 10% of people employed, their number would need to more than double by 2030, instead of increasing by less than half. Due to Poland's large population, its efforts will have decisive consequences on the achievement of the EU-level 2030 target for ICT specialists.

To increase the number of ICT specialists, Poland proposed in its roadmap several measures to increase the number of ICT teachers, the number of female ICT specialists and specialists in digital accessibility and improve awareness of high-performance computing among academia and businesses. However, the combined expected results of these measures do not seem sufficient to ensure the required growth, even considering Poland's lower target in this area.

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

3.1.2.a e-ID

In April 2023, Poland notified its Public Electronic Identification Scheme. One of the notified e-ID means – the personal profile (*profil osobisty*) – is also available to private entities, enabling user identification on their website. Likewise, the 'mCitizen profile' (profil mObywatel) has also been available to private entities since its release in July 2023 as a new feature in the mObywatel 2.0 public mobile application. The legal act underpinning the new edition of this application made it easier to establish cooperation between the public and commercial entities. The new version of the mObywatel app also enables users to verify and download their data in all major public registries and systems.

Poland, along with 18 other Member States and Ukraine, participates in the POTENTIAL consortium, one of the four large-scale pilots selected by the Commission to experiment with digital identity through Europe. POTENTIAL aims to develop interoperable national digital wallets accessible across Europe in a fully secure manner and to streamline online procedures in six digital identity sectors (governmental services, banking, telecommunications, driving licenses, electronic signatures, and health).

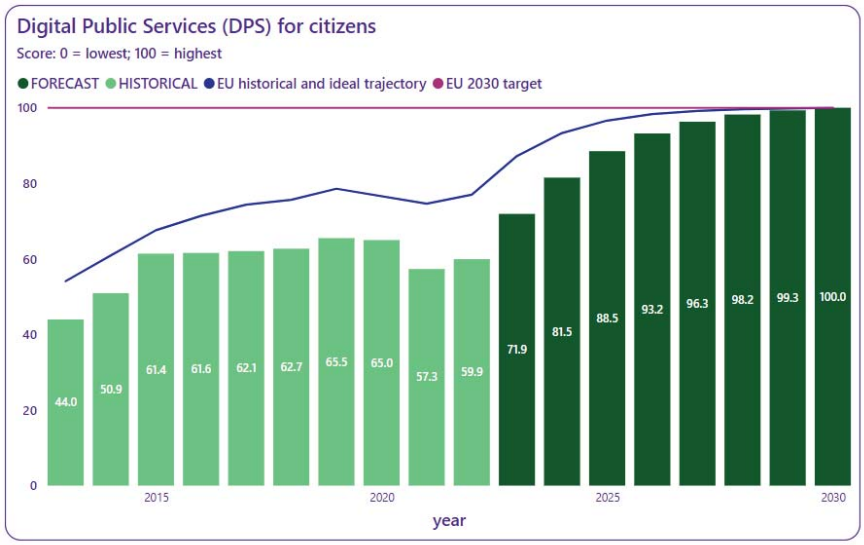
Moreover, Poland was among the Member States, which applied to the European Commission to set up the EUROPEUM EDIC. This new initiative, which was formally established in May 2024, aims to strengthen, and enlarge the activities of the European Blockchain Partnership, including the use of this technology in relation to e-ID.

To contribute to the Digital Decade target in this domain, Poland included five measures in its national roadmap. This includes two measures that should have been completed in 2023: (i) implementing the law on the mObywatel application; and (ii) participation in the Commission expert group working on the standards, architecture, and functionalities of the European Digital Identity Wallet under European Digital Identity Regulation. A third measure is Poland's participation in the above-mentioned POTENTIAL consortium. The fourth measure in the draft roadmap envisages analysis of the national law and its adaptation to the European Digital Identity Regulation, while the fifth measure, due to start once the pilot is completed, should ensure that the Polish digital wallet is consistent with the EU standards.

Best practice: mObywatel

mObywatel is the most popular government application in Poland - by December 2023 it had been installed over 12.6 million times. What was launched in 2020 as a digital wallet for documents and services has now become an assistant that can be used to handle various official matters. Since July 2023 and release of mObywatel 2.0, the application includes also mID, which can be used to confirm identity of the bearer. As a result, Poland has become the largest EU country that has a digital identity document; by the end of 2023, almost 6 million mIDs had been issued. Another new feature is the addition of the mObywatel profile in the application, providing a new means of electronic identification. Through the application, users can access several other official documents (including the mDriving licence, the large family card, the mSchool and student cards) and services (including reporting environmental violations, checking penalty points or filling e-prescriptions without providing the national identification number).

