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Digital Decade 2025 country reports

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State of the Digital Decade 2025: Keep building the EU's sovereignty and digital future

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European Commission

DIGITAL DECADE 2025
COUNTRY REPORTS

Spain

Spain

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Executive summary

Spain benefits from a robust digital infrastructure, which allows it to develop its digital transformation. The country is making moderate progress in the adoption of key digital technologies by enterprises. Regarding AI, the Spanish government shows ambition with the last developments, but still continues to face challenges in AI adoption by SMEs. Although Spain lags behind in digital public services for business, the country has improved its performance in digital public services for citizens and in access to e-Health records. Spain is leading in initiatives to strengthen the cybersecurity of its public services and enterprises.

Spain's contribution to the Digital Decade is very ambitious, with 13 national targets, 92% of which are aligned with the EU 2030 targets. The country is following its trajectories well with 75% of them being on track (based on the 2024 trajectories established for 8 KPIs out of 8 analysed). Spain addressed 100% of the 7 recommendations issued by the Commission in 2024 by making some changes through new measures.

Digital Decade KPI (1)	Spain				EU		Digital Decade target by 2030	
	DESI 2024 (year 2023)	DESI 2025 (year 2024)	Annual progress	National trajectory 2024 (3)	DESI 2025	Annual progress	ES	EU
Fixed Very High Capacity Network (VHCN) coverage	96.3%	95.0%	-1.4%	97.0%	82.5%	4.9%	100.0%	100%
Fibre to the Premises (FTTP) coverage	95.2%	94.9%	-0.4%	96.0%	69.2%	8.4%	100.0%	-
Overall 5G coverage	92.3%	95.7%	3.7%	98.9%	94.3%	5.9%	100.0%	100%
Edge Nodes (estimate)	167	301	80.2%	-	2257	90.5%	-	10000
SMEs with at least a basic level of digital intensity (2)	-	74.2%	4.8%	-	72.9%	2.8%	90.0%	90%
Cloud	27.3%	33.1%	21.5%	-	-	-	75.0%	75%
Artificial Intelligence	9.2%	11.3%	23.2%	10.6%	13.5%	67.2%	75.0%	75%
Data analytics	38.0%	40.9%	7.7%	-	-	-	75.0%	75%
AI or Cloud or Data analytics	49.9%	55.7%	11.6%	-	-	-	-	75%
Unicorns	13	13	0.0%	16	286	4.4%	24	500
At least basic digital skills	66.2%	-	-	-	-	-	85.0%	80%
ICT specialists	4.4%	4.7%	6.8%	5.0%	5.0%	4.2%	8.6%	~10%
eID scheme notification		Yes						
Digital public services for citizens	84.2	88.8	5.4%	88.7	82.3	3.6%	100.0	100
Digital public services for businesses	91.0	85.1	-6.5%	95.0	86.2	0.9%	100.0	100
Access to e-Health records	84.6	88.3	4.4%	87.3	82.7	4.5%	100.0	100

(1) See the methodological note for the description of the indicators and other metrics
(2) DESI 2025 reports the version 4 of the Digital Intensity Index, that is comparable with the DII value from DESI 2023 (referring to year 2022) for the calculation of the annual progress. It is not comparable to the national trajectory that is based on version 3 of the index.
(3) National trajectory value if present in the national roadmap and if the indicator was measured in DESI2025 (year 2024)

According to the special Eurobarometer on 'the Digital Decade' 2025, 72% of Spanish citizens consider that the digitalisation of daily public and private services is making their lives easier. Concerning the action of the public authorities, 92% consider it important to counter and mitigate the issue of fake news and disinformation online. Regarding competitiveness, 85% consider it important

to ensure that European companies can grow and become “European Champions” able to compete globally.

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

Spain's digital infrastructure is generally more advanced than the EU average, with higher coverage rates in most categories. Spain's 5G spectrum assignment in pioneer bands is particularly strong too (98.33%). The country prioritises semiconductor production through PERTE Chip (The Strategic Project for Microelectronics and Semiconductors), which aims to strengthen design and production capabilities in the microelectronics and semiconductor industries. It is backed by a budget of EUR 12.25 billion until 2027 and the country has created the SETT (Spanish Society for Technological Transformation) to accelerate the allocation of funds. Spain is actively participating in the IPCEI-ME and Chips JU initiatives and is leading the Integrated Photonics Pilot Line. Notably, the Spanish government approved the updated 2024 National Artificial Intelligence Strategy and published an open-source GenAI models trained with a high percentage of data in Spanish and co-official languages as part of its effort to strengthen digital sovereignty. Moreover, Spain is actively participating in the IPCEI-CIS to accelerate the edge nodes deployment. Spain also launched a regulatory sandbox for high-risk AI systems, a pioneering step in implementing the European AI Act and supporting companies in meeting upcoming obligations.

The country’s commitment to quantum technologies is reflected in the launch of the Quantum Technologies Strategy in April 2025 and in the deployment of initiatives, projects such as Quantum Spain, the Rydberg Atoms Computer and the EuroHPC Quantum Annealer. Concerning the digitalisation of business, the country shows strength in the basic digital intensity of SMEs (74.2%), and in the adoption of Cloud and data analytics by enterprises, although faces challenges in AI adoption by SMEs. Nonetheless, Spain is making efforts to improve its performance in these areas. The country is focusing on bolstering the innovative scale-up ecosystem with strategic investments to nurture and support innovative enterprises.

Protecting and empowering EU people and society

Spain continues to take positive steps toward empowering people and promoting opportunities for all individuals in the digital economy. The country is aiming to bridge gaps concerning the accessibility of digital technologies through all the activities related to its National Digital Skills Plan, which includes initiatives like a EUR 200 million program to train over 80 000 professionals in digital skills and AI. Spain is also making strides in the development of specialists in ICT, with initiatives like the ICT Talent Attraction and Retention Programme providing scholarships and contracts. Regarding Digital Public Services, Spain makes a significant contribution to the EU’s Digital Decade targets, with its performance in public services for citizens (88.8), however the country lags behind concerning the public services for business (85.1). The Spanish government has taken significant policy actions against online misinformation and in favour of the minors’ protection in the digital environment. It also pays particular attention to the promotion of digital rights and principles, with the recent launch of the Digital Rights observatory.

Leveraging digital transformation for a smart greening

Spain continues its efforts to support the synergies between the digital and green transitions. The country is implementing innovative programmes to reduce the environmental impact of energy-

intensive digital technologies. The National Green Algorithms Plan has four axes and aims to make AI more sustainable and to find AI solutions for the green transition.

National Digital Decade strategic roadmap

Spain did not submit a revised adjustment to its national Digital Decade roadmap. The Spanish authorities indicated that they plan at a later stage to formally revise the national roadmap, submitted in January 2024, in accordance with article 8 (3) of the Decision establishing the Digital Decade Policy Programme. The initial roadmap contains 67 measures with a budget of EUR 33.8 billion, of which EUR 26.7 billion come from public budgets (equivalent to 1.68 % of GDP). However, Spain has worked on addressing the recommendations made in 2024, by changing existing measures and implementing new ones that will be included in a future revised roadmap. The Spanish authorities published the initial national roadmap in March 2025.

Funding & projects for digital

Spain allocates 26% of its total recovery and resilience plan to digital (EUR 40.4 billion)[1]. In addition, under cohesion policy, EUR 5.0 billion, representing 14% of the country's total cohesion policy funding, is dedicated to advancing Spain's digital transformation[2].

Spain is a member of the three established EDICs; the Alliance for Language Technologies EDIC, the Local Digital Twins towards the CitiVERSE EDIC and of the EUROPEUM EDIC. Spain is directly participating in the IPCEI on Microelectronics and Communication Technologies (IPCEI-ME/CT) and in the IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS). Spain is also a participating state of the EuroHPC Joint Undertaking (JU) and of the Chips JU.

Spain has contributed to the **Best Practice Accelerator**[3] by sharing one best practice in the frame of the Digital Skills cluster (The Generation D Pact launched in November 2022).

Digital rights and principles

According to a support study, Spain has been one of the most active Member States in implementing the **European Declaration on Digital Rights and Principles**, with over 100 initiatives overall and 30 new initiatives launched in 2024. Spain is most active in the area of digital education, training and skills. Less activity has been identified with regards to sustainability. Measures in the area of solidarity and inclusion appear to have most impact on the ground, in contrast to those addressing participation in the digital public space.

[1] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation. Last data update: 16 May 2025.
[2] This amount includes all investment specifically aimed at or substantially contributing to digital transformation in the 2021-2027 Cohesion policy programming period. The source funds are the European Regional Development Fund, the Cohesion Fund, the European Social Fund Plus, and the Just Transition Fund.
[3] The Best Practice Accelerator (BPA) is a platform that enables Member States to share successful measures and challenges encountered in their efforts to meet their Digital Decade targets and objectives. Best practices are made available to Member States via the BPA Repository and showcased in regular workshops, currently focused on three thematic clusters: Digital Skills, Green IT, and the Uptake of Digital Technologies.

