Digital Decade Country Report 2024:

Spain

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Executive summary

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

In **2023, Spain made notable progress** on increasing basic digital skills and in the use of artificial intelligence by enterprises. Spain has an excellent FTTP coverage and has taken significant action in the area of semiconductors. However, important **challenges persist** regarding the lack of ICT specialists and some indicators related to the digitalization of business, including the take up of cloud.

The Digital Spain Agenda is the country's digital transformation strategy aiming to leverage new technologies to drive intensive economic growth, placing people at the centre, and reaching all territories. The agenda is structured around ten strategic axes and two cross-cutting axes, which are framed by three dimensions reflecting the Digital Decade Policy Programme: (i) infrastructure and technology; (ii) economy; and (iii) people. It was approved in 2020 and updated in 2022 under the name 'Digital Spain 2026'. According to the special Eurobarometer on 'the Digital Decade' 2024[1], **73% of Spanish citizens consider that the digitalisation of daily public and private services is making their lives easier**. This percentage aligns with the EU average and reflects the success of Spanish authorities in the inclusive implementation of the Digital Agenda.

Spain is a member and the host of the **European Digital Infrastructure Consortium** of the Local Digital Twins towards the **CitiVERSE – EDIC** (already set up) and has recently joined the Alliance for Language Technologies EDIC (**ALT-EDIC**, already set up), which addresses the scarcity of European language data needed for AI solutions. Spain is also developing the Statutes and other relevant documents of the possible future Genome EDIC and the EDIC for Mobility and Logistics Data, within their informal working groups. In addition, the country is engaging in discussions on the setting up of the Cancer Image Europe (EUCAIM) and the Agri-Food EDICs, within their informal Working Groups[2]. Concerning the Important Projects of Common European Interest (IPCEIs), Spain takes part in the IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS) and the **IPCEI on Microelectronics and Communication Technologies** (IPCEI-ME/CT). In addition, Spain takes part in the European High Performance Computing Joint Undertaking (EuroHPC) with the supercomputer MareNostrum 5 based in Barcelona.

The Spanish Recovery and Resilience Plan (RRP) allocates 26% of its budget to measures linked to the digital area[3]. The modified plan, updated in October 2023, has a stronger focus on the digital transition, devoting **EUR 40.4 billion to measures that support digital objectives** (up from EUR 19.7 billion in the original plan). Under the cohesion policy, an additional EUR 5.7 billion (16% of the country's total cohesion policy funding) is allocated to the country's digital transformation[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.

Spain

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

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

National digital decade strategic roadmap

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

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

Recommendations for the roadmap

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

- **TARGETS:** (i) Propose targets and develop trajectories for edge nodes; (ii) align with the EU level of ambition for ICT specialists.
- **MEASURES:** (i) Reinforce the roadmap with additional measures on ICT specialists, on the adoption of the advanced digital technologies, and on objectives; (ii) Provide more

information on the implementation of digital rights and principles (and Digital Decade general objectives), including on contributing measures.
- **CONSULTATION:** Publish the roadmap to encourage open debate and engagement with the Digital objectives and receive future stakeholder feedback.

Digital rights and principles

The Special Eurobarometer on 'the Digital Decade' 2024 highlights that only 36% of Spaniards believe the EU protects their digital rights, a significant 9-point gap below the EU average (45%) and a 13-point increase in distrust since last year. Concerns are growing, notably with 61% alarmed about children's online safety—up 21 points, and 53% about control over personal data—up 17 points. Positively, 60% trust in affordable high-speed internet and 62% are satisfied with the level of digital skills. These findings underscore the urgency of enhancing digital rights and principles in Spain's roadmap and digital strategies. The monitoring of the Declaration on Digital Rights and Principles shows that increasing the profile of the Declaration at national level and fostering better stakeholder engagement could help to improve outcomes in the years to come[5].

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

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

Recommendations – Spain should:

- **CONNECTIVITY INFRASTRUCTURE:** Ensure sufficient access of new players to spectrum for innovative business-to-business (B2B) and business-to-consumer (B2C) applications and encourage operators to speed up the deployment of 5G stand-alone core networks.
- **DIGITALISATION OF SMEs/ AI, CLOUD and DATA ANALYTICS:** (i) Continue the efforts to support the digitalisation of enterprises, in particular to foster the adoption of advanced technologies; (ii) Ensure the broad uptake of the next generation of cloud infrastructure and services under development in the IPCEI-CIS by companies of all sizes, including by developing a country-specific dissemination strategy (complementing what has already been committed under IPCEI-CIS); contributing to the additional dissemination activities led by the Cloud IPCEI Exploitation Office.

[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.

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

Protecting and empowering EU people and society

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

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

Recommendations – Spain should:

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

Leveraging digital transformation for a smart greening

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

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

Spain

Recommendations - Spain should:

- Continue developing and implementing a coherent approach to twinning the digital and green transitions, by leveraging advanced technologies and scaling up successful initiatives that improve the energy and material efficiency of digital infrastructures, in particular data centres, and by proposing decarbonisation measures and supporting the take up of green technologies that reduce the carbon footprint in other sectors, such as energy, transport, buildings, and agriculture.
- Monitor and quantify the emission reductions of the deployed digital solutions in line with the relevant EU guidance and with the support of the methodology developed by the European Green Digital Coalition, in view of future policy development, as well as of attracting relevant financing.

A competitive, sovereign and resilient EU based on technological leadership

The Digital Spain Agenda has been successful in stimulating the development of infrastructure, continued growth, and digitalisation of the Spanish economy, bringing a very important contribution to the Digital Decade targets. The country performs exceptionally well in connectivity infrastructure, standing well above the EU average in several indicators. Spain continues to expand its digital industry. This will strengthen the EU's digital leadership and sovereignty, particularly in semiconductor production.

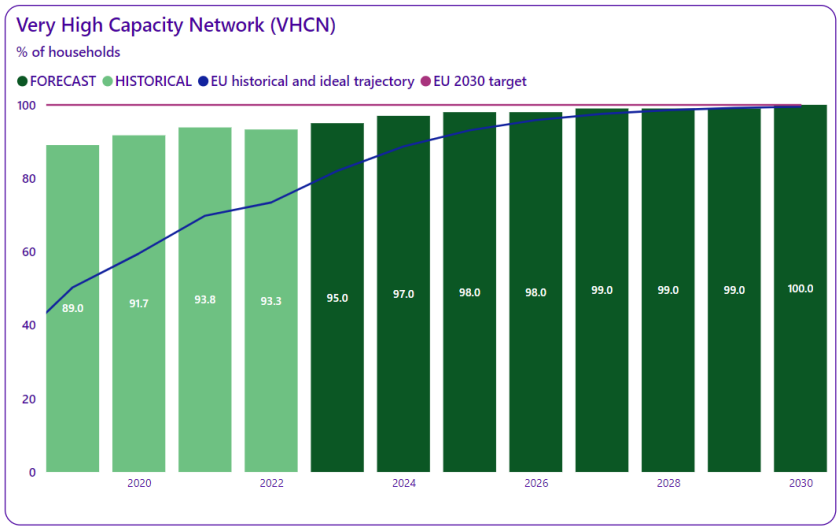
According to the 2024 Eurobarometer, **85% of Spanish people think that public authorities should support building efficient and secure digital infrastructures including connectivity and data processing facilities**. **83% think that the same should be done to ensure that European companies can grow and become European champions able to compete globally.**

Of the 10 strategic axes of the Digital Spain agenda, those most relevant to the EU's technological leadership are: (i) digital connectivity, (ii) the impulse to 5G technology, and (iii) the digital transformation of enterprises and digital entrepreneurship.

Building technological leadership: digital infrastructure and technologies

As a result of its active deployment of connectivity infrastructures, Spain has nearly met the EU targets for VHCN, FTTP and 5G coverage.

Connectivity infrastructure (Gigabit)[6]



2023 state of play and recent progress

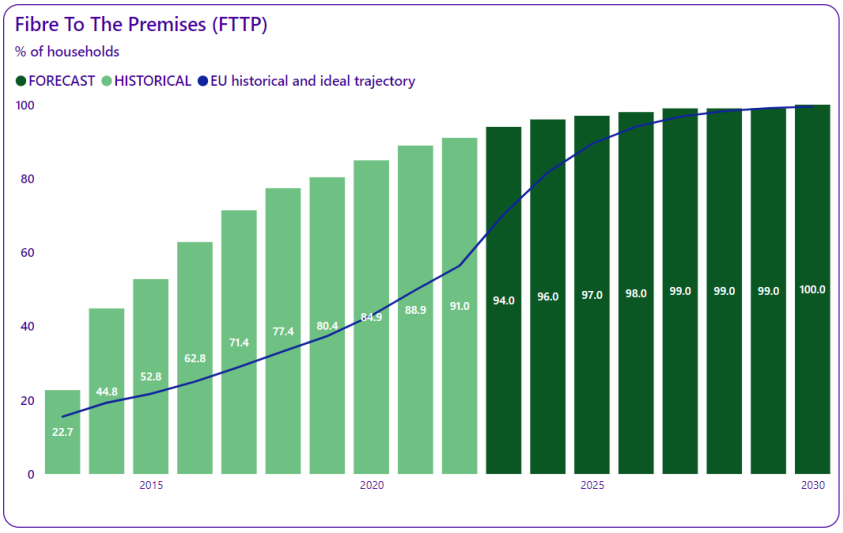
	Country level	EU level
FORECAST	95.0	82.0
DESI 2024	96.3	78.8
AVERAGE ANNUAL GROWTH %	3.2	7.4

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

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

Spain



2023 state of play and recent progress

	Country level	EU level
FORECAST	94.0	70.3
DESI 2024	95.2	64.0
AVERAGE ANNUAL GROWTH %	4.6	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

Spain makes a very strong contribution to the EU's digital decade VHCN target, showing a positive dynamic. In 2023, VHCN coverage stood at 96.3%, well above the EU average (78.8%). At 95.2%, FTTP coverage is also well above the EU average (64.0%). Spain is once again at the forefront of the roll-out of VHCN, up 3.2% from the previous year. For FTTP the growth is +4.6%. The progression is lower than in the EU but it can be explained by the fact that the last percentages of coverage are the most difficult to reach for advanced countries like Spain.