3.1.2.b Digitalisation of public services for citizens and businesses



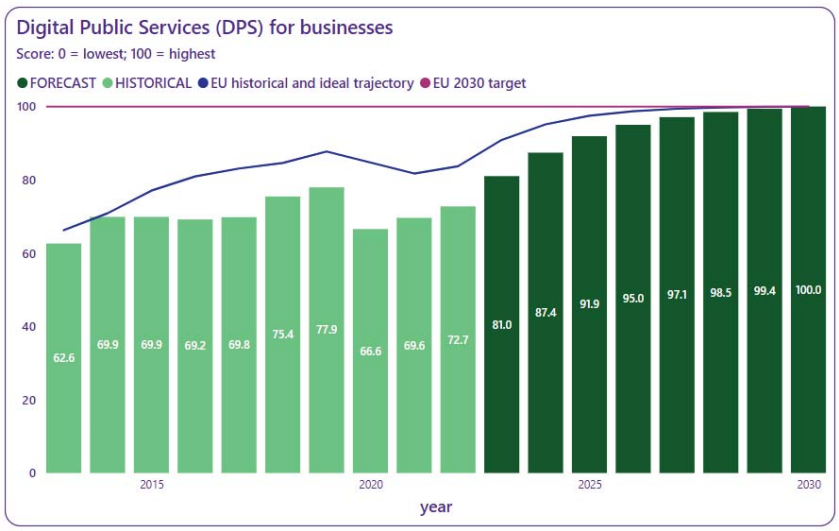
2023 state of play and recent progress

	Country level	EU level
FORECAST	71.9	87.2
DESI 2024	63.7	79.4
AVERAGE ANNUAL GROWTH %	6.4	3.1

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

Note 1: Data break-in-series in 2020

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



2023 state of play and recent progress

	Country level	EU level
FORECAST	81.0	90.9
DESI 2024	72.9	85.4
AVERAGE ANNUAL GROWTH %	0.2	2.0

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

Note 1: Data break-in-series in 2020

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

Poland has scope to improve its performance to contribute to the EU's digital decade targets on digitals services for citizens and businesses, but is demonstrating a positive dynamic. On both public services for citizens (63.7) and businesses (72.9), Poland ranks below the EU average in absolute terms, but the annual growth rate for public services for citizens is higher than the EU average. The same applies to the use of e-government. Here also, Poland's score for the indicator is lower than for the whole EU (66.4% of individuals who used internet in the last 12 months, versus 75%), but the rate of growth is higher in Poland than for the EU as a whole.

In 2023, Poland implemented several measures to enhance accessibility of key public services. Continuous development of the *Elektroniczne Zarządzanie Dokumentami, EZD* electronic documentation management system helped more than 1 000 public entities across the country start electronic documentation management (EZD RP). At the same time, work continued on enabling the delivery of correspondence using

ePUAP (a Polish nationwide platform that the public can use to communicate with the public authorities) and e-delivery services.

The Ministry of Digital Affairs worked on revising and updating of the National Interoperability Framework (NIF) and minimal requirements for ICT systems, public registers and electronic information exchange. Once adopted, these should increase the level of public registers data reuse. This will have a positive impact on the number of public tasks carried out in accordance with the once-only principle and will increase the level of interoperability.

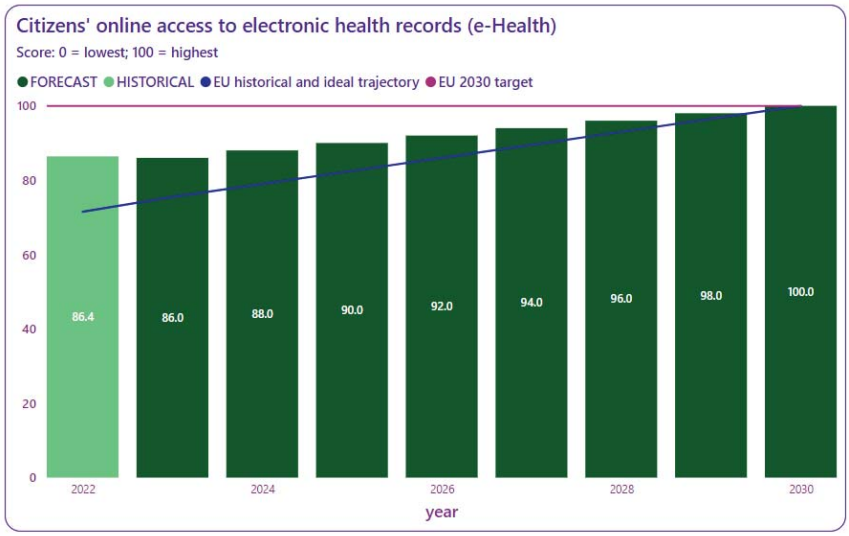
At the EU level, Poland was among the Member States that in May 2023 declared that it would participate in preparation of the application to set up the **Connected Public Administration European Digital Infrastructure Consortium** (IMPACTS-EDIC). The initiative aims to connect public administrations to: (i) provide advanced public services across Europe, in line with the objective of the Interoperable Europe Act that calls for strengthened collaboration on interoperability in the EU; and (ii) promote digital ready policy making.