Spain

Recommendations

- **AI, cloud and data analytics**: continue the efforts to support the digitalisation of enterprises, in particular, to foster the adoption of AI, and paying attention to SMEs.
- **ICT specialists**: continue the efforts to increase the number of ICT specialists and their percentage over the total employment in the country.
- **Green**: Develop a system for monitoring and quantifying the emission reductions of the deployed digital solutions.
- **Unicorns**: Continue efforts to improve the business environment and access to finance for digital start-ups.
- **Semiconductors and digital innovation**: Accelerate the efforts to allocate public funds in strategic projects.
- **Cybersecurity**: Continue efforts in cybersecurity to address evolving threats, particularly for enterprises and administration.

A competitive, sovereign and resilient EU based on technological leadership

Spanish policymakers are focusing on digital technologies as an enabler for competitiveness. In recent years, significant progress has been made thanks to the Digital Spain Agenda. It has succeeded in stimulating the development of infrastructure, continued growth, and digitalisation of the Spanish economy. In addition, the national Recovery and Resilience Plan significantly helps boost the digital transformation.

Spain's digital infrastructure is generally more advanced than the EU average, with higher coverage rates in most categories. However, the observed values are below the trajectories expected for 2024, which could indicate a need for accelerated development to maintain the lead.

Spain is making significant progress in ensuring that enterprises have a basic level of digital intensity and that they adopt more advanced technologies. Spanish SMEs accounted for 33.2% of the value added in the economy, while large enterprises generated 45.5%. SMEs in particular represented about 97.4% of the enterprises with more than 10 employees, while large enterprises constituted 2.6%. According to the last available data, R&D in the ICT sector represented 17.81% of total R&D expenditure by businesses and 22.73% of total R&D personnel in 2022[4]. However, as reflected in the European Semester report, regional disparities persist, affecting Spain's overall innovation performance. Regions like Madrid, Catalonia and the Basque Country are strong innovators with higher levels of investment in R&D than the Spanish average, while other regions continue to exhibit low R&D investment, highlighting an innovation gap.

The country also attaches importance to AI. On 15 May 2024, the Spanish government approved the updated **National Artificial Intelligence Strategy 2024** to build upon and accelerate the progress made by the 2020 strategy. Its goal is to strengthen Spain's position in AI by adapting to recent technological advances, promoting a transparent, ethical, and human-centered approach, while boosting innovation and competitiveness. The strategy focuses on key areas like supercomputing, data infrastructure, AI talent, cybersecurity, and promoting responsible AI across both the public and private sectors. Several initiatives are already underway, including major investments in the Barcelona Supercomputing Centre to support advanced AI model development and efforts to promote generative AI startups. Projects are also advancing the development of high-quality Spanish language corpora and foundational models as just in September 2024, the first AI model was published. This model has been trained with a high percentage of data in Spanish and co-official languages and is available to all as an open-source infrastructure. The country has already created a European Regulatory Sandbox on AI, with 12 selected high risk AI systems that will work on the implementation of the European regulation on AI through operational guidelines.

According to the 2025 Eurobarometer[5], 86% of Spanish people think that building efficient and secure digital infrastructures and data processing facilities should be a priority for the public authorities.

[4] Most of the indicators mentioned in the country report are explained in the DESI 2025 Methodological Note accompanying the State of the Digital Decade report 2025.
[5] Special Eurobarometer 566 on 'the Digital Decade' 2025: https://digital-strategy.ec.europa.eu/en/news-redirect/883227

Building technological leadership: digital infrastructure and technologies

Spain benefits from its active deployment of connectivity infrastructures and the country has nearly met the EU targets for VHCN, FTTP and 5G coverage. The country is a leader in the deployment of edge nodes and invests heavily in semiconductors and quantum technologies.

Connectivity infrastructure

Spain's VHCN coverage for all households is significantly higher than the EU average, but the country is lagging compared to its national trajectory as coverage has not grown over the last year. In 2023, Spain's total VHCN coverage was 96.32%, compared to the EU's 78.64%, and in 2024, it was 95.01%, still above the EU's 82.49%. However, Spain's growth rate is -1.4%, which is below the EU's 4.9%. For households in sparsely populated areas, Spain's coverage was 86.94% in 2023 and 86.33% in 2024, both higher than the EU's 55.59% and 61.89%, respectively. Spain's growth rate of -0.7% is lower than the EU's 11.3%. These lower growth rates compared to the European average are due to the greater difficulty of increasing coverage in the last few %, as well as Spain's low population density.

Spain's FTTP coverage is also notably higher than the EU average, but it is also slightly below the expected national trajectory. In 2023, its total FTTP coverage was 95.21%, compared to the EU's 63.87%, and in 2024, it was 94.87%, still above the EU's 69.24%. Spain's growth rate of -0.4% is lower than the EU's 8.4%. For households in sparsely populated areas, Spain's coverage was 85.89% in 2023 and 86.32% in 2024, both higher than the EU's 52.55% and 58.78%, respectively. Spain's growth rate of 0.5% is lower than the EU's 11.9%.

Spain's broadband take up indicators show a strong performance in terms of high-speed broadband subscriptions, with shares well above the EU average. In 2023, Spain's share of fixed broadband subscriptions at 100 Mbps or higher was 93.54%, surpassing the EU's 65.9%. This figure increased to 95.68% in 2024, still ahead of the EU's 71.88%. For fixed broadband subscriptions at 1 Gbps or higher, Spain's share was 20.34% in 2023, outpacing the EU's 18.47%. In 2024, this increased to 25.4%, remaining above the EU's 22.25%. Spain's growth rate of 24.9% exceeded the EU's 20.5%. The share of 5G SIM cards in Spain was 22.08% in 2023, slightly above the EU's 21.7%. By 2024, this figure had risen to 35.14%, just below the EU's 35.56%. Spain's growth rate of 59.1% was lower than the EU's 63.9%.

Spain's overall 5G coverage is slightly higher than the EU average, but it is lagging compared to its national trajectory. In 2023, Spain's total 5G coverage was 92.28%, compared to the EU's 89.05%, and in 2024, it was 95.72%, still above the EU's 94.35% but 3 percentage points below the national trajectory for 2024 (98.9%). Spain's growth rate of 3.7% is lower than the EU's 6.0%. For households in sparsely populated areas, Spain's coverage was 67.44% in 2023 and 79.57% in 2024, equal to the EU's 71.1% and 79.57%, respectively. Spain's growth rate of 18.0% is higher than the EU's 11.9%.

Spain's 5G coverage in the 3.4–3.8 GHz band is higher than the EU average, but its growth rate is lower. In 2023, Spain's total coverage was 58.29%, compared to the EU's 51.06%, and in 2024, it was 74.04%, still above the EU's 67.72%. Spain's growth rate of 27.0% is lower than the EU's 32.6%. For households in sparsely populated areas, Spain's coverage was 10.24% in 2023 and 22.28% in 2024, both lower than the EU's 15.86% and 26.19%, respectively. Spain's growth rate of 117.6% is higher than the EU's 65.1%.

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Spain's 5G spectrum assignment in pioneer bands is significantly higher than the EU average. In 2024, Spain's assignment was 98.33%, compared to the EU's 73.4%, and in 2025, it remained at 98.33%, still above the EU's 74.63%. Spain has no growth between 2024 and 2025, while the EU's growth is 1.7%.

Spain should focus on increasing growth rates in digital infrastructure to maintain its lead over the EU average. Priorities should include improving growth in VHCN, FTTP, and overall 5G coverage, as well as ensuring that households in sparsely populated areas are not left behind. The country's strong 5G spectrum assignment should be used to drive further advancements in digital connectivity.

VHCN and FTTP

Spain sets the VHCN/FTTP target at 100% by 2030 in its roadmap, which is aligned with the EU effort. Although the current VHCN/FTTP values are slightly below the trajectories expected in 2024, **the country is on track according to its national trajectory.**
In 2024, Spain launched UNICO Banda Ancha 2024 programme. It provides EUR 18.5 million in grants that will mobilise investments to provide coverage of new generation, very high speed, public broadband networks capable of providing fixed technology services at speeds of at least 300 Mbps, both downstream and upstream, to almost 60,000 homes and businesses.

5G

Spain's 5G target remains at 100%, as set in its national roadmap submitted in 2024, and it is planned to be achieved by 2027. In 2024, Spain showed an annual progress of 3.7%, achieving 95.7% of overall 5G coverage. However, to reach 100% coverage in populated areas by 2027 as planned in its national roadmap, it should have achieved the 98.9% according to the established trajectory. Nevertheless, the difference isa minor, which means that **the country is on track according to its national trajectory.** The national roadmap outlines six measures aimed at reaching 100% 5G coverage by 2030 and they are under implementation.

Between 2022 and 2024 the UNICO Sectorial 5G programme supported 5G projects aimed at transforming different economic sectors and essential services, with a total amount of nearly EUR 115 million awarded. Concerning the deployment of 5G standalone by private operators, Telefonica reported coverage in all cities with more than 250.000 habitants and continues expanding its network, while Orange is already covering more than 60 cities across the country.