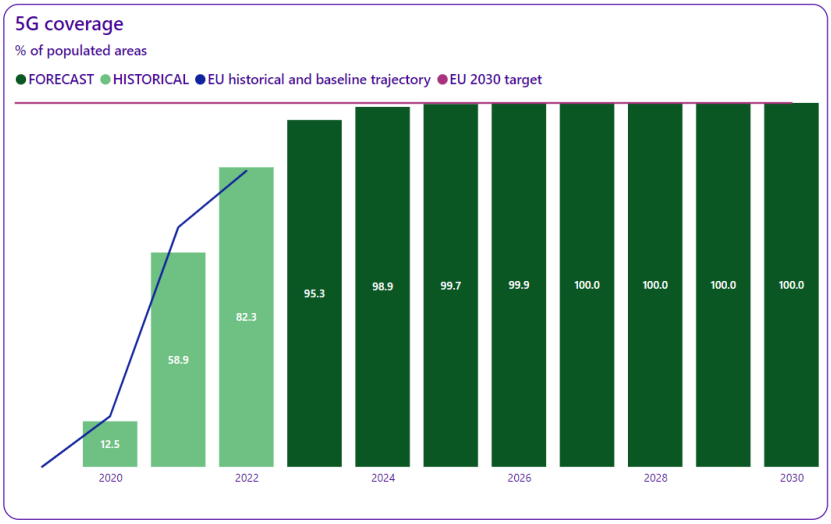
The Spanish roadmap includes five measures linked to the Gigabit infrastructure in order to reach the targets aligned with the EU objectives: achieving 100% coverage in VHCN and FTTP by 2030. Given the current rate of progress and focus on achieving the last 5% by 2030, the country is on track to reach these targets before the end of that year. By then, it expects all end users at a fixed location to be covered up to the termination point of a Gigabit network.

Spain continues to take a number of steps to improve these key performance indicators. In 2023, the Secretariat of State for Telecommunications and Digital Infrastructure launched the 2023 **UNICO Broadband programme**. This initiative promotes the deployment of broadband infrastructures capable of offering services of more than 300 Mbps symmetrical (scalable to 1Gbps), primarily in rural, isolated and remote areas not covered by private initiatives. The 2023 call, with a total awarded budget of EUR 134.36 million, complements the actions of the previous two years. Its aim is to cover nearly 360 000 premises. It is expected to provide Gigabit connectivity to the 1-2 % of the population that still lacks it or has no immediate coverage plans.

The private sector continues to invest in and to roll out VHCNs, primarily FTTH, as it has done in previous years. The main drivers of this high level of infrastructure-based competition include: (i) investment decisions and commercial co-investment agreements, where operators strive to compete as extensively as possible on the basis of their own FTTH networks; (ii) the regulatory framework derived from, among others things, the reviews of the various wholesale markets for broadband access that the Spanish National Markets and Competition Commission (the CNMC) performed in 2009, 2016 and 2021; and (iii) the availability of regulated access to Telefónica's civil engineering infrastructure.

Spain

Connectivity infrastructure (5G)



2023 state of play and recent progress

	Country level	EU level
FORECAST	95.3	
DESI 2024	92.3	89.3
AVERAGE ANNUAL GROWTH %	12.1	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

Spain brings a positive contribution to the EU's Digital Decade 5G target, showing also a positive dynamic. At 92.3%, 5G coverage in Spain is above the EU average (89.3%). With annual growth of 12.1%, Spain is on track to achieve 100% coverage in populated areas by 2027 as planned. The national roadmap outlines six measures aimed at reaching complete 5G coverage by 2030.

Deployment of 5G was accelerated once the 3.6 GHz band was rearranged to provide operators with a contiguous block of spectrum, and the rest of the priority bands (especially the 700 MHz band was made available to operators). 5G in the 3.4-3.8 GHz band, an essential band for enabling advanced applications requiring large spectrum bandwidth, covers 52.3% of Spanish households in 2023, standing above EU average (50.6%). In 2023, to close the digital divide between urban and rural areas and in the frame of UNICO programmes, Spain launched two projects to accelerate 5G deployment in less populated areas and municipalities. The **UNICO 5G Networks – Backhaul Optical Fibre project** (total budget awarded: EUR 447 340 893) seeks to equip sites in municipalities of fewer than 5000 inhabitants with fibre optic backhaul connectivity to support future 5G network traffic and services. Meanwhile, the **UNICO 5G Networks – Active project** (call budget: EUR 543 879 531) aims to support deployment of equipment and infrastructure in less populated areas of Spain (with fewer than 10.000 inhabitants). The equipment and infrastructure will be used to roll out standalone 5G networks with minimum download and upload speeds of 100 Mbps and 5 Mbps, respectively, in peak time conditions and with advanced characteristics of edge computing and network slicing.

Semiconductors

The Spanish roadmap does not set a target or trajectory for semiconductor production. However, as part of the Spanish Recovery Plan, Spain presents a dedicated Plan for Semiconductors called **PERTE Chip, which includes five measures to reinforce the value chain in the industry of semiconductors and microelectronics.** This overarching initiative will be able to tackle the different challenges Spain may face in its way of contributing to semiconductor production in the EU. It has an overall budget of EUR 12.25 billion and covers the whole value chain, including training, design, and production measures. Concerning its implementation, **a first mission PERTE Chip 2023 from the Centre for Innovation and Technological Development** was financed with EUR 47 million. It promotes R&D&I around cutting-edge microelectronic design, with a particular interest in the design of systems based on microprocessor cores of alternative architectures (such as RISC-V) so that progress is made in future

generations of chips. In addition, the scope of this mission not only refers to the design of the microprocessor core and its digital peripherals but also to the design of elements of another nature that complete a system-on-chip (SoC), which may include communication interfaces, sensors and actuators or power elements. Furthermore, **a call for 'the proof of concept' projects 2023 PERTE Chip** to fund projects that accelerate the transfer of knowledge and results generated in research was published in September 2023 with a budget of EUR 30.33 million, of which EUR 21.22 million have been awarded in May 2024.

In addition to the PERTE Chip, Spain participates along with 13 other Member States, in the **IPCEI on Microelectronics and Communication Technologies** (IPCEI-ME/CT). With a total budget of EUR 236 million, the project finances research and development activities covering microelectronics and communication technologies throughout the value chain, i.e., from materials and tools to chip design in advanced an open architectures and manufacturing processes associated.

A call for the '**Cátedras Chip' programme** to finance the creation of university chairs in microelectronics research, and boost talent in Spain associated with semiconductor design and manufacturing, was published in July 2023. In May 2024, EUR 45.74 million have been awarded to 17 universities.

In the private sector, the American chip maker **Broadcom** announced its plans to open a chip factory in Spain, attracting investment of EUR 920 million, and the world's leading independent nanoelectronics R & D hub, **IMEC**, based in Leuven (Belgium), announced the opening of an R & D centre in Andalusia.

Edge nodes

The Spanish roadmap does not set a target or trajectory for deployment of edge nodes. However, it contains three measures with a total public investment of EUR 207 million to help to reach the target for at least 10 000 climate-neutral, highly secure edge nodes to be deployed in the EU by 2030. Spain is currently starting its deployment of edge nodes, which is to be carried out mainly by the private sector. The European edge nodes observatory estimates that Spain had deployed 171 edge nodes in 2023.

Spain is leveraging its participation in the **IPCEI Next Generation Cloud Infrastructure and Services (IPCEI-CIS)** to accelerate the deployment of edge nodes. The IPCEI-CIS includes the development and first industrial deployment of Cloud Edge nodes co-funded by public and private stakeholders to meet the specific needs of end-users located in EU Member States. These investments may cover all cloud edge categories, with a specific focus on supporting the development and initial deployment of cloud edge facilities. The IPCEI-CIS is expected to drive the research, development, and deployment of the next generation of cloud infrastructures, platforms, services, and applications in a in a centralised manner but with regional flexibility, leveraging existing national initiatives and resources where relevant. In December 2023, a first call awarded EUR 111 million to finance projects of Telefónica España, OpenNebula Systems and Arsys Internet.

To ensure Spain meets the EU-level edge nodes target, Spain is complementing this IPCEI programme with two national programmes: the **UNICO I+D Cloud** (EUR 40.8 million awarded in 2022) and the **FEDER Servicio Computacional** (scheduled for 2025), which focuses on facilitating deployment where there is a market failure.