Poland aims to equal the EU level target for digital public services by 2030 (score 100). However, Poland's starting point is markedly below the EU average. Based on the current rate of progress, Poland will likely find it difficult to meet its goal unless it intensifies its efforts over the coming years.

Poland proposed in its draft roadmap four measures to improve the accessibility of digital public services. Two of the measures envisage adding new key public services so that by 2030 all of them are accessible online, including for cross-border users. The third measure, financed from the RRP, aims to create new, or improve existing services and IT systems in the public administration. The fourth measure, financed from cohesion policy funds under European Funds for Digital Development (*Fundusze Europejskie na Rozwój Cyfrowy, FERC*), will help the public administration create e-services and adopt solutions to optimise its activity (e.g., e-services using AI, automation, use of cloud solutions).

Moreover, on basic digital skills, the roadmap includes a measure funded from the RRP to improve the digital competences of employees in the public administration, including the creation and implementation of e-services. Furthermore, the measures to improve digitalisation of enterprises include also Biznes.gov.pl, a website for those who intend to start and run a business. The purpose of the portal is to assist in matters related to setting up and running a business and simplifying the formalities necessary to set up and run a business.

3.1.2.c e-Health



2023 state of play and recent progress

	Country level	EU level
FORECAST	86.0	75.5
DESI 2024	90.0	79.1
AVERAGE ANNUAL GROWTH %	4.2	10.6

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

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

Poland brings a very strong contribution to the EU's digital decade target while demonstrating a limited dynamic. Poland scored 90 out of 100 in 2023 for overall e-Health maturity, placing it well above the overall EU score of 79. However, the Poland's rate of progress (4%) was much lower than in several other Member States.

A centralised, nationwide access service is technically available in Poland. 80-100% of the national population is technically able to access e-health records online through both native mobile application(s) and online portal(s), logging in using an e-ID compliant with the European Digital Identity Regulation.

In Poland, all health data categories, except those about current problems and medical images, are made available to citizens. The data categories of e-prescription and e-dispensation are available in a timely manner. The country scores 60 on categories of health data, compared to a European average of 74.

Regarding access opportunities for certain categories of people, Poland scores 100 compared to a European average of 77 and does follow the Web Content Accessibility Guidelines. Poland's online access service for electronic health records provides functionality that reduces barriers to accessing the service, such as following web accessibility guidelines and the ability to grant legal guardians and authorised persons access to electronic health records on behalf of others.

To further improve citizens' access to their electronic health records, in 2023, the Polish Ministry of Health continued to increase the number of services available through the internet patient account (*Internetowe Konto Pacjenta, IKP*), adding such services as the individual healthcare plan and individual healthcare plan schedule, e-orders for medical devices, blood donor services, making / cancelling appointments for vaccinations and for laboratory tests under preventive medicine programmes. New functions were also introduced as part of myIKP (*mojeIKP*) mobile application. These include presentation of medical events, ordering e-prescriptions, patient evaluation of performed medical events, presentation of contact information for healthcare facilities with the possibility to call the facility, and a drug scanner (checking the medicines' leaflet and expiration date, adding reminders to take medication).

Poland aims to score 100 for citizen's access to electronic health records by 2030, in line with the target at EU level. Given Poland's strong starting point, it appears possible that it will meet the target, provided it maintains its current level of effort in this area.

Poland proposed in its roadmap two measures to improve the accessibility of electronic health records. One will focus on expanding the scope of individual health information available to the citizens to cover information from the Patient Summary (*Karta Pacjenta*) such as allergies, previous diagnoses, medical devices, and medications taken. The other measure aims to make available the results of laboratory tests, medical imaging, and their descriptions. In both cases new information will be made available through the internet patient account.