In 2023, it was launched the first call (EUR 544 million) of the UNICO 5G Networks – Active programme, which aims to support deployment of equipment and infrastructure in less populated areas of Spain (with fewer than 10.000 inhabitants). A second call (EUR 171 million) was published in August 2024 . This programme guarantees that the 5G stand alone will arrive to these less populated areas.

2024 recommendation: 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.
Spain made some efforts to address the recommendation through policy actions in 2024: To accelerate 5G deployment and its industrial use for innovative business-to business (B2B), in the 26 GHz band, Spain has made the 450 MHz band available to businesses in the self-provision regime.

Semiconductors

With a budget of EUR 12.25 billion, PERTE Chip is the key strategic initiative to strengthen its scientific, design, and manufacturing capabilities in microelectronics and semiconductors. The goal

is to bolster the technological and research ecosystem across the entire value chain, supporting innovation, cleanroom infrastructure, talent development, and specific areas like integrated photonics and RISC-V architecture. The initiative takes a comprehensive approach, targeting all stages from conception and chip design to production and boosting the ICT manufacturing sector to increase demand for locally produced semiconductors. It supports scientific research in advanced microprocessors and quantum chips, promotes fabless companies and training networks, and promotes national semiconductor manufacturing with leading-edge and mid-range technologies. It also aims to stimulate the ICT manufacturing sector and entrepreneurial ecosystem through venture capital focused on chip startups and scaleups. **Despite the efforts of the Spanish government, there has been a delay in the implementation and allocation of funds. To try to accelerate public funding, SETT (Spanish Society for Technological Transformation) was created as a public entity in July 2024 to manage the EU funds for strategic sectors.**

The **Cátedras Chip initiative**, with EUR 45 million allocated, focuses on scientific capacity-building in universities involving private sector in the Chairs to contribute to the transfer of knowledge. Another major effort involves the Chips Joint Undertaking pilot lines, with over EUR 133 million of funding (half from the EU). It includes the Integrated Photonics pilot line intended to establish Spain as a global leader in photonics and ensure full technological independence in this area by 2030.

The Ministry of Industry and Tourism allocated EUR 65.4 million to direct participants in the **Important Project of Common European Interest (IPCEI) on Microelectronics and Communication Technologies**, with an additional EUR 56.6 million for indirect participants. Meanwhile, EUR 111 million were granted to a direct participant by the State Secretariat for Telecommunications in the same programme, summing EUR 233 million invested in the IPCEI-MC. These funds aim to strengthen the design ecosystem, supply chain capabilities, and the initial deployment of advanced semiconductor technologies.

Further efforts include EUR 110 million in support of R&D projects which enforce the whole value chain of microelectronics and semiconductors and operate outside of specific European programmes. An additional EUR 174.1 million to enhance the Spanish science and technology system, with funding for supercomputing, cleanroom networks, and research infrastructures. Moreover, EUR 76.1 million for lower TRL R&D projects and the consolidation of researchers. SETT will invest EUR 4 million in the only Spanish company to produce semiconductor metrology equipment. The aim is to dramatically improve chip wafer production using patented world-leading technology. SETT will also invest EUR 9 million in a project for the development of disruptive infrared sensors based on nanotechnology. **Spain also secured an agreement to establish Imec's second European manufacturing and R&D centre in Málaga, with over EUR 600 million in investment expected by 2030 partly funded through the RRF**.

Edge nodes

According to the Edge Node Observatory, Spain is expected to have deployed a total of 302 edge nodes by 2024, an increase of 80.2% since 2023. This is close to doubling (+134 edge nodes) the amount estimated for 2023 (167, number revised since SDDR 2024). Spain is currently the third country in the EU in terms of edge nodes deployment.

The European Project of Common Interest on Information Services and Cloud (IPCEI-CIS) is currently under being implemented and will allow at least 17 edge nodes to be deployed. The UNICO R&D Cloud project also supports R&D in this area. Private investments in the country are likewise noteworthy.

Quantum technologies

On April 2025, the Spanish government launched the first **Quantum Technologies Strategy**, which amounts to EUR 808 million coming from European Regional Development Fund and the Recovery and Resilience Facility , with the possibility to leverage up to EUR 1.5 billion in public and private investments. This initiative seeks to boost funding for infrastructure and industrial applications of quantum technologies. It aims to highlight Spain's strengths in areas like quantum communications and post-quantum cryptography while also making the most of market-driven opportunities in sensing and metrology, particularly in sectors such as navigation, manufacturing, crisis prevention and defence. The strategy's core objectives include advancing research and market transfer, developing a national quantum industry, preparing society for digital transformation, and consolidating Spain's position in the global quantum landscape through coordinated initiatives spanning business support, AI integration, communications, sensing, data privacy, and infrastructure development. The strategy is aligned with the UN's International Year of Quantum Science and Technology and has been drafted after a participative process with regional governments and stakeholders. As a first action, in April 2025, the Council of Ministers approved the Royal Decree creating the Quantum Communications Hub. With a budget of EUR 10 million, it will promote the development of use cases, the promotion of R&D in quantum photonics and the implementation of training and dissemination initiatives.

In 2024, the Spanish Ministry for Digital Transformation and Public Service invested in the development of three quantum computing infrastructures, viewing quantum technology as a crucial component for more sustainable AI. One of the key initiatives is Quantum Spain, a EUR 22 million project to build a national quantum ecosystem, featuring a superconducting qubit-based quantum computer, cloud access, quantum algorithm development, and emulators in Galicia, Castilla y León, and Barcelona. Another project involves the creation of a quantum device based on Rydberg atoms, backed by EUR 7 million. It is expected to function as a quantum simulator within two years and evolve into a universal quantum computer. This initiative is likely to generate patents and spin-off companies, further enhancing the Spanish quantum ecosystem. A third investment of EUR 8.5 million supports the Euro QCS-Spain quantum annealer, co-funded by the European Commission, to be hosted by the Barcelona Supercomputing Centre. It will integrate with existing supercomputers and quantum systems, contributing to a broader European hybrid supercomputing network.

Supporting EU-wide digital ecosystems and scaling up innovative enterprises

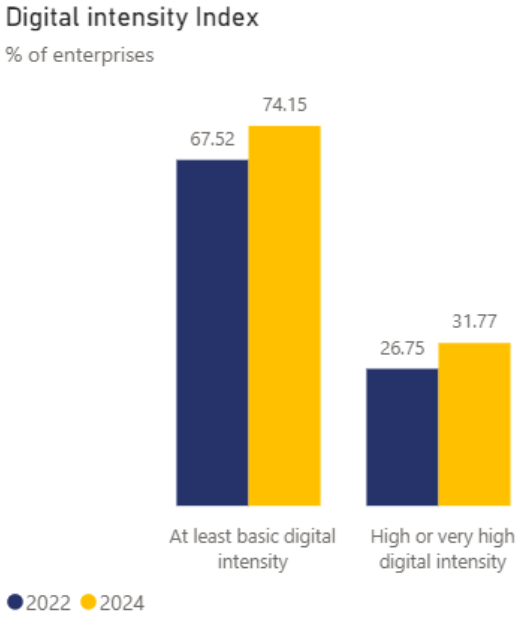
Spain is notably progressing in ensuring the basic level of digital intensity of enterprises as well as regarding the uptake of more advanced technologies by companies. However, it is facing some challenges in AI take-up regarding small enterprises, as it is below the EU average, although it is performing significantly higher than the EU average regarding large enterprises. There are several public measures, implemented mostly under the national Recovery and Resilience Plan, to support digitalisation of businesses.

The country has not increased its number of unicorns over the last year. At the end of 2024, Spain was home to 13 unicorns, lagging behind the 16 unicorns expected for 2024 according to the trajectory established in its national roadmap. Spain aims to have 24 by 2030. However, this would still represent a limited contribution to the EU's target of nearly 500 unicorns by 2030. Spain remained stable in the Global Start-up Ecosystem Index 2024 between 2023 and 2024, ranking 7th in the EU, although the number of cities in the top 1 000 worldwide declined.

Spain

SMEs with at least basic digital intensity

By 2024, 3 out of 4 (74.15%) of SMEs in Spain had at least a basic level of digital intensity, an increase from 67.52% in 2022, with a robust growth rate of 4.8% every year (2022 is the last comparable year that used a similar methodology for measuring the digital intensity of enterprises). This placed Spain above the EU average of 72.91% in 2024. At the same time, zooming in on the SMEs that had a high or very high digital intensity, 31.77% achieved such an advanced level, in line the EU average of 32.66%. Overall, the data shows good progress for Spanish SMEs in their digital transformation.



According to the latest available data, in 2022**, Spanish SMEs accounted for 33.2% of the value added in the economy**, while large enterprises generated 45.5%. Notably, **SMEs represented about 97.4% of the enterprises with more than 10 employees**, while large enterprises constituted 2.6%.