As far as the **private sector activities** are concerned, in March 2023 **Meta** announced its plan to invest EUR 1 000 million to develop a data centre in Talavera de la Reina (Castilla-La Mancha). In July 2023, **IBM** announced the opening of its first multi zone cloud region (MZR) in Spain, designed to support

the hybrid cloud and AI transformation journeys for Spanish and European enterprises. It will be comprised of three data centres located in Alcobendas, Las Rozas and Madrid City. In October 2023, **Microsoft** announced that it will build a data centre region in Aragon.

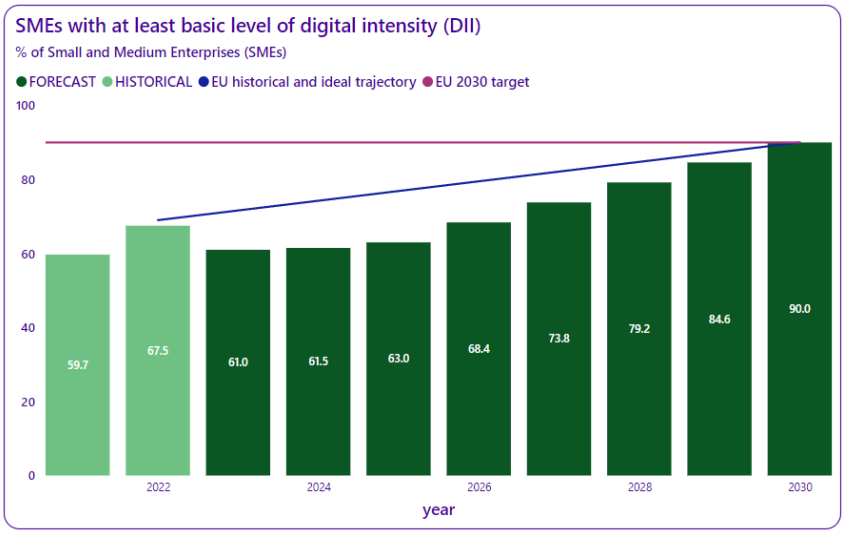
Quantum technologies

The Spanish roadmap does not set a target or trajectory for high-performance computing and quantum technologies. However, the roadmap includes the Quantum Spain Programme, which promotes and strengthens the national quantum computing ecosystem, aiming at creating **the first quantum computing infrastructure in Spain**. In February 2023, the planned installation of the first quantum computer in southern Europe at the Barcelona Supercomputing Centre was announced. The project will be carried out by a group of Spanish companies, integrated into the Temporary Business Union (UTE) formed by the start-up Qilimanjaro Quantum Tech and the Spanish technology company GMV, which have won the public tender. The investment amounts to a total of EUR 12.5 million, 50% co-financed by the EU and the Government of Spain[7].

In December 2023, under the Spanish Presidency of the Council of the European Union, the government submitted the '**Quantum Pact**', which promotes collaboration both between countries themselves and between countries and the European Commission to develop and deploy of quantum technologies. The aim is for the EU to play a role within a growing international competitive landscape[8]. Also in December, the **MareNostrum 5** supercomputer was inaugurated in Barcelona. The aim is for it to be used by AI developers, making use of the most advanced accelerator chips. It is part of the Span's contribution to the **European High Performance Computing Joint Undertaking (EuroHPC)**.

Supporting EU-wide digital ecosystems and scaling up innovative enterprises

SMEs with at least basic digital intensity



2023 state of play and recent progress

	Country level	EU level
FORECAST	61.0	71.6
DESI 2024	60.5	57.7
AVERAGE ANNUAL GROWTH %	0.7	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

Spain brings a positive contribution to the EU's Digital Decade target on digitalisation of SMEs while

[7] https://portal.mineco.gob.es/RecursosNoticia/mineco/prensa/noticias/2023/20230227_ndp_quantum_spain.pdf

[8] https://espanadigital.gob.es/actualidad/presentado-bajo-la-presidencia-espanola-del-consejo-de-la-union-europea-el-quantum-pact

demonstrating a limited dynamic. The country performs slightly above the EU average, with 60.5% of the SMEs having at least a basic level of digital intensity (EU average: 57.7%). This represents annual growth of 0.7% over the 2 years compared to 2021, which is the last comparable year when a similar methodology was used to measure the digital intensity of enterprises. This is below the average progress made in the EU (2.6%). Other indicators show a positive trend in the digitalisation of Spanish enterprises as 40% of them use e-Invoices (slightly above the EU average of 39%) and 29.6% of SMEs are selling online (standing 10 percentage points above the EU average).

Spain's roadmap is in line with the 2030 target for the EU, aiming to digitalise 90% of SMEs. However, the current slow growth rate cannot ensure that the target would be reached for 2030, indicating the need for accelerated efforts. The 2023 State of the Digital Decade report recommended Spain to continue the digitalisation of businesses, particularly SMEs. The country's roadmap therefore includes seven measures targeted at these digital late adopters, accounting for EUR 3 922 million of public investment.

SMEs are particularly prominent in Spain's economy, where there are almost 2.9 million of them, accounting for around 65% of GDP and employing 11 million people in 2023[9]. The prominence and share of SMEs in the country's economy mean that reforms and investments to improve the scalability and digitalisation of SMEs not only have a direct effect on SMEs' basic and advanced digitalisation, but also have an indirect multiplier impact on other dimensions and targets and on Spain's economy overall. To ensure the transformation of SMEs, Spain launched programmes in three dimensions: digitisation services to bring in new digital operations for SMEs, provide personalised advisory services and training for entrepreneurs and employees, and support for cooperation and innovation networks. In 2023 and 2024, Spain continued implementing different programmes, such as the 'Digital Kit' and 'Acelera Pyme' (which already has 160 offices around the country that provides assessment services to SMEs). Addressing the digital transformation of SMEs is also expected to foster the adoption of advanced technologies among SMEs. Following the recently approved Artificial Intelligence Strategy 2024[10], the 'Digital Kit' programme has been expanded with 350 million and the incorporation of new AI products. Additionally, for the development of AI in the private sector, a new 'Kit Consulting'[11] programme will be launched with 300 million euros so that smaller business projects can hire advisory services for the adoption of AI.

Take up of cloud/AI/data analytics

Spain faces challenges in the integration of advanced digital technologies by enterprises, which mainly affect SMEs. Consequently, many of the measures specifically support SMEs by encouraging them to adopt these technologies in value chains through various means (subsidy programmes, specialised consultancy, detection of needs, etc.). These measures mainly focus on promoting research and design innovation or identify use cases and tailored solutions for vital sectors of the Spanish economy, including creating sectoral data spaces to foster innovation by providing access to more data in a secure and trusted environment. The Spanish roadmap includes six measures to reach this target by 2030.

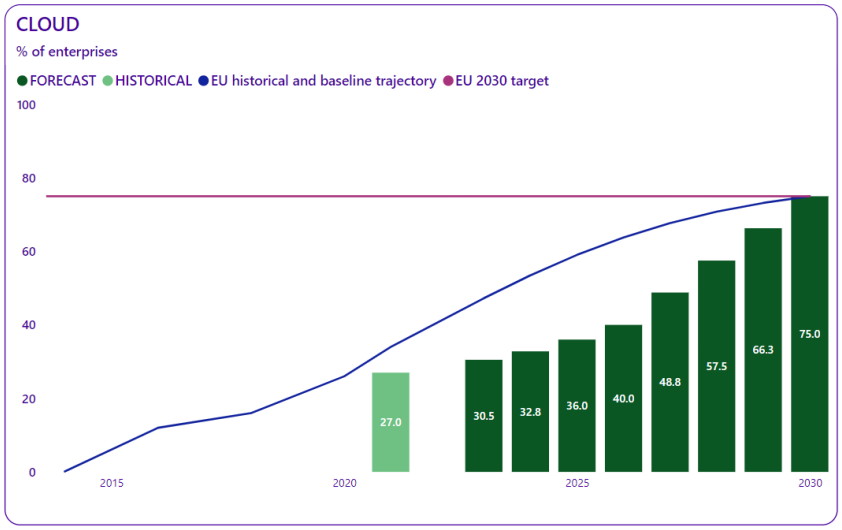
- **Cloud**

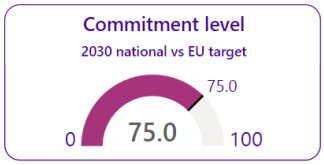
[9] https://industria.gob.es/es-es/estadisticas/Cifras_PYME/CifrasPYME-marzo2024.pdf

[10] https://www.lamoncloa.gob.es/serviciosdeprensa/notasprensa/transformacion-digital-y-funcion-publica/Paginas/2024/ia-inteligencia-artificial-estrategia-espana.aspx

[11] https://planderecuperacion.gob.es/noticias/conoce-programa-kit-consulting-servicios-asesoramiento-digital-prtr

Spain





2023 state of play and recent progress

	Country level	EU level
FORECAST	30.5	47.3
DESI 2024	27.2	38.9
AVERAGE ANNUAL GROWTH %	0.4	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

On the uptake of cloud services, Spain has room for improvement in its performance to contribute to EU's digital decade target of 75% of EU enterprises using cloud services by 2030; it shows a very limited dynamic in this regard. 27.2 % of Spanish enterprises use cloud services, which is well below the EU average of 38.9%. In addition, Spain's growth rate (0.4%) is below the EU rate (7%).