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

In 2023, the Polish Parliament adopted a law combating abuse in electronic communications, the goal being to protect users against smishing and spoofing. Under the new legislation, the CSIRT (computer security incident response team) at the NASK national research institute, one of the CSIRTs at the national level, will analyse text messages containing smishing and send their patterns to telecoms operators so that they can block text messages that match this pattern. In addition, the law provides a new legal basis for operating the list of dangerous domains. The list will include domains identified as being used for fraud or phishing. Internet providers who have concluded an agreement with the NASK CSIRT can block such domains, thus protecting users.

Moreover, **the Department of Countering Disinformation at NASK carried out a number of activities to counter disinformation online. These were: monitoring the Polish infosphere, training people on how to deal with disinformation, raising public awareness about the dangers of this problem and fostering a conscious understanding of the issue**. In 2023, the department ran projects such as 'Safe election' (*Bezpieczne Wybory*), 'Poland in context' (*Polska na tle*), 'ISAC – Dezinfo' and 'Checking.info' (*Sprawdzam.info*). The goal was to flag harmful or misleading content and foster prudent habits on consuming information online.

In 2023, the Department for Reacting to Illegal Content at NASK analysed 18 346 incidents related to content prohibited by law on the internet, such as material depicting sexual abuse of children, paedophilia, and racist and xenophobic content. In 2 611 cases the reported content concerned child sexual abuse material (CSAM). Based on the analysis of the reports made through Internet *Dyzurnet.pl*, the department notified an internet service provider of the need for the swift removal of the illegal content, mainly related to the sexual abuse of children, and to report the case to the relevant law enforcement agency for victim identification purposes.

Polish internet users are among those most satisfied in the EU with the protection they enjoy against disinformation and illegal content. 68% of Eurobarometer respondents in Poland replied that their digital rights and principles concerning access to trustworthy, diverse, and multilingual digital environment, including more diverse content, less disinformation and less illegal content, are well applied, compared to 53% in the whole EU. A higher share of respondents gave this answer in only two other Member States.

4 Leveraging digital transformation for a smart greening

Businesses appear to recognise the need for energy- and resource-efficient digital infrastructure and technologies at a level on a par with those in other Member States. In 2022 (most recent data), 50.8% of Polish enterprises with 10 employees or more considered the environmental impact of ICT solutions and devices when choosing them and applied some measures to reduce paper of energy consumption of ICT devices. For comparison, the EU average was 48.7%. Many operators of telecoms infrastructure inform about their purchase of 'green' energy from suppliers or the use of local sources of solar and wind energy to power their installations.

The same concerns are evident on the part of the public administration, particularly in the case of investments funded from the EU resources. For example, improving energy efficiency and increasing the use of energy from renewable sources is one of the goals of a project to build three data processing centres for the public administration. The investment, supported under the Polish RRP, started in 2023 and should be completed in 2025. Moreover, the beneficiaries of broadband projects supported by the RRF are contractually obliged to provide a transparent way to monitor the commitment to reuse or recycle at least 70% of waste generated under the projects. This applies both during the investment process and during the subsequent operation of the network. In addition, legislative work has been carried out on a draft regulation on the technical conditions for the electrical power supply of telecommunications buildings and telecommunications rooms (the 'electricity regulation'). The purpose of the legislation is to reduce the energy consumption of the telecoms sector.

All major mobile phone operators offer users possibility to send them old phones for recycling. The people can also deliver old or broken electronic device to a selective waste collection point, which should be organised in every *gmina* (lowest level of territorial organisation in Poland). As a result, recycling of old electronic devices was more common in 2022 than on average in the EU, except for the laptops and tablets. 12.8% of people in Poland had their desktop computers recycled, 12.4% their mobile phones and 9.4% their laptops or tablets (corresponding EU averages: 12.8%, 10.4% and 9.7%).

Poland included in its roadmap four measures relating to the general objective concerning green transformation. The measures are quite diverse. They include: (i) creation of regulatory sandboxes to test AI solutions, including in the context of their environmental impact (TEF AI); (ii) participation in the Destination Earth initiative aiming to create the earth's digital twin; (iii) implementation of initiatives from the Polish RRP (support for transformation of enterprises to contribute to the circular economy, and development of national systems analysing satellite data, including to better protect the environment); and (iv) digitalisation of administrative procedures in the construction sector.

The roadmap does not include the environmental impact of digital infrastructures and technologies among the challenges for Poland. The roadmap does not assess the issue or put forward a proposal on how to assess it.

Annex I – National roadmap analysis

Polish national Digital Decade strategic roadmap

The Polish national strategic roadmap has yet to be adopted, officially submitted, and published. However, the draft shared with the Commission on 30 January 2024 has already gone through two rounds of consultation with stakeholders and was deemed ready to start adoption in the Council of Ministers.