The Spanish Ministry for Digital Transformation and Public Service is implementing several initiatives to strength the digitalisation and competitiveness of the enterprises. **The Kit Consulting, which expands the existing Kit Digital programme to help SMEs adopt advanced technologies and extend support to medium-sized enterprises**. So far, EUR 165 million have been granted through over 12.000 aid packages, while the broader Kit Digital programme has distributed over 710 000 digital vouchers totalling more than EUR 2.9 billion in investment. The **Generación D Pymes programme**, backed by EUR 256 million and managed by the School of Industrial Organization (EOI), aims to train SME leaders and employees in digital transformation to help create a new digital culture within businesses.

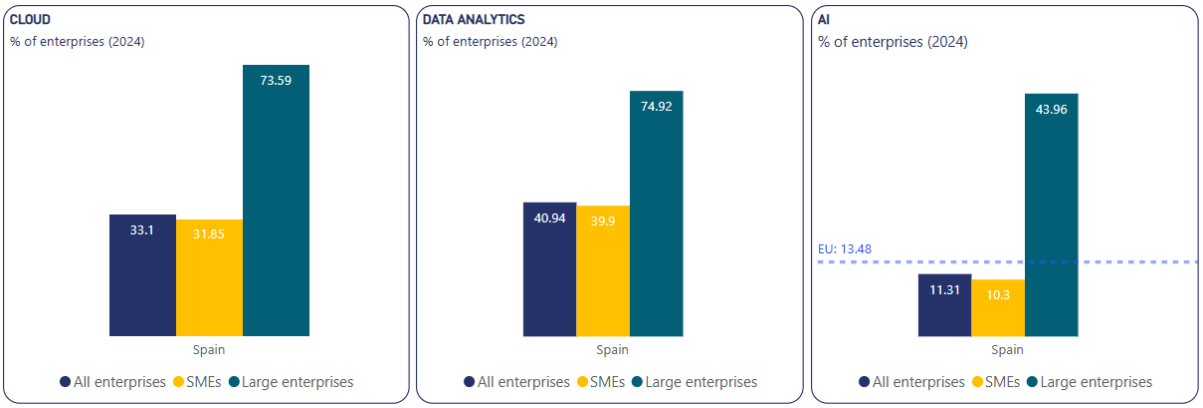
The **National Entrepreneurship Office**, with a budget of EUR 60 million, acts as a digital platform to support innovative entrepreneurship by connecting startups, entrepreneurs, and ecosystem stakeholders. It offers access to funding opportunities, educational resources, diagnostic tools, and a startup map, and has already engaged thousands of users and startups across the country. The UNICO Pymes programme, EUR 44.6 million in funding, focuses on bridging connectivity gaps for small businesses, microenterprises, and freelancers. It provides financial support in the form of connectivity vouchers to improve internet access and related services, helping businesses overcome a significant barrier in their digital transformation.

In addition, **the country has 50 digital innovation hubs** connected within the European Digital Innovation Hubs network. They provide testing, training, funding and incubation support across sectors and technologies, e.g. in mobility, health, AI and cybersecurity.

SETT also helps channel funding to businesses, in particular, the Next Tech Fund, which contains EUR 4 billion from RRF funds.

Spain

Take up of cloud/AI/data analytics



In 2024, more than 1 in 2 enterprises (55.67%) in Spain adopted AI technologies, sophisticated or intermediate cloud computing services, or performed data analytics, a 11.61% increase compared to 2023 (49.88%). More specifically, the uptake among SMEs was slightly lower at 54.68% while large enterprises demonstrated a significantly higher engagement rate of 87.84%. As a result, a difference of 33.16 pps in uptake was recorded between SMEs and large enterprises in Spain, showing a decrease compared to the 2023 gap (39.04 pps).

Spain exhibited mixed performance in the adoption of cloud computing, data analytics, and AI technologies among enterprises with 10 or more employees. Data analytics and AI adoption exceeded EU averages, while cloud uptake and overall engagement with these technologies fell below EU levels. Large enterprises consistently reported significantly higher adoption rates than SMEs, with differences in technology uptake often exceeding EU trends. Considering the predominant share of SMEs among enterprises with 10 or more employees in Spain and their relatively lower contribution to economic value added, addressing these adoption disparities could play a key role in supporting balanced digital development.

In November 2024, the Spanish Minister for Digital Transformation and Public Function launched the Plan to Promote Sectoral Data Spaces, which aims to accelerate the deployment of interoperable data ecosystems across all productive sectors in Spain. The plan is designed to help companies make the most of the future European single market for data, fostering innovation and boosting competitiveness. Its main goals include aligning with EU initiatives, boosting technological and industrial competitiveness, and encouraging public-private collaboration in the development of sectoral data spaces. The plan is structured around six strategic axes and involves 11 key initiatives that support demonstrators and use cases in strategic sectors, including tourism, language economy, smart urban infrastructures, and regional development. Funding is provided for technical and legal integration into existing data spaces, the development of digital products and services and for centralised management of public data demand. The plan also includes the creation of neutral data-sharing platforms, such as one for the tourism sector, which will host a marketplace for reusable applications and services. To support long-term sustainability and interoperability, the plan also establishes a centre of reference that will develop the technical reference framework, manage a registry of trusted and interoperable data spaces, and coordinate shared infrastructures and testing capacities. Additionally, a national campaign for awareness, training, and capacity building will be rolled out to ensure the broad adoption of sectoral data spaces and strengthen Spain's leadership in the digital data economy at both national and EU levels.

- **Cloud**

Based on the latest available data, **33.1% of Spanish enterprises used cloud services in 2024, revealing a 21.47% growth compared to 2023 (27.25%).** However, while SMEs had an uptake of 31.85%, large enterprises showed a much higher adoption rate of 73.59%. This indicates a notable difference of 41.74 pps in uptake between SMEs and large enterprises in Spain.

- **Data Analytics**

40.94% of enterprises in Spain performed data analytics in 2024, showing a 7.71% increase compared to 2023, when 38.01% of them used data analytics in their work. More specifically, among SMEs, 39.9% adopted data analytics, while this was the case for 74.92% of large enterprises (about 3 out of 4). This indicates a gap of 35.02 pps between SMEs and large enterprises.

As part of the Sectoral Data Spaces roadmap, measures for the adoption of advanced data analytics have been implemented. A competitive grant call resulted in the approval of over EUR 75 million in funding for 78 projects. The aim is to establish demonstrator centres and use cases within data spaces, with additional private investment of EUR 47 million expected. These Data Space initiatives are being driven by a mix of companies and research organisations, with the collaboration of hundreds of entities acting as data providers or consumers. The funding supports two project lines: the creation of a national network of specialized demonstrator centres offering infrastructure for data space pilots across sectors like agri-food, health, and environment, and the development of data-sharing use cases to test new business models and services. Furthermore, the Language New Economy Data Space Project, under the 'Language Valley' initiative in collaboration with La Rioja, is underway with a EUR 12 million budget. This project will integrate data from various sources, including key institutions, and will create a Spanish speech corpus (a large collection of audio recordings of spoken language) as a shared data resource. Additionally, use cases will be developed for the Dialnet Global Data Space, a large Spanish scientific article database, to benefit economic sector data spaces.

- **Artificial Intelligence**

Approximately 1 in 10 (11.31%) enterprises in Spain were using AI technology in 2024. Although it is slightly below the corresponding EU level value of 13.48%, the country is on track according to its national trajectory. This reveals a 23.2% growth in AI uptake from 2023 (9.18%), considerably below the EU average growth rate (67.2%). Among SMEs, the 2024 uptake was 10.3%, whereas large enterprises showed a much higher rate of adoption, with 43.96% using AI. This corresponds to a gap of 33.66 percentage points between SMEs and large enterprises, above the EU gap of 28.53 percentage points.

To accelerate this trajectory, in January 2025 the Spain presented HispanIA 2040, a strategic vision for how artificial intelligence can contribute to the country's future. At the same event, ALIA was presented, Spain's first foundational AI model developed with extensive data in Spanish and co-official languages (Catalan, Galician, and Basque). Designed as a public, open-source infrastructure, ALIA strengthens technological sovereignty by offering a transparent alternative to large-scale models trained mainly in English. Spain is also working to build an open-source AI community around ALIA to foster collaboration, encourage reuse, and support its adoption across public and private sectors.

In a further step towards leadership in ethical and human-centered AI, Spain activated in April 2025 a regulatory sandbox for high-risk AI systems. This controlled environment has started by testing 12 systems to evaluate their compliance with key requirements of the European Regulation such as human oversight. The initiative aims to support companies—especially SMEs and startups—in adapting to the EU AI Act, set to enter into force in August 2026.

Together, these initiatives aim to lower barriers to AI adoption, foster innovation, and ensure that the benefits of artificial intelligence are accessible across the entire economy.

2024 recommendation: continue the efforts to support the digitalisation of enterprises, in particular to foster the adoption of advanced technologies.
Spain made some efforts to address the recommendation through policy actions in 2024: Spain has increased the basic level of digital intensity of its enterprises with a growth rate of 4.8% over the last two years. Concerning the adoption of advanced technologies, there has been a 11.61% increase compared to 2023. It is the result of different programmes implemented by the Spanish authorities. However, there are still challenges in AI adoption, which is still below the EU average (11.3% vs 13.5%), and in the gap between SMEs and large enterprises.