The Spanish roadmap sets a very ambitious a target of 75% uptake by 2030, which is in line with the EU target. Taking into account the starting point and the current uptake rate, reaching the target will be challenging and extra efforts will be needed.

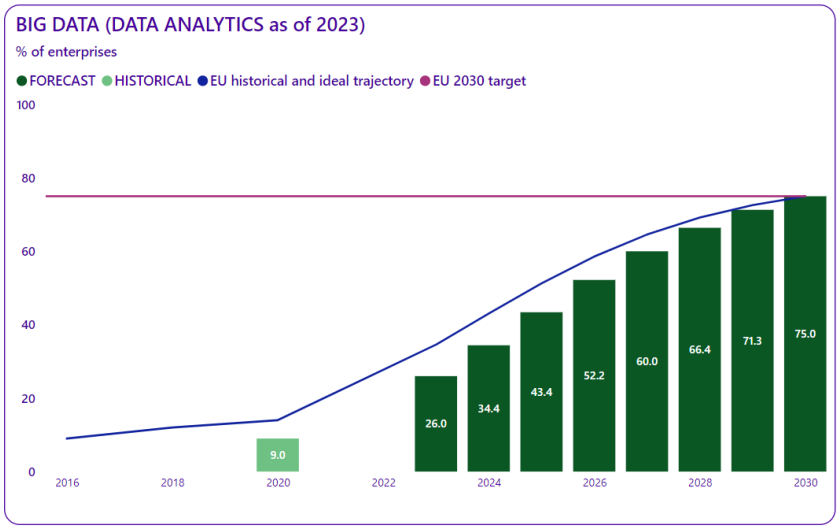
A positive element is that Spain, as a direct participant of the **IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS),** is at the forefront of developing and deploying cutting-edge cloud and edge capacities.

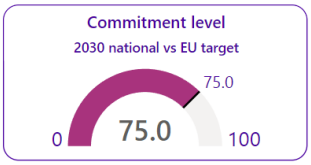
To ensure broad uptake of the future solutions by companies of all sizes, especially SMEs, it is important for Spain to develop an outreach strategy, including activities such as those led by the Cloud IPCEI Exploitation Office.

- Data Analytics (Big Data)[12]

[12] As of 2023, Big Data was changed by ESTAT, in agreement with all the EU National Statistical Institutes, into Data Analytics and covers a broader range of technologies including Big Data. For this reason, no comparison is possible with previous years.

Spain





2023 state of play and recent progress

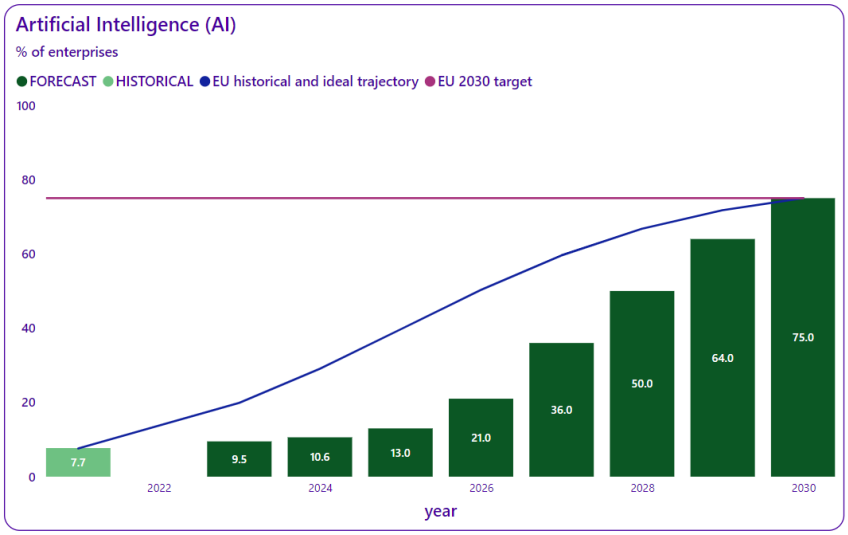
	Country level	EU level
FORECAST	26.0	34.6
DESI 2024	38.0	33.2
AVERAGE ANNUAL GROWTH %		

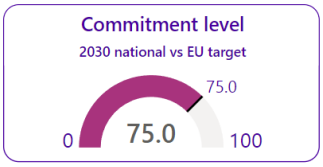
Annual growth cannot be computed in this case because Big Data was replaced by Data Analytics in 2023. The two indicators are not comparable.

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

Spain brings a positive contribution to the EU's digital decade target, with 38% of its enterprises using Data analytics, which is above the EU average (33.2%). The Spanish roadmap sets an ambitious target of 75% uptake by 2030; this in line with the EU target.

- **Artificial Intelligence**





2023 state of play and recent progress

	Country level	EU level
FORECAST	9.5	19.9
DESI 2024	9.2	8.0
AVERAGE ANNUAL GROWTH %	9.3	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

On the uptake of Artificial Intelligence solutions, Spain brings a positive contribution to the EU's Digital Decade target, and shows a very strong dynamic. 9.2% of Spanish enterprises had adopted AI solutions in 2023, which is above the EU average of 8.0%. In addition, Spain's average annual growth (9.3%) is almost four times the EU average (2.6%), which is an indication of the good momentum in the sector. In addition, the Spanish roadmap sets a very ambitious target of 75% uptake by 2030, which is in line with the EU target. It includes four measures linked to AI uptake, such as the integration of AI in value chains, AI R & D missions and the Spanish Network of Excellence in AI.

Spain fully supports to the adoption of trustworthy sovereign AI-enabled solutions, facilitating the transition of AI solutions from research labs to testing environments to deployment, uptake, and commercial markets.

Spain is also joining forces with other Member States to jointly develop cutting-edge Europe-based AI models. In March 2023 it joined the **European Digital Infrastructure Consortium on the Alliance for Language Technologies (ALT-EDIC)**, to develop both a common infrastructure for natural language processing and to develop large multi-language models.

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

Combining the adoption of these three technologies together (AI, Cloud, and Data analytics), Spain's take-up stands at 49.9%. The country has untapped potential to contribute to the EU's digital decade target, as it is below the EU average of 54.6%.

Unicorns/scale-ups/start-ups

Spain intends to make the best of its digital transformation and economic dynamism to make a significant contribution to the Digital Decade target that seeks to transform businesses and to grow innovative scale-ups and improve their access to funding. This will result in the number of unicorn companies in the EU at least doubling by 2030. Starting from 11 unicorns in 2023, the Spanish roadmap sets a target of 24 unicorn companies in Spain by 2030 and contains measures to contribute to achieve it, planning a total public investment of EUR 4 837 million and an estimated private investment of EUR 4 058 million.

Although Spain has a lower rate of entrepreneurial activity and business spending on R & D than the European Union, in recent years, the country has developed an emerging start-up ecosystem around two poles of attraction, such as Barcelona and Madrid. The Start-Up Law, approved in 2022, has started to improve the digital entrepreneurship ecosystem. Specific programmes are being deployed to support digital entrepreneurship through financing (e.g., Next-Tech), support for growth (e.g., Activa Start-ups), talent attraction and support for women's entrepreneurship (e.g., Emprendedoras Digitales, The Break). Other programmes are in place to support internationalisation (e.g., Desafia) and innovation (INNOVA, Neotec).

Concerning the development of the Start-up ecosystem, the South Summit 2023 Entrepreneurship Map highlighted that the Spanish entrepreneurial ecosystem has laid the path to maturity, due in part to the growing number of start-ups accumulating more years of market traction.

Although Artificial Intelligence was probably the predominant technology among start-ups and scale-ups in 2023, with the launch of the Miura 1 rocket by the Spanish start-up PLD Spain, Spain became the 10th country in the world with direct access to space. This could open the door to the development of a Spanish ecosystem of start-ups and scale-ups committed to the aerospace industry. In addition, through the PERTE Chip, Spain aims to make an international benchmark in the sector and to boost the sector in the coming years.

Strengthening Cybersecurity & Resilience

Cybersecurity is one of the strategic axes of Spain's digital agenda. With their growing reliance on digital technologies, companies face an increased risk of cybersecurity incidents and a greater need for protection. In 2022, 21.9% of enterprises in Spain reported ICT service outages due to cyberattacks. This was slightly below the EU average (25%). Most Spanish enterprises (87.7%) reported using ICT security measures slightly below the EU average of 91.8%. But only 21.9% reported being insured against ICT security incidents (EU average of 25.0%). Public administrations are also affected by cyberattacks and are among the entities most targeted by cybercriminals. According to the 2024

Eurobarometer, 81% of Spanish people think that building efficient and secure digital infrastructures should be a priority for the public authorities.

To strengthen cybersecurity capabilities, multiple initiatives and measures are being developed across several lines of action: cybersecurity incident response services, training and capacity-building programmes, development of diagnostic tools for cyber risk prevention, and enhancement of the country's resilience to cyberattacks.