The draft Polish roadmap provides national trajectories, including projected yearly data points and targets **to be achieved by 2030 for all 13 KPIs**, except for separate information about Very High-Capacity Networks**.** Most of national targets are set at the same level as those for the whole EU, with the notable commitment to achieve 100% coverage of 5G by 2027. On the other hand, Poland envisages that ICT specialists will account for 6% of the workforce by 2030, compared to 10% expected at EU level. Moreover, the adoption of advanced technologies – if measured separately – should reach 75% by 2030 only for cloud computing, while the expected values for data analytics and AI are 35% and 10% respectively.

The roadmap contains 52 measures, with a total value of EUR 12.4 billion. They cover all Digital Decade **targets, but some measures are deemed to contribute to more than one target** (e.g., measures related to digitalisation of businesses), making precise attribution difficult. The roadmap also lists measures relating to general objectives, but without providing information about their budget or timing.

The below table reflects a best-effort attempt at categorising the measures and budget as presented in the Polish draft roadmap.

Digital Decade Target/objective	Budget (EUR Million)	Number of measures
Connectivity gigabit	2 144.9	7
Connectivity 5G	1.8	2
Semiconductors	1 702.3	3
Edge nodes	2.7	1
Quantum computing	21.3	2
SME take up	5 698.9	8
Cloud/AI/Big data uptake	-	-
Cloud only uptake	649.2	1
AI only uptake	474.7	3
Big data uptake	-	-
Unicorns	-	-
Basic digital skills	494.8	11
ICT specialists	23.2	6
e-ID	8.9	5
Key public services	150.9	4
e-Health	1 000.1	2
Objectives	-	-
Total	12 373.7	55

The measures differ in scale, from single projects to whole priorities in the operational programmes or milestones / targets in the RRP. Their descriptions vary in terms of detail, especially where the related budget is concerned (e.g., no budget defined yet for implementation of e-ID, digital public services and some measures related to semiconductors, because depends on the outcome of the ongoing legislative

procedure, as well as implementing decisions on the EU level).

The bulk of the measures and their related funding are meant for improving gigabit connectivity, digitalisation of enterprises and production of semiconductors. The remaining resources are divided between digitalisation of public services (e-health accounting for the most part) and measures on enhancing basic digital skills and increasing the number of ICT specialists.

The timespan of most measures coincides with the timeframe of cohesion policy and Recovery and Resilience Fund programme implementation, and most of the budget set out in the draft roadmap comes from those sources of funding. The remaining part comes from national public resources. Over 80% of the funding is said to have been already allocated to measures, and most of the initiatives are interventions designed under other programmes or policies. 62% of measures listed in the roadmap are expected to run beyond 2026.

The policies and measures address some of the main challenges that Poland is facing (insufficient digital infrastructure, delays in deployment of 5G, need to enhance digitalisation of enterprises), as identified in the draft roadmap, and covered under the recommendations issued in the Report on the state of the Digital Decade 2023 and the European Semester country specific recommendations. **However, they do not match the high level of ambition for the development of digital competences and increased numbers of ICT specialists**. Moreover, to a large extent they are a continuation of the existing set of measures.

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

MCPs and EDICs[33]

Poland is a member for Alliance for Language Technologies (ALT-EDIC) and applied to join the EUROPEUM EDIC (both already set up). Poland belongs to the working group to submit the application for the possible future IMPACTS and AGRIfood EDICs and is an observer in the working group to submit the application for possible future Digital Commons and Cancer Image Europe (EUCAIM) EDICs. All in all, Poland is active in 6 EDICs already set-up or in the making. Poland is also a member of the Important Projects of Common European Interest on Next Generation Cloud Infrastructure and Services (IPCEI-CIS) and on Microelectronics and Communication Technologies (IPCEI-ME/CT).

EU funding for digital policies in Poland

EU funds support the digitalisation efforts in Member States. The Polish Recovery and Resilience Plan devotes EUR 7.4 billion (21% of the total) to the digital transformation. According to the Joint Research Centre's 'study[34], EUR 6.0 billion of the Polish Recovery and Resilience Plan directly contribute to achieving Digital Decade targets. Out of the cohesion policy funds received by Poland, EUR 3.9 billion contribute directly to Digital Decade targets according to the same mapping study.

The largest amount from the Recovery and Resilience Plan is dedicated to ensuring access to high-speed internet (EUR 1.4 billion), followed by investments in digital infrastructure and equipment for schools, as well as digital skills for teachers (EUR 1.2 billion) those focused on e-health (EUR 1 billion).

[33] Information updated on 31 May 2024

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