Unicorns, scale-ups and start-ups

At the end of 2024, Spain had 13 unicorns[6] (2030 national target of 24), which is the same value as last year and represents a deviation from the value expected in the Spanish national roadmap (16). However, Spanish authorities are making efforts to reinforce and boost the startup ecosystem.

In December 2024, the Spanish government enacted Royal Decree 1138/2024 to formally establish the **National Forum for Emerging Companies**, as outlined in the Startup Law passed in late 2022. This forum is designed to foster strategic collaboration between public institutions and private sector players. The aim is to enhance Spain's technological and innovative entrepreneurship ecosystem. It will also promote coordination among various bodies that support technological innovation and entrepreneurship across the country. The creation of a structured space for dialogue among key players in Spain's innovation landscape is considered vital for improving public policy. Through this forum, stakeholders will assess existing objectives and measures, identify emerging needs, and ensure more effective and efficient policy design and implementation.

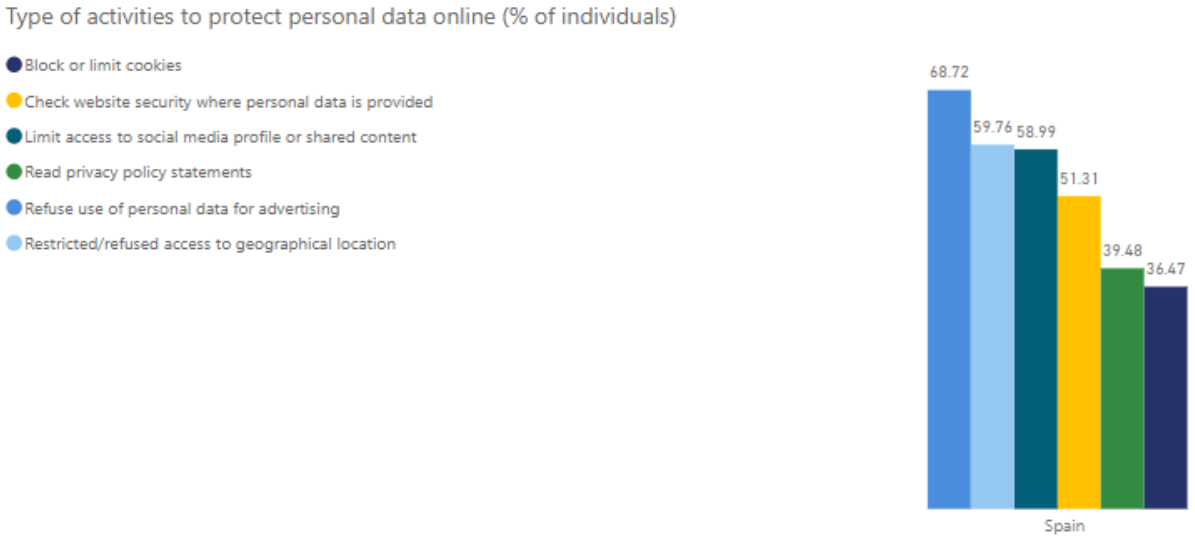
To better understand and guide the development of the startup ecosystem, and specifically to evaluate the impact of the Startup Law, a project funded by the European Commission under the Technical Support Instrument (TSI) is currently underway. Led by the OECD, this initiative involves Spanish ministries, public institutions, startups, and private organisations. Its goal is to pinpoint the ecosystem's main challenges and opportunities, assess the law's effectiveness, and develop policy recommendations to support its implementation and governance.

Strengthening Cybersecurity & Resilience

In Spain, 80.12% of individuals took at least one action to protect their personal data online in 2023, significantly higher than the EU average of 69.55%. In addition, a significant share of the population (62.94%) took three or more precautionary actions (and could therefore be considered as having above basic digital safety skills). Refusing the use of personal data for advertising purposes was the most common, with 68.72% of individuals engaging in this measure, while changing the browser settings to block or limit cookies on any device was the least common, reported by 36.47%.

[6] Data extracted from Dealroom on 24 March 2025, including all possible retroactive revisions. See the methodological note for more details.

Spain



The number of enterprises that experienced ICT security incidents leading to unavailability of ICT services due to attack from outside (e.g. Ransomware attacks, Denial of Service attacks) has slightly decreased in Spain, from 3.67% in 2022 to 3.57% in 2024. It remains in line with the EU average (3.43%). Spanish enterprises are quite below the EU average (11.97% vs 17.97%) concerning incidents related to hardware or software failures.

In term of measures, 89.92% of enterprises deployed some ICT security measures (below the EU average of 92.76%) but only 57.14% of enterprises made their employees aware of their obligations in ICT security related issues, which is slightly below the EU average (59.97%).

Concerning the deployment of secure internet standards, Spain lags behind in the roll-out of Internet Protocol version 6 (IPv6) for the end users (9% at the end of 2024), which is quite below the EU average (36%). It is similar the situation of Spain regarding the server side as the country stands with a 6% while the EU average is 17%. IPv6 is an important protocol as it ensures the scalability, stability, and security of the Internet. The deployment of this new version is increasingly urgent, as traditional IPv4 addresses have been long depleted. Domain Name System Security Extensions (DNSSEC) is also an important standard to be rolled out as it introduces security features to DNS. In Spain, the DNSSEC validation rate is 25% (Q3 2024), below the EU average of 47%.

The data on several dimensions of cybersecurity suggest that Spain has room for improvement, performing significatively below the EU average despite the efforts of the Spanish authorities detailed as follows.

According to the Digital Decade Eurobarometer 2025, 85% of Spanish citizens think that an improved cybersecurity, better protection of online data and safety of digital technologies would facilitate their daily use of digital technologies. An increase of four percentage points compared to last year, reflects the growing concern of the Spaniards about this subject.

The Spanish government has significantly advanced its cybersecurity infrastructure by consolidating a central **Cybersecurity Operations Centre** capable of offering coordinated protection to 126 public organisations and over 200 000 users. It enables continuous incident response and provides centralized security event management, proactive threat detection, and support services for onboarding new entities. Additionally, a dedicated **Security Operations Centre** has been deployed for

local organisations with fewer than 50 000 inhabitants to ensure uniform protection and benefit local authorities from virtual security operations centers.

Another key development includes the certification of the State Administration's private cloud at a high-security level, ensuring data integrity and confidentiality. Various digital transformation projects have been launched, such as the digitalization of consular services to enhance remote work, the modernization of unemployment benefits management systems, and the creation of a digital civil registry to streamline administrative interactions.

A new General Subdirectorate for Digital Security has been established to unify the Ministry for Digital Transformation's cybersecurity responsibilities. It leads strategic actions in telecommunications and digital infrastructure, including network security, regulatory supervision, and the management of aid programmes. The Subdirectorate is structured in the Division for Telecommunications and Infrastructure Security, which oversees 5G security compliance, manages the 5G Security Operations Centre, and represents Spain in international network security forums; and the Division for Cybersecurity in Digital Transformation, which coordinates national cybersecurity strategies in collaboration with INCIBE, supports the cybersecurity business ecosystem, promotes regulatory frameworks and manages EU funded programmes.

Additionally, the Council of Ministers has recently approved EUR 1.157 million for 40 new projects aimed at strengthening Spain's cybersecurity and cyberdefense capabilities. It is aligned with the 2022 National Cybersecurity Plan and the Industrial and Technological Plan for Security and Defense.

Meanwhile, **INCIBE (National Cybersecurity Institute)**, under the Ministry's authority, continues to strengthen cybersecurity for citizens, SMEs, and professionals. Among its services is 'Tu Ayuda en Ciberseguridad 017', a free, confidential assistance helpline that handled over 98.000 queries in 2024.

INCIBE is also working on a national list of harmful pornographic websites, particularly those targeting minors. Its outreach includes awareness campaigns like Safe Internet Day and #ExperienciaINCIBE, which uses interactive and gamified experiences, and educational efforts that reached over 117.000 children, families, and teachers in 2024. Cybersecurity training programmes and digital skills initiatives targeted a wide range of groups, including vulnerable communities and people with disabilities.

Furthermore, INCIBE has developed and promoted a range of cybersecurity tools and solutions tailored to the needs of both enterprises and families. In 2024, a total of 14 820 SMEs and professionals benefited from these tools, which aim to strengthen digital security in the business sector. For families, INCIBE updated its catalogue of parental control solutions, expanding it to 68 entries to help parents better protect children online. It also supports entrepreneurship through the INCIBE Emprende programme, which in 2024 included events, workshops, and startup incubations and accelerations. Public procurement initiatives focused on innovation led to the awarding of multiple contracts to foster technological advancements. INCIBE also contributes to the implementation of the Digital Services Act (DSA), serving as a trusted flagger (responsible for detecting potentially illegal content and alert online platforms) within European networks. As part of its strategic agenda, it has launched five research-based cybersecurity projects in collaboration with Spanish universities. Under the RETECH Ciber initiative, INCIBE supports regional cybersecurity ecosystems, coordinating with 17 autonomous communities and with a budget of EUR 162 million. In 2024, agreements were signed with Asturias, La Rioja, Madrid, and Aragón to further develop these capabilities.