In Spain, most of the measures are coordinated by or involve the **National Institute for Cybersecurity (INCIBE)**, which implemented several programmes in 2023. For example, **the helpline 'Tu Ayuda en Ciberseguridad'**, which helps internet users, businesses, professionals and children and their teachers to deal with day-to-day cybersecurity issues, has handled over 184 199 queries, at an average of more than 1 295 queries per week, over the 3 years it has been in operation. It is a free and confidential national service provided by a team of experts from various disciplines offering technical, psychosocial and legal advice through a range of contact options including calling 017, instant messaging (WhatsApp and Telegram), email, a web form, and, since 2023, face-to-face consultations at the INCIBE premises. There are also other ongoing initiatives, such as the 'Secure Your Business and the 'Confía' programmes to empower companies and the public, the 'Cyber-resilience Improvement Indicators' initiative to prevent cyberattacks, the 'programme to foster ISMS (Information Security Management Systems) Certifications' with grants for SMEs, the 'Cibercooperantes' programme to increase awareness and the '**INCIBE Emprende'** programme adapted to start-ups and entrepreneurs with cybersecurity-related projects and ideas.

The Computer Security Incident Response Team, as provided for in the NIS and the NIS2 Directives**,** is another service provided by INCIBE. It offers round-the-clock response to cybersecurity incidents that may affect the operations of the public and of private law organisations, including those involved in critical and strategic infrastructure, essential services and the provision of digital services.

In addition, **INCIBE serves as a common vulnerabilities and exposures (CVE) numbering authority (CNA)**. In this role, INCIBE assesses cybersecurity vulnerability reports and designates vulneralibity identifiers for the purposes of the internationally used CVE system. INCIBE serves as a root CNA that is responsible for the recruitment and onboarding of new numbering authorities in Spain. These activities help to make the cybersecurity ecosystem more resilient to vulnerabilities.

Finally, regarding the security of 5G networks, Spain is implementing **the 5G cybersecurity toolbox** by assessing the risk profile of equipment providers. Further steps are expected to be taken to ensure that the digital infrastructure and communication network is resilient and secure.

Best practice: Digital Kit programme

This programme covers the adoption of digitalisation solutions funded by direct aid to SMEs, small businesses, micro-businesses, and self-employed people. The solutions are provided on the basis of the grant decision issuing a 'digital voucher'. Beneficiaries must select from various digital solution categories provided by expert businesses, also known as digitalising agents, in order to provide services from the catalogue (e-commerce, digitalisation of SMEs' internal processes, their relations with the public administration, and e-invoicing).

Spain

So far, this programme has received more applications than any other aid programme for businesses in recent history in Spain. To date, 320 159 grants have been awarded for a value of EUR 1 429 million (80% of the current budget of the calls), and the application period has been extended until December 2024.

Protecting and empowering EU people and society

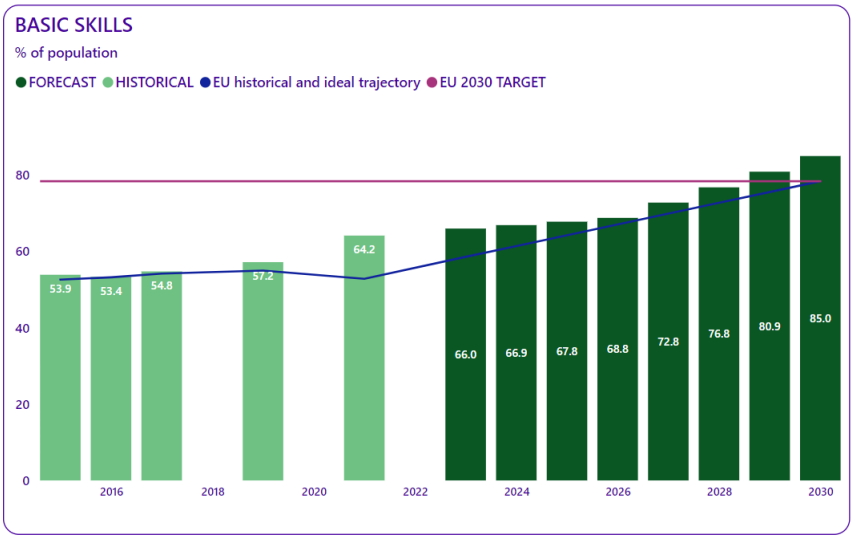
Empowering people and bringing the digital transformation closer to their needs

Spain is taking positive steps towards empowering people and promoting continuous opportunities for all individuals in the digital economy. To bridge gaps, digital technologies must be accessible to all, and that is what Spain is achieving through all the activities related to its National Digital Skills Plan. Spain is ambitious on digital skills, as testified by its current performance. However, the country still has an issue with ICT specialists, which is likely to last until the measures implemented start to take effect. Developments in **Digital Public Services in Spain shows are positive.**

According to the 2024 Eurobarometer, 84% of Spanish people think that accessing public services online will be important for their daily life in 2030. Concerning human support to help access and use digital technologies and services, 83% consider it would improve their daily use of digital technologies, and **92% think public authorities should consider it important to ensure that people receive proper human support** to help them adapt to the changes in their lives brought about by digital technologies and services.

Equipping people with digital skills

Basic Digital Skills



2023 state of play and recent progress

	Country level	EU level
FORECAST	66.0	59.8
DESI 2024	66.2	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

Spain brings a very strong contribution to the EU's Digital Decade target on basic digital skills and shows a positive dynamic. In 2023, 66.2% of the Spanish population had at least basic digital skills. That is above the EU average of 55.6%, although Spain is not one of EU's front-runners. Average annual growth is 1.6% while the EU average is 1.5%. Other digital skills indicators such as internet use (94.5%), above-basic digital skills (38.7%), and basic digital skills in content creation (73.8%) point to a similar performance in those areas.

Spain

Although it is still behind the EU's front-runners, Spain's current rate of progress, indicates that it is in a **good position to achieve its national target of 85%**, which is above the EU target, by 2030. The roadmap contains eight measures for achieving basic digital skills, accounting for a total public investment of EUR 1 953 million.

While the level of digital skills in all sociodemographic groups in Spain exceeds the European Union average, the digital divide means that there are still significant differences between groups. The differences relate more to age, occupation, and level of education, than to place of residence and gender (the 66% of the population with basic digital skills was made up half-and-half of men and women).

Since the launch of its national digital skills plan in 2021, Spain has been implementing several measures to improve the basic digital skills of the population. In February 2023, RTVE (the Spanish radio television public broadcaster) introduced the '**Generation D Campaign'** with programmes to explain the digital transformation of various aspects of life to viewers and to help them adapt to the changes. It also launched a channel on its website that has so far received more than 100 000 visits. In addition, the **Pact for Generation D**, a Spanish government initiative bringing together the public and private sectors to train people in digital skills, raise awareness in society and provide a common space to promote digital skills initiatives, has already gathered more than 200 members and more than 900 learning initiatives.

In February 2023, the launch of the '**Digital Rural Challenge Plan**' was announced with an investment of EUR 90 million aimed at training over 380 000 people in rural areas in digital skills by 2025.

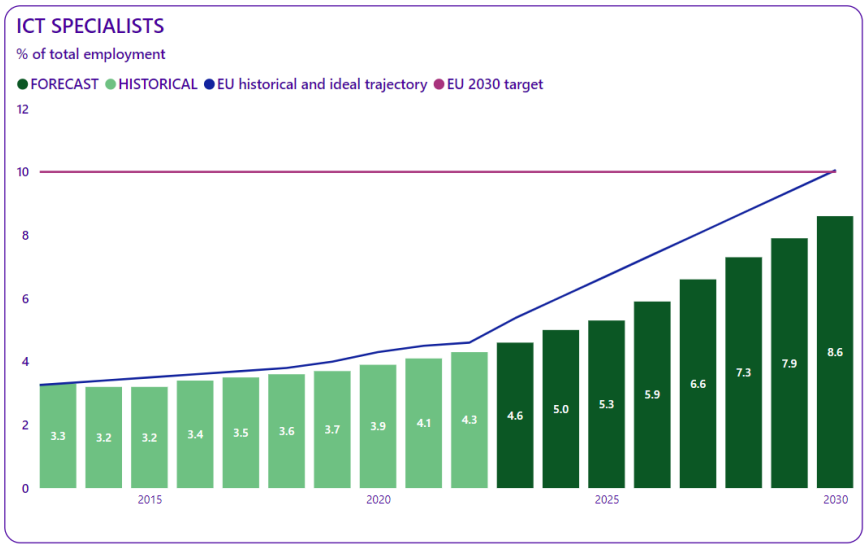
In order to improve the basic digital skills of children, the **Digital Skills for Children Program (CODI)** launched a tender for the design and development of a platform and methodology for teaching, both virtually and face to face, with tailored content for each age group. In December, a direct grant of EUR 97 million was allocated to 12 third-sector entities to train 418 761 girls and boys in digital skills. Other programmes, such as 'School Code 4.0', 'Educa en Digital' and 'Escuelas Conectadas', are also showing positive results.

Moreover, from June to September 2023, Spain participated in the '**European digital skills certificate' pilot**, a digital skills enhancement project carried out in collaboration with a community of 71 public and private entities and members of the Generation D Pact.

In addition, there are other measures, such as the acquisition of digital content for the provision of advanced digital skills for the active population and the 'State Network of Digital Training Centres' programme. The latter distributes funds to the autonomous communities and helps the local entities to create of a nationwide network of digital training centres and to implement specific classroom and training initiatives associated with public digital training.