Finally, Spain actively participates in the European initiative IRIS2 (new EU Secure Satellite Constellation) and GOVSATCOM (European Union Governmental Satellite Communications programme) that aim to provide secure, resilient and cost-efficient satellite communications.

2024 recommendation: continue the implementation of the 5G Cybersecurity Toolbox to ensure secure and resilient 5G networks.

Spain made important efforts to address the recommendation in 2024:

In 2024, Spain approved Royal Decree 443/2024, establishing the **National Security Framework for 5G networks** and services. This decree, developed under Royal Decree-Law 7/2022, aims to ensure the security of fifth-generation electronic communications. Its main purpose is to strengthen national security and guarantee the continuous and secure operation of 5G networks by taking a comprehensive approach that involves all actors in the 5G value chain. It also seeks to reinforce security in the deployment and operation of 5G infrastructure, promote a diverse supplier market to avoid high-risk vendors, and support national cybersecurity R&D activities related to 5G. Furthermore, it emphasizes the importance of education and awareness in 5G cybersecurity. As part of this framework, Spain has launched a pioneering **5G Security Operations Centre**, which supports the Ministry for Digital Transformation and Public Service by assisting organisations in preventing, detecting, and responding to cyber threats and attacks on 5G systems. It also contributes to the certification and standardization of 5G security, and it is a joint initiative between the National Cryptologic Centre and the Ministry for Digital Transformation.

Protecting and empowering EU people and society

Empowering people and bringing the digital transformation closer to their needs

Spain is making commendable efforts to empower its population and ensure ongoing opportunities for everyone within the digital economy. Achieving digital inclusion requires broad access to technology, and Spain is moving in that direction through the initiatives under its **National Digital Skills Plan**. The country's commitment to enhancing digital skills is evident in its current progress. However, a shortage of ICT specialists remains a challenge that may continue until recent policies begin to yield results. Nonetheless, advancements in Spain's digital public services are showing encouraging signs.

According to the 2025 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, 84% 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

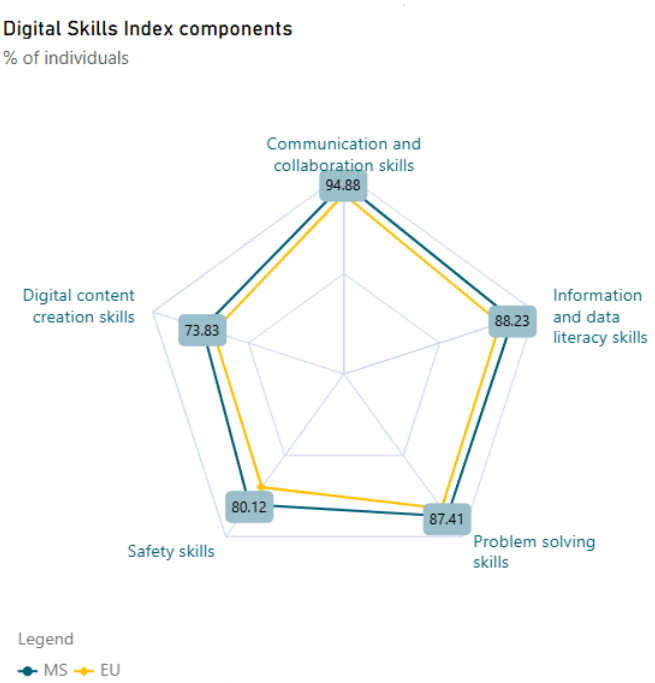
Basic Digital Skills

In 2023, Spain showcased a strong digital skills presence, with 66.18% of its population having at least basic digital skills, surpassing the EU average of 55.56%. Even without new data in 2024, a detailed look into various demographics reveals insightful trends.

- **Gender Gap:** Spain shows a tiny gender gap in digital skills, with 66.49% of men and 65.87% of women proficient, leading to a gap of only 0.62 percentage points. This is better than the EU average gap of 2.23 percentage points.
- **Education Level:** Those with higher education in Spain are doing well in digital, with 85.78% having at least basic digital skills, which is above the EU average of 79.83%. However, individuals with lower levels of education are lagging, with 43.47% having at least basic digital skills, but still above the EU average (33.61%). The gap between this group and the national average is 22.71 percentage points, a tad higher than the EU average (21.95pp).
- **Living Areas:** In Spain's rural areas, 56.50% of people have at least basic digital skills, which is more than the EU average for rural areas (47.50%). Yet, there's a noticeable gap of 9.68 percentage points between rural areas and the rest of Spain, which is more significant than the EU average divide (8.06pp).
- **Age Groups:** Young Spaniards aged 16 to 24 are leading with digital skills, at an impressive 83.56%, way above the EU average (69.98%). The 65 to 74-year-olds are the least skilled in Spain, with 32.83%, but even this is better than the EU average for their age group (28.19%).

- **Digital Skills Index components:** Across the Digital Skills Index, Spain outperforms the EU average in all five categories. It excels in communication and collaboration skills with a high score of 94.88%. Even in its weakest area, digital content creation, the score is 73.83%, which is still above the EU average.

In summary, Spain's digital skills are robust, with particularly strong communication and collaboration abilities. While the gap in skills between education levels and rural versus urban areas does exist, the overall levels are very good, especially among young people and those with higher education. Spain's scores in the Digital Skills Index suggest a nation well-equipped for the digital age.



The country 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.

Red.es has established a digital skills training program aimed at citizens at risk of digital exclusion to bridge various digital divides. The primary target audience includes individuals over 65, people with disabilities, vulnerable groups, and those with low digital skills. The programme Includes in-person group training sessions with a practical focus and oriented toward everyday life situations, helping participants recognize how basic digital skills can support them in their daily activities. It will engage foundations, third sector organisations, and other companies with experience in providing basic digital skills training and reaching individuals at high risk of digital exclusion in both urban and rural areas. The goal is to leverage their local and regional presence and expertise in raising awareness to encourage participation in digital skills development.

In November 2022, the Secretary of State for Digitalization and Artificial Intelligence launched the **'Generación D Pact'** to improve the digital skills of the Spanish population through collaboration between public and private organisations. It aims to create a cohesive, coordinated and complete ecosystem to make visible and involve Spanish society in the digital transformation process, in order to close the digital skills gap, raising the percentage of the Spanish population up 100%. Currently 206 organisations have joined the Pact and have added 3 372 learning initiatives, and 80 772 citizens have registered in the portal and completed the self-diagnosis questionnaires of their level of digital skills.

ICT specialists

Spain's performance in ICT training and ICT specialists shows a mixed picture when compared to the EU average. Although the Spain's total percentage of ICT specialists is below the EU average, it is shown a positive trajectory in terms of growth rates. It is explained due to the significant growth in employment in other sectors in Spain in recent years, the percentage of ICT specialists as a share of

total employment remains below the EU average. According to the latest data published by Eurostat[7], Spain now employs a total of 1 022 600 ICT specialists, accounting for approximately 10% of all ICT specialists in the EU.

In terms of percentage over the total employment, Spain's percentage of ICT specialists was 4.4% in 2023, compared to the EU's 4.8%. **By 2024, this figure increased to 4.7%,** although it is still below the EU's 5.0%. However, **Spain's growth rate of 6.8% surpassed the EU's 4.2%**, indicating a robust increase in the ICT specialist workforce. Regarding **female ICT specialists**, Spain's percentage was 19.5% in 2023, higher than the EU's 19.4%. **By 2024, this figure rose to 19.6%**, still higher than the EU's 19.5% and maintaining a growth rate of 0.5% equal to the EU's one.

Regarding ICT graduates, Spain is also showing a positive trend. According to the latest data published by Eurostat[8], ICT graduates accounted for 5.7% in 2023, a 9.6% increase compared to the previous year. This rate exceeds the EU average, which rose from 4,5% in 2022 to 4.7% in 2023.

In 2022, the percentage of enterprises with 10 or more employees providing ICT training in Spain was 20.7%, compared to the EU's 22.37%. By 2024, this figure rose to 21.22%, slightly below the EU's 22.29%. However, Spain's annual growth rate of 1.2% outperformed the EU's -0.2%. This indicates that while Spain starts from a lower base, it is making strides to catch up.

To attract and retain AI specialists, Red.es launched in October 2024 the Talent Attraction and Retention Programme in Artificial Intelligence in collaboration with major research centers, offering 374 scholarships and training contracts lasting 48 months to support academic plans of at least 240 ECTS credits. Additionally, to meet the growing demand for digital experts across various professional fields, a EUR 200 million training programme in digital skills for professional associations has been initiated. The aim is to provide over 80,000 professionals in sectors such as legal, healthcare, economic, social, scientific, architecture, engineering, and educational with 150 hours of specialized training in advanced digital skills and AI.

2024 recommendation: 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.
Spain made some efforts to address the recommendation through policy actions in 2024: In 2024, the percentage of ICT specialists continued to grow in Spain as a result of the efforts of public administrations and the previously observed trend in the number of ICT graduates. However, the volume of ICT specialists continues below the EU average, although its growth rate is higher.

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

Spain's digital public services and access to e-health records have shown a mixed performance when compared to the EU average. In 2023, Spain's total score for **digital public services for citizens** was 84.18, surpassing the EU's 79.44. This trend continued in 2024, with **Spain's score reaching 88.75**, compared to the EU's 82.32, **which makes the country on track according to its national trajectory.** Spain's growth rate of 5.4% in this area outpaced the EU's 3.6%. Similarly, Spain's cross-border digital public services score was 71.05 in 2023 and 78.73 in 2024, both higher than the EU's 68.37 and 71.28, respectively. Spain's growth rate of 10.8% in this category also exceeded the EU's 4.3%. The share of

[7] Eurostat https://ec.europa.eu/eurostat/databrowser/bookmark/0157d626-0bd6-4a78-8dac-8cc5a785a7b4?lang=en

[8] Eurostat https://ec.europa.eu/eurostat/databrowser/bookmark/899b66a1-3936-4a3c-9512-97b3c9084062?lang=en

people using government internet websites or apps remains quite above the EU average (82.70% versus 74.71%) in 2024.
However, Spain's **digital public services for businesses** tell a different story. **While Spain's total score was 91.0 in 2023, higher than the EU's 85.42, it dropped to 85.11 in 2024, falling below the EU's 86.23 and making the country lag behind compared to its national trajectory.** Spain's growth rate of -6.5% lagged behind the EU's 0.9%. A similar pattern is observed in the cross-border category, where Spain's score decreased from 82.5 in 2023 to 72.5 in 2024, while the EU's score increased from 73.13 to 73.76. Spain's growth rate of -12.1% was significantly lower than the EU's 0.9%.
In the realm of access to e-health records, Spain shows a positive trend. In 2023, its total score was 84.58, higher than the EU's 79.12. This gap widened in 2024, with **Spain's score reaching 88.29, compared to the EU's 82.70**. Spain's growth rate of 4.4% in this area was slightly lower than the EU's 4.5%.

In addition, the share of people using government internet websites or apps is slightly decreasing year after year in Spain, from 84.02% in 2022 to 82.70% in 2024. However, it was significantly above the EU average of 70.01% in 2024.

In overall, Spain's digital public services and access to e-health records have shown a mixed performance. While Spain has made significant strides in digital public services for citizens and access to e-health records, there is a clear need for improvement in digital public services for businesses. To enhance Spain's digital landscape, policymakers should focus on bolstering digital public services for businesses, while continuing to build on the progress made in other areas. This might involve investing in digital infrastructure, promoting digital literacy, and encouraging public-private partnerships to drive innovation and growth.

e-ID

In 2023, the last year with available data, 54.43% of Spanish people have used their eID to access online services for private purpose in the last 12 months, which is above the EU average (41.11%). However, 13.99% did not use eID because they did not have one.

Spain actively participates in several Large Scale Pilots to test the specifications of EU Digital Identity Wallets in a wide range of use cases, before their roll-out to Member States. Spanish stakeholders, both public and private, are taking part in three of the four LSPs projects which began in April 2023: POTENTIAL (involved in work on identification for eGovernment Services and registration for SIM cards, mobile driving licence, health credentials for ePrescription), EWC (piloting the use-cases of Digital Travel Credentials, payments and organisational digital identities) and DC4EU (Education/Professional qualifications & Social Security document).

Work is underway on the first version of the Spanish Digital Wallet, which will enable age verification to prevent minors from accessing adult content online. Its development will follow European standards in line with the EU agreement to ensure the protection of minors.

In addition, Spain has officially launched 'MiDNI' app in April 2025 to obtain and use the digital National Identity Document (DNI). This application allows citizens to identify themselves, prove majority of age, carry out administrative procedures, register in services such as hotels or banks, and sign documents before a notary, among other functions. However, it is not yet valid for international travel or border controls, so the physical DNI is still required. In a second phase planned for 2026, functionalities such as electronic signature and authentication in online procedures will be incorporated.

Digitalisation of public services for citizens and businesses

Spain aims at reaching a score of 100 for the digitalisation of public services for citizen and businesses. Current observed rate of growth is significantly higher than EU average in public services for citizens but it is quite below the EU average in public services for business, where in addition, the country is lagging behind the expected value for 2024 in its national roadmap (85.1 vs 95.0).

Spain continues to lead in online public services, emphasizing omnichannel strategies to make digital services accessible to all citizens, primarily through mobile phones. Among the most impactful mobile applications are '*Mi Carpeta Ciudadana'*, which centralizes access to various public administration services and has over 5 million downloads, and others like *'Notifica'* for managing notifications, *Cita Previa* for scheduling appointments*, 'Líneas de Ayuda'* for accessing information on public grants, '*Empleo Público'* for job opportunities, '*Catastro'* for real estate information, *QEDU* for university data, and *ICA* for real-time air quality monitoring. Additionally, the 060 service has expanded its capacity with virtual agents, handling over 27 million calls and 140,500 chatbot inquiries since 2022.

In terms of data use and interoperability, Spain is advancing major initiatives. In 2024, Red.es granted EUR 12.9 million to the Spanish Federation of Municipalities and Provinces (FEMP) to develop multi-sectoral data spaces for smart cities, fostering public-private data exchange to improve decision-making and support economic growth, particularly in sustainable mobility. The Spanish administration is also developing the Data Platform, designed to break down data silos across ministries through big data technologies, improving data quality, innovation, and reuse. The platform is expanding in phases, aiming to create a shared data space for public organizations with analytical capabilities and interoperability with sectoral data spaces. 17 organisations and 51 information systems are already connected. Efforts continue to enhance the platform's capabilities, expand its development environment, and ensure compliance with the National Security Framework to guarantee the security and reliability of the hosted data.

As part of its broader public service digitalisation and AI strategy, Spain has also begun deploying ALIA across key government services. Early applications include a virtual assistant for the Tax Agency to streamline citizen queries, and '*Cardiomentor'*, a clinical decision-support tool used in primary care to improve the early diagnosis of heart failure, showcasing the potential of public, open-source AI to deliver inclusive, citizen-oriented solutions. More than thirty other use cases are being planned for the next phases of the project.

2024 recommendation: Continue efforts to digitalise public services and further promote their use.
Spain made some effort to address the recommendation through new policy actions in 2024: Spain is making progress in the digitisation of public services and scores above the EU average in public services for citizens. However, there is a deviation from this trend in public services for businesses.

e-Health

Spain aims at a score of 100 for the access to medical records, in line with the 2030 EU target. In the context of the current rate of progress and the high score in 2024, which is one point above the expected value for 2024 in the national roadmap (88.3 vs 87.3), the country is on track to reach the target by 2030.

The National Health Data Space (ENDS) aims to integrate health system information nationwide to enable large-scale analysis and real-time responses, supporting disease diagnosis and treatment.

Led by the Secretary of State for Digitalization and Artificial Intelligence in collaboration with the Ministry of Health, the project provides regional governments with infrastructure for shared health data management, including multi-format repositories and advanced analytics tools with AI capabilities. In 2024, licenses were acquired for the data management platform, and procurement documents were prepared for the necessary on-premises and cloud infrastructure. A preliminary working environment was deployed, implementing three healthcare use cases related to antibiotic consumption, risk factors in COPD patients, and vector-borne disease monitoring. Work also began on defining Secure Processing Environments (SPE) to comply with the European Health Data Space Regulation. Additionally, a user support and incident management tool was launched and tested with regional staff. By the end of 2024, funds were successfully transferred to all regions and territories except Andalusia and Extremadura, which were finalizing the required documentation. A corporate visual identity for the ENDS was also created to support communication and outreach efforts.

According to the 2025 Eurobarometer, 80% Spanish people think that digital technologies will be important when accessing or receiving healthcare services (e.g., telemedicine, artificial intelligence for diagnosis diseases) during their daily life by 2030.

2024 recommendation on 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.

Spain made some efforts to address the recommendation through new policy actions in 2024:

Spain provided data for each of its 18 health regions. **In 2024, Spain improved their eHealth maturity score.** More data categories investigated under this framework have become available in more regions, especially data on procedures and operations, laboratory test results, medical imaging reports and hospital discharge reports. However, data on medical devices and implants and medical images are still unavailable in more than half the regions. Of the 11 categories of healthcare providers investigated in this study, all public ones and pharmacies in all regions supply data. In addition, in two regions, some private healthcare providers were supplying data. However, in general**, private providers in Spain have their own systems, which are not currently interoperable with the public systems**. It remains a significant gap for Spain.

Regarding access for legal guardians and authorised individual, legal provisions are in place across Spain. In 2024, one additional region introduced functionalities for legal guardians to access the data of their wards (56% of regions in total) and four regions for the first time implemented access for authorised persons as a functional feature (22% of the regions in total).