Spain

ICT specialists



2023 state of play and recent progress

	Country level	EU level
FORECAST	4.6	5.4
DESI 2024	4.4	4.8
AVERAGE ANNUAL GROWTH %	2.3	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

Spain has untapped potential to contribute to the EU's digital decade target for ICT specialists, while showing positive dynamic. 4.4% of all Spanish employees are ICT specialists; this is slightly below the EU average (4.8%) and shows a limited dynamic (2.3% annual progress).

The target figure for ICT specialists in the Spanish roadmap is lower than the EU target. The national target is 1.75 million, which would represent 8.6% of total employment in 2022, while the European target is 20 million ICT specialists, which, if achieved, would represent 9.8% of total employment in the EU. However, the roadmap includes six measures targeting this objective, accounting for a total public investment of EUR 259 million. This appears to be in line with the recommendation Spain received in the 2023 State of the Digital Decade report, encouraging it to accelerate its efforts in digital skills, notably in the upskilling and reskilling of the labour force, in particular in advanced and emerging technologies, to address the lack of ICT specialists. **Spain could set its sights higher as the country has untapped potential to contribute to the ICT specialist target.**

The measures implemented by Spain focus mainly on increasing the number of ICT graduates, given the high number of unfilled vacancies in the sector. These measures are therefore expected to start showing results from 2026 onwards, when the number of ICT graduates will increase, and the growing demand for ICT specialists should be met. The measures will also positively impact the advanced digitisation of companies, especially SMEs, which often face major challenges in recruiting ICT specialists, hindering their digitisation. In particular, a higher level of ICT specialists in the labour market could have a very positive effect on the digitalisation of the Spanish enterprises, as the percentage of Spanish enterprises that recruited or tried to recruit ICT specialists in 2022 (62.3%), was well above the EU average (32.8%).

The **Plan FP Digital** has resulted in a thoroughgoing reform of vocational training, widening the range of qualifications available to ICT specialists to increase the number of professionals who choose this career. The new training courses are being designed in cooperation with technology companies in the sector through the technology hub set up by the Ministry of Education and Vocational Training. This will ensure that the training is closely related to the real-life demands of the profession. Efforts are also being made through public-private collaboration to increase the number of ICT specialists by improving the training opportunities available to workers and SMEs via the 'Digitalízate Plus' platform.

Additionally, various initiatives are in place to develop and attract talent in specific areas, such as the audiovisual sector (through the 'Haz Project'), AI (through the Chair on AI) or cybersecurity (through Talento Hacker). Promoting science, technology, engineering and mathematics (STEM) vocations among women and developing female talent is a common feature of all these measures, which aim to achieve **gender balance among ICT specialists**. In 2022, 5.2% of all Spanish graduates were ICT graduates (4.8% were male and 0.7% were female, while the EU average for female ICT graduates is 1%); this is above the EU average (4.5%) and represents an increase by 0.4 percentage points compared to last year.

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

e-ID

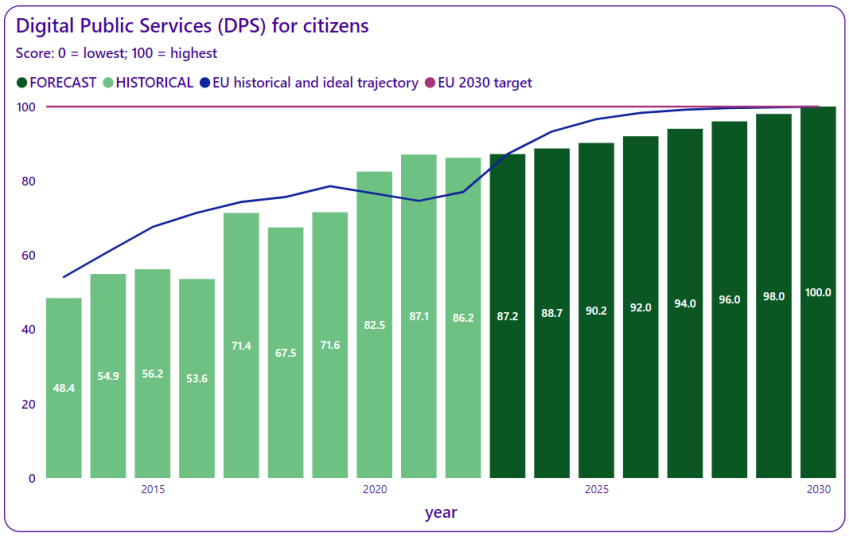
Spain has one national e-ID scheme, the Spanish ID card (DNIe), which has been notified under the Regulation (EU) No 910/2014 on electronic identification ('the eIDAS Regulation') with assurance level 'high'. 54.4% of Spanish people used e-ID for private purposes during the last 12 months, while 50.3% used it for accessing public services. Both figures exceed the EU average (41.1% and 35.7%, respectively), reflecting the efforts made by the Spanish authorities to implement electronic means of identification.

Spain participates in three European consortia piloting the cross-border use of the EU Digital Identity Wallet: Multi-Country Digital Credential for Europe (DC4EU), EU Digital Wallet Consortium (EWC) and PilOTs for EuropeaN digiTal Identity wALlet (POTENTIAL). Spanish stakeholders, both public and private, are represented in the consortia now that the grant agreement is about to be prepared. In addition, Spain is coordinating the DC4EU consortium, which aims to apply the EU's eIDAS trust framework to the education and social security fields. DC4EU will investigate the issuing of educational credentials and professional qualifications in the education sector and the issuing of the Portable Document A1 and the European Health Insurance Card in the social security sector. In addition, it will support large-scale cross-border piloting of the European Digital Identity Wallet in compliance with the EU Toolbox process. DC4EU will develop four use cases to test interoperability and scalability in the national domain and multiple cross-border contexts to provide feedback to the European Commission and Member States for iterative updates. DC4EU involves 80 institutions from 22 countries backed by 43 public organisations and 49 private entities, including wallet issuing organisations, credential issuers and involving various qualified trust service providers and authentic sources. This will allow comprehensive testing of the wallet using qualified electronic attestations of attributes (QEEAs) and credentials.

The Spanish roadmap includes one measure for achieving the Digital Decade objective of 100% of people in the EU having access to secure electronic identification (e-ID) means recognised throughout the EU, enabling them to have full control over identity transactions and shared personal data. It refers to the establishment of a **National Digital ID-Wallet by Spain**, which aims to foster an inclusive digital landscape, granting everyone a secure handle on their digital identities and interactions with public services. The project is part of Spain's 2026 digital strategy and the 2021-2025 Digitalisation Plan for Public Administration and involves a mobile application enabling Spanish citizens to verify their identity and other associated attributes. The goal is to provide a harmonised electronic identification method allowing authentication and identity related data to be shared with both public and private entities, emphasising that people have control over their data. It aims to improve overall usability, accessibility and security of public services while fostering a people-centric approach to managing personal information. It is also designed to allow for the future updates of the eIDAS Regulation (EU) and the introduction of the European Digital Identity Wallet (EUDI Wallet).

Spain

Digitalisation of public services for citizens and businesses



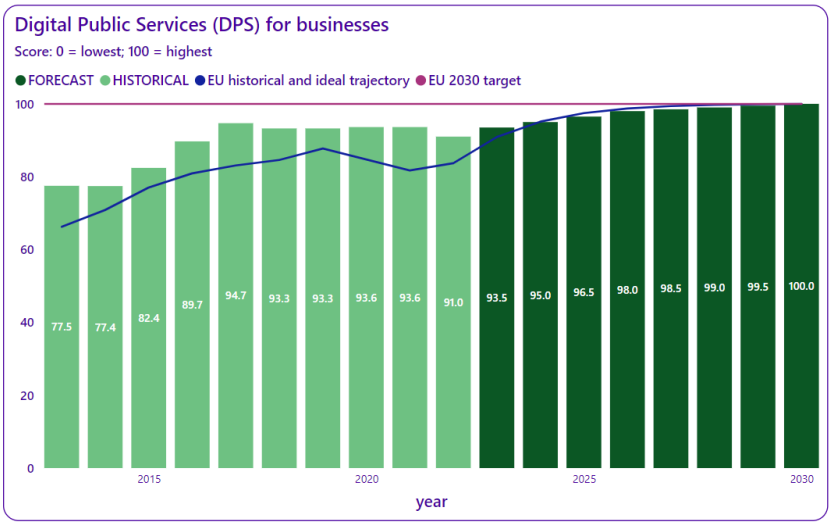
2023 state of play and recent progress

	Country level	EU level
FORECAST	87.2	87.2
DESI 2024	84.2	79.4
AVERAGE ANNUAL GROWTH %	-2.3	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	93.5	90.9
DESI 2024	91.0	85.4
AVERAGE ANNUAL GROWTH %	0.0	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

Spain brings a positive contribution to the EU's digital decade targets on public services for both citizens (84) and businesses (91), ranking well above the EU average (79 and 85).