In 2024, authentication to the electronic health record systems is done using a (pre)notified eID compliant with the eIDAS regulation in all regions.

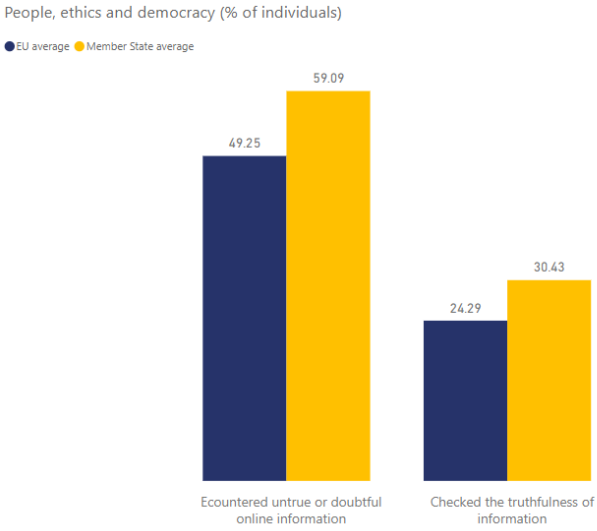
Building a safe and human centric digital environment and preserving our democracy

In Spain, the online participation to political and civic life is growing. In 2024, 23.02% of people used the internet to participate to consultation, for voting or sharing opinions online. This share is above the EU average and trending upwards (22.13% in 2022), which is in line of the trend observed at the EU level (17.59% in 2022 and 20.45% in 2024).

Spain

In 2023, 59.09% of individuals in Spain reported having encountered information or content on internet news sites or social media that they perceived as untrue or doubtful, considerably higher than the EU average of 49.25%. Among those exposed to such content, 30.43% engaged in verifying its truthfulness, highlighting that a significant proportion of individuals, compared to the EU average, took steps to assess the accuracy of the information. Young people aged 16–24 (71.69%) was significantly more likely than adults aged 25–64 (60.96%) to report such content, and their verification rates also differed, with 40.82% of young people verifying content compared to a significantly lower 31.24% of adults. Males (61.33%) and females (56.90%) reported similar levels of exposure, and their verification rates were also comparable, at 32.54% for males and 28.36% for females.

The 2023 data on online interactions in Spain reveals a high prevalence of potentially misleading information online, with a significant proportion of individuals encountering untrue or doubtful content. However, the data also suggests that Spaniards have been taking steps to address this issue, with a relatively high proportion of individuals, particularly young people aged 16–24, verifying the accuracy of online content. While there is still room for improvement, the findings indicate that Spain is making progress in promoting critical thinking and digital literacy, with a higher proportion of individuals engaging in fact-checking compared to the EU average.



In September 2024, the Spanish government presented the Action Plan for Democracy, which includes key tools to combat the spread of disinformation, fake news, and other misleading content. Measures include the creation of a media registry and a 'one-stop shop' to increase transparency regarding media ownership and advertising investments, the introduction of a Law on Journalistic Professional Secrecy, and EUR 100 million in funding to strengthen the media sector. Additional actions involve establishing a new commission on disinformation in the Congress of deputies and reforming electoral law to make electoral debates mandatory. The aim is to promote pluralism, transparency, and political party engagement in fighting disinformation.

On protecting the children online, special attention is also being given to protecting minors in the digital environment. In December 2024, the Ministry of Youth and Childhood presented the Report of the Committee of Experts for the Development of a Safe Digital Environment for Children and Adolescents, offering a detailed analysis and 107 proposed measures for government consideration. The Council of Ministers approved the first draft of the Organic Law for the Protection of Minors in Digital Environments, incorporating 35 of the proposed initiatives, such as age verification systems and parental controls. The remaining proposals will be reviewed for possible inclusion during the legislative

process or through separate initiatives. Additionally, a National Strategy will be launched to guarantee children's rights, promote safe internet use, and encourage their participation in decision-making.

Separately, the Ministry for Digital Transformation and Public Service, through Red.es, is collaborating with UNICEF, the University of Santiago de Compostela, and the General Council of Computer Engineering of Spain to conduct a study on the impact of technology on children and adolescents. This study includes a survey of 100 000 of students aged 10 to 20 across 500 schools and 5.000 surveys of teachers. The aim is to build strong evidence to guide public policies and educational strategies. Supported by a Scientific Committee of 45 internationally recognized experts, the study aspires to become a national and international benchmark for understanding and managing the digital challenges faced by younger generations.

According to the Digital Decade Eurobarometer 2025, 95% Spanish people think it should be urgent the action of the public authorities to protect children online regarding the negative impact of social media on children's mental health, cyberbullying and online harassment and to put in place age assurance mechanisms to restrict age-inappropriate content.

Increasing attention is being paid to the promotion of the Digital Rights and Principles. In 2023, Red.es launched a public invitation to partner with nonprofit organizations to promote and implement digital rights through awareness and action. As a result, in 2024, seven collaboration agreements were signed with over 40 nonprofit organisations, amounting to initiatives valued at EUR 10.8 million, 80% of which is funded by Red.es through RRF funds. These agreements aim to deepen understanding of digital rights, stimulate public debate, foster consensus, and engage civil society, academia, and public and private institutions. The activities involve cooperation with 175 organisations and research groups, as well as over 280 experts.

In February 2025, the Spanish Government launched the Digital Rights Observatory as a result of one of the aforementioned agreements. It is intended as an **open forum to raise awareness and promote digital rights at both national and international levels, including public outreach initiatives like events, surveys on public perception, and an AI-based digital rights monitoring platform**. The other six agreements support initiatives related to freedom, protection, and security in the digital world; equality and non-discrimination, including accessibility and child protection; digital participation rights such as freedom of expression and access to truthful information; labour and business-related digital rights; rights in specific areas like health, culture, data access, and public services; and rights in emerging digital environments like AI, the metaverse, and neurotechnology. In this context, the government had already announced in late 2024 the creation of NEUROTECH, a national centre in Madrid dedicated to applied neurotechnologies and the ethical use of brain-computer interfaces. These efforts help to build a network of experts and include reflection sessions, research studies, and stakeholder discussions. Since their launch, 147 reports, 98 events, and 15 seminars have been organized, covering topics like digital equality, neurotechnology, education, industry, AI, and more. There have also been in-depth reports on gender perspectives in the workplace, disinformation, online appointment systems, and electoral reform recommendations involving AI.

In line with its broader commitment to a secure and human-centric digital environment, Spain is incorporating post-quantum privacy and confidentiality of information as part of the Digital Rights reflection and advancing these considerations internationally in fora like the UNESCO or the OECD.

In line with that, Spain is also contributing to international efforts on the ethical governance of artificial intelligence. Through its active participation in global forums, including the United Nations Global Digital Compact and the Dialogue on the Governance on AI, the country supports the development of

governance frameworks that uphold democratic values, human rights, and inclusive innovation—seeking to ensure that the benefits of AI are shared broadly while mitigating cross-border risks.

The 2025 Eurobarometer shows that 82% 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. It represents an increase of three percentage points compared to last year and it is in line with the EU average (83%) that has also increased, reflecting the growing interest of the citizens at this respect.

Leveraging digital transformation for a smart greening

Spain is progressing in harnessing the digital and green transitions through several initiatives aimed at strengthening synergies.

Spain launched the **National Green Algorithms Programme** to promote the development of environmentally friendly AI algorithms. Its goal is to maximise energy efficiency and minimise the environmental impact of AI models, particularly during training and inference, thereby reducing carbon emissions. The programme follows a dual approach: 'Green in AI' focuses on eco-designing AI models, and 'Green by AI' which promotes sustainable solutions with a positive impact on key sectors for the green transition. It is structured around research in green AI through initiatives like the ENIA Chairs, including collaborations with UDC-Inditex and Siemens Energy to develop energy-efficient algorithms, sustainable robotics, and address the ethical and social implications of green algorithms. It also promotes the use of efficient infrastructures and services, currently under development through consulting and software services contracts. The integration of green AI into the production sector is supported through projects like advanced technologies for sustainable energy transition and AI applied to the agricultural production value chain, with a combined investment exceeding EUR 20 million. Furthermore, the Spanish market is being stimulated by activities such as hackathons focused on hydro predictive energy and biodiversity solutions using generative AI, emphasizing energy-efficient models trained on platforms and shared openly. The programme also involves developing tools and standards to measure energy consumption during AI training and inference, including collaborations with the Spanish Standardisation Agency and European working groups. Upgrades to government data centres are underway, aiming for a 45% energy saving, equivalent to preventing more than 10.000 tonnes of CO2 emissions annually.

To encourage the business adoption of green AI, voluntary certification schemes following the new national standards are being promoted, along with the creation of a green AI ecosystem involving academia, large enterprises, SMEs, and startups. Several webinars have been held and more are planned to increase awareness and collaboration around sustainable AI practices.

Under the **Sectoral Data Spaces Programme**, several projects have been selected to create data-sharing