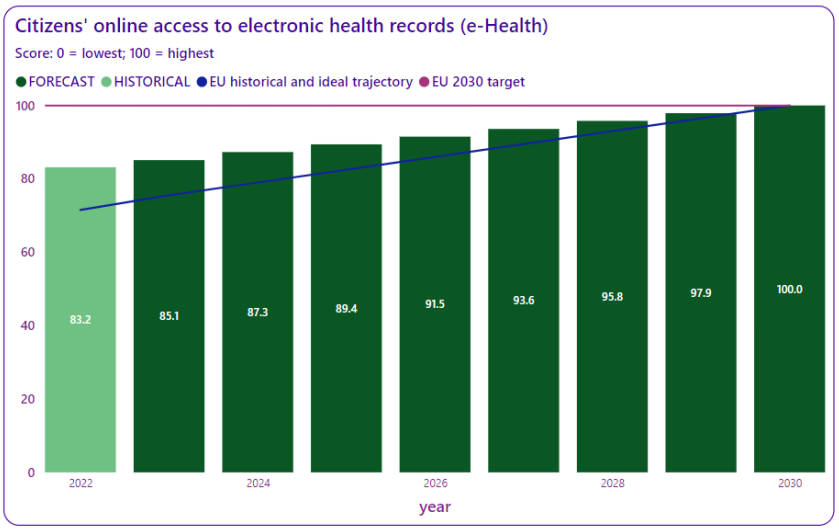
The Spanish roadmap sets a score of 100 for both indicators, which matches the EU expectations. However, Spain would need to see a return to a positive dynamic to reach its targets by 2030.

In other indicators such as e-Government users (83.03%), user support (87) and transparency of service delivery, design and personal data (71.4), Spain is generally above the EU average (75%, 86.4 and 70, respectively). In mobile friendliness, Spain (94.8) is slightly below the EU average (95.3).

The roadmap contains six measures, with a total allocated budget of EUR 244 million, to enhance public services online. These measures are: (i) the 'My Citizen Folder' app to simplify the relationship between the administration and the public by making it accessible, proactive and personalised from any device; (ii) the 'GovTechLab' to utilise technology, notably AI, to enhance the inclusivity and

efficiency of public services, simplifying public communication and fostering innovative solutions through a dedicated lab; (iii) the 'App Factory' for the development of quality mobile apps for the main public services on offer, creating a community of open-source developers around the administration that helps to make a Marketplace of Administration mobile application publicly available; (iv) the 'Intelligent Automation Service' (RPA) that uses intelligent automation technologies to improve the quality management and processing services and processes of the public administration; (v) 'SOC' to expand and strengthen prevention and reaction capabilities for security incidents and increase the capacity for surveillance and detection of cyberthreats in a centralised manner; and (vi) the 'New digital services and platforms to improve the active and passive labour market service' which aims to develop innovative and digital services that result in more efficient and effective management of employment services.

e-Health



2023 state of play and recent progress

	Country level	EU level
FORECAST	85.1	75.5
DESI 2024	84.6	79.1
AVERAGE ANNUAL GROWTH %	1.7	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

Spain brings a positive contribution to the EU's digital decade target on the access to e-Health records. The country's overall eHealth maturity scores is 84.6, well above the EU average (79.1). This compares to a maturity score of 83 in 2022.

National territories (i.e., regions) have their own regional access services in Spain. It is estimated that 80 to 100% of the national population is technically able to access the online access services for eHealth records through both native mobile applications and online portals, logging in using an eID compliant with eIDAS Regulation.

Health data is available across all the 18 health regions of Spain. The country scores 81 on categories of health data, compared to a European average of 74. Data about medical devices/implants, procedures/operations, and medical images are unavailable in more than half the regions. However, the rest of the data investigated in this framework is available in a timely manner. The country's lowest-scoring sub-indicator in this thematic layer is electronic results and reports, with a maturity score of 64.

The main gap in Spain's eHealth maturity is that private healthcare providers do not supply data to the online access service for electronic health records.

Spain is aiming for a score of 100 in e-Health by 2030, in line with the EU target. The roadmap contains two measures, accounting for EUR 29 million of public investment, consisting in improving governance,

quality and standardisation of health data and incorporating clinical data into EU interoperability models.

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

Spain is promoting a human-centric and inclusive digital transformation process, in line with the principles, values and rights set out in the Charter of Digital Rights, which was adopted in 2021.

Spain focuses on solidarity and inclusion in the digital environment and puts people at the centre with measures such as the promotion of the Charter of Digital Rights and the creation of a Digital Rights Observatory in 2023, and with the New Economy of Language PERTE project. Spain also has the National Plan for Language Technologies, which aims to further explore of new strategic markets for language teaching and the promotion of the learning industry. In May, a grant of EUR 2.5 million was approved for the International Spanish Centre of the University of Salamanca - CIEUSAL)[13].

To **ensure privacy and safety online**, the Spanish Data Protection Authority published multiple guidelines in 2023. To **protect consumers online**, the Ministry of Social Rights, Consumer Affairs and 2030 Agenda funded the research 'Untangling the loot boxes: opening and purchasing as risk factors for video game and online gambling problems' that will study the relationship between the purchase and opening of this type of random rewards and its link with pathologies associated with online gambling. In addition, in March 2023 the Council of Ministers approved a royal decree that reinforces the protection of the most vulnerable players online and forces operators to create safer gaming environments.

The Code on the Use of Influencers in Advertising is an ethical code that regulates advertising carried out by influencers on social networks and other digital platforms and offers an extrajudicial dispute resolution service. It is promoted by Autocontrol, an independent advertising self-regulatory organisation, and the Spanish Association of Advertisers (AEA). It acquired new members including advertisers, agencies, and representatives of influencers.

Concerning the **protection of users from illegal content and hate speech**, in 2023 the Global Privacy Assembly awarded a 'Dispute resolution and enforcement' prize to the priority channel of the Spanish Data Protection Agency (AEPD). The channel allows complaints to be submitted quickly and free of charge to the AEPD in order to request the removal of online, e.g., sexual or violent, content published without consent and posing grave risks to the rights, freedoms and physical and mental health of the people affected. In July 2023, the Spanish government approved the (2023-2027) Spanish strategic framework for citizenship and inclusion and against racism and xenophobia[14], which includes a specific line of action with measures targeting the prevention, monitoring, notification and reporting of racist and xenophobic incidents and other related forms of intolerance through media, internet and social networks.

According to the 2024 Eurobarometer**, Spanish people identified** the insufficient protection of children online as one of the online issues with the biggest impact on their personal lives. In addition, **61% of Spanish people consider that the principle of ensuring safe digital environments and content**

[13] https://planderecuperacion.gob.es/noticias/consejo-ministros-acuerda-transferencia-dos-millones-y-medio-centro-internacional-espanol-universidad-salamanca-CIEUSAL-prtr

[14] https://www.inclusion.gob.es/oberaxe/ficheros/documentos/SummaryStrategic-Frameworkfor-Citizenship-and-Inclusionagainst-Racism-and-Xenophobia2023-2027.pdf

for children and young people is not being well implemented: an increase of 21 percentage points compared to last year's result. **This reflects an increase in public awareness**, as the Spanish authorities have taken numerous measures to protect children online. In January 2023, a final provision of Organic Law 1/2023 amended the Spanish Penal Code to strengthen the penalties applicable to the creation of a false profile on social networks with a view to impersonating someone when the victim is a child or a person with disabilities.

Several campaigns were launched during 2023 including: (i) the family digital plan, with information and recommendations regarding the healthy use of digital services and electronic devices; (ii) the awareness campaign 'Change the plan', to promote the digital health of children and to reduce the physical, mental, sexual and social risks posed by the intensive and uncontrolled use of screens by children and adolescents; and (iii) the 'Generation XXX' campaign to raise awareness of the risks and dangers of access to pornography by children, which has become widespread.

In November 2023, Spain, alongside Australia, Belgium, Denmark, Estonia, France, Germany, the Netherlands and the United Kingdom, signed the call for global initiatives to reinforce the protection of children online and joined the Children Online Protection Lab. In December 2023, the Spanish Data Protection Authority published the '**10 principles of age verification and protection of children from inappropriate content**' and presented three systems developed as a proof of concept to demonstrate the feasibility of the practical application of the principles.

The Spanish National Markets and Competition Commission (CNMC), which is the national regulatory authority for telecommunications, is also responsible for ensuring that video-sharing platforms implement systems to protect children from access to harmful content. In particular, Article 93(3) of the Audiovisual Law empowers the CNMC to assess the suitability of the systems that verify the age of users requesting access to a platform. In December 2023, the CNMC launched a 'public consultation on age verification systems', which aims to set out the essential requirements that age verification systems must meet in order to fulfil the objective of protecting children.

Furthermore, Spain is committed to safeguarding people from the **risks associated with advanced technologies**, providing adequate regulatory frameworks and promoting the ethical and humane use of such technologies. The 2024 Eurobarometer shows that 79% of Spanish people think that public authorities should prioritise shaping the development of Artificial Intelligence and other digital technologies to ensure that they respect our rights and values. Spain has recently created the first European AI Supervision Agency (AESIA) and is developing, together with the European Commission, the AI regulatory sandbox. This initiative aims to bring competent authorities closer to AI developers in order to jointly define best practices that will serve as the foundation for implementing the future AI Act. This Spanish-led pilot is expected to generate good practice guidelines and guides that promote and raise awareness among companies, especially SMEs and start-ups, facilitating the implementation of ethical AI practices.

Best practice: promotion of the Charter of Digital Rights and the creation of a Digital Rights Observatory

In May 2023 a general invitation was published for entities to help promote the implementation of the Charter of Digital Rights and the creation of a space for the Digital Rights Observatory. This invitation aims to select up to six entities to sign cooperation agreements in order to promote implementation of the charter and a further entity to create the Digital Rights Observatory. This observatory aims to develop an open, inclusive and collaborative space from which to promote knowledge, debate and

awareness raising of digital rights among the public and both the public and private sectors, at national and international level.

Leveraging digital transformation for a smart greening

Spanish enterprises pay fairly close attention to matters related to the impact of ICT equipment, while Spanish people consider digital technology important to support the green transition. 53.9% of enterprises in Spain consider the environmental impact of ICT services or ICT equipment before selecting them and taking steps to reduce the amount of paper or energy consumed by the equipment. This is slightly below the EU average of 48.7%. Spanish people's propensity to recycle old digital devices is in line with the rest of the EU. About 12.4% of the population recycles mobile phones, 8.2% laptops and tablets and 6.7 % desktop computers (10.4%, 9.7% and 12.8%, respectively, at EU level). The level of desktop recycling is particularly low. In addition, Spanish people think that digital technology is relevant to tackling climate change and supporting the green transition. According to the '2024 Digital Decade' Eurobarometer survey, **72% of respondents in Spain consider digital technologies important to help fight climate change** (slightly below the EU average of 74%), while 85% of Spanish respondents think that ensuring that digital technologies serve the green transition should be an important action for public authorities (above the EU average of 81%).

Spain is harnessing digital technologies to enhance the green transition in key areas while implementing innovative programmes to reduce the environmental impact of energy-intensive digital technologies. A wide range of measures are being implemented in several sectors, such as agri-food, mobility, energy, circular economy, and water use and management. In primary industry, the green transition is being promoted within the (2021-2023) second action plan framework of the digitalisation strategy for the **agri-food and forestry sector** and rural areas[15]. Several measures, backed by a substantial budget of EUR 64 million, aim to foster an economically, socially and environmentally sustainable agri-food sector and to strengthen the active population in rural areas. The initiatives include support for 4.0 technology and precision agriculture, the promotion of data usage to increase efficiency and monitor environmental impact, support for sustainable technological entrepreneurship in the sector, and the establishment of an observatory to digitise the agri-food sector. The third action plan implementing measures up to 2026 will be unveiled during 2024, ensuring that these lines of action are extended.

In mobility, Spain has promoted several initiatives, including the **PERTE electric car project**, to create the necessary ecosystem for the development and manufacture of electric and grid-connected vehicles, with the ultimate aim of positioning Spain as a European e-mobility hub. In total more than EUR 24 000 million is expected to be invested in developing the project, EUR 19 700 million of which will be private funding. In addition, the digital transformation of the **transport system** is being undertaken to increase economic and environmental efficiency. To support the energy transition, Spain is focusing on the digitisation of electricity grids. Between 2021 and 2023 up to 525 million euro was invested to promote decarbonisation of the economy. This has provided incentives for electrification by allowing more renewable energies to be integrated into the system and improving management of energy flows, without penalising electricity price signals.

In environmental management and the circular economy, EUR 100 million has been awarded to develop digitalisation tools that efficiently manage the information needed in transition territories.

[15] https://www.mapa.gob.es/es/ministerio/planes-estrategias/estrategia-digitalizacion-sector-agroalimentario/.

The tools seek to secure an accessible material supply chain, reduce waste generation and facilitate the processing of data files. In water use and management, the PERTE project for digitalisation of the water cycle has been launched, with an investment of more than EUR 3 485 million. The project promotes the use of new information technologies throughout the water cycle, which will improve its management, increase efficiency, reduce losses in the supply networks and help to meet the environmental objectives of the hydrological planning and international regulations.

In the **telecoms sector**, during 2023 Telefónica has developed its strategy to replace all copper lines with fibre cables. On 19 April 2024, to mark the celebration of its centenary, Telefónica switched off its copper network and stations.

To develop environmentally friendly technology guided by sustainability criteria, **the National Green Algorithms Plan (PNAV)**[16] has been launched, with an investment of EUR 257 million from the European Next Generation EU funds. The programme focuses on three key aspects: (i) the defining of energy consumption measurement standards in the development and training of artificial intelligence algorithms; (ii) the creation of a quality seal for companies involved in sustainable AI or applying AI to address environmental issues; and (iii) the development of technological challenges (hackathons) where AI developers compete to solve problems with a pronounced environmental focus. In November, a contract was awarded to provide consulting, software development and support services for the programme.

Overall, Spain is committed to ensuring that all the measures included in the Digital Spain agenda adhere to the principle of not causing significant harm to the environment. This, combined with the associated climate/environmental labelling, will help to ensure that digitisation continues to be sustainable.

[16] https://espanadigital.gob.es/lineas-de-actuacion/programa-nacional-de-algoritmos-verdes

Annex I – National roadmap analysis

Spain's national Digital Decade strategic roadmap

The Spanish roadmap was formally submitted in late January 2024 following a public consultation launched in October 2023. Its main document is 82 pages long. In addition, there are three annexes relating to the trajectories and measures for achieving the digital targets and objectives, respectively. To date, the Spanish authorities have not publicly presented or published the roadmap.

Digital Decade target	Budget in the roadmap (EUR million)	Number of measures in the roadmap
Connectivity gigabit	1 486.3	5
Connectivity 5G	3 027.4	6
Semiconductors	12 697.0	5
Edge nodes	211.0	3
Quantum computing	22.0	1
SME take up	3 916.0	7
Cloud/AI/Big data uptake	990.0	6
Cloud only uptake	-	-
AI only uptake	-	-
Big data uptake	-	-
Unicorns	8 895.0	11
Basic digital skills	1 952.9	8
ICT specialists	263.0	6
e-ID	16.7	1
Key public services	243.4	6
e-Health	29.0	2
Objectives	-	-
Total	**33 749.7**	**67**

The national strategic roadmap includes national target values for all targets where possible, except for edge nodes. Most of the national target values provided are comparable to the EU targets, except in digital skills. While the country shows a good level of commitment by setting higher basic digital skills targets, the targets for ICT specialists are below the EU target level.

Moreover, the roadmap submitted by Spain describes policies, measures and actions supporting each of the targets and groups of objectives. Most measures in the roadmap help empower the population by developing their digital skills, the digital transformation of businesses and public services, and by developing digital infrastructure and ecosystems. However, hardly any of the measures promote synergies between the digital and green transitions. The time frame for most measures corresponds to that for implementing the structural funds and Recovery and Resilience Facility (RRF) programme, and most of the budget set out in the roadmap comes from those sources of funding. The measures set out in the national strategic roadmap address the main challenges faced by Spain. Those challenges are identified in the roadmap and covered under the DDPP and country-specific recommendations. The measures also go further than previous efforts by both helping to achieve the targets and supporting the wider objectives of the programme. At the same time, the policies, measures and actions set out in the national strategic roadmap build on the existing Digital Spain strategy launched in 2020 and updated in 2022 by maintaining a high level of

ambition, as would be expected from a country whose contribution will be essential to achieving the EU Digital Decade targets and objectives by 2030.

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

MCP and EDICs

Spain is a member and the host of the European Digital Infrastructure Consortium of the Local Digital Twins towards the **CitiVERSE – EDIC** and has recently joined the **Alliance for Language Technologies EDIC (ALT-EDIC)**, which addresses the scarcity of European language data needed for AI solutions (both already set up). Spain is also developing the Statutes and other relevant documents of the possible future **Genome EDIC** and the **EDIC for mobility and logistics data**, within their informal working groups. In addition, the country is engaging in discussions on the setups of the possible future **Cancer Image Europe (EUCAIM)** and the **Agri-Food EDICs**, within their informal Working Groups.

Concerning the Important Projects of Common European Interest (IPCEIs), Spain takes part in the IPCEI on **Next Generation Cloud Infrastructure and Services (IPCEI-CIS)** and the IPCEI on **Microelectronics and Communication Technologies (IPCEI-ME/CT).**

In addition, Spain takes part in the **European High Performance Computing Joint Undertaking (EuroHPC)** with the supercomputer MareNostrum 5 based in Barcelona.

EU funding for digital policies in Spain

The Spanish Recovery and Resilience Plan (RRP) allocates 26% of its budget to measures linked to the digital area. The modified plan, updated in October 2023, has a stronger focus on the digital transition incorporating 18 new measures on digital. It devotes EUR 40.4 billion to measures that support digital objectives (up from EUR 19.7 billion in the original plan), having **EUR 39.4 billion directly linked to the Digital Decade objectives and targets**[17]. The plan allocates EUR 3.6 billion to the digital transformation of the public administration, EUR 3.6 billion to digital skills training, EUR 10.2 billion to promote the digitalisation of industry and SMEs, investments in artificial intelligence, digitalisation of tourism and culture systems, and EUR 15.4 billion to support fixed and 5G connectivity, data infrastructure and the related ecosystem. As of May 2024, implementation of the Spanish RRP is advancing as evidenced by payment requests that successfully led to the disbursement of EUR 38.4 billion. The Commission is currently analysing the request for the fourth instalment. Additionally, under the cohesion policy, EUR 5.7 billion (16% of the country's total cohesion policy funding) is allocated to the country's digital transformation.

[17] 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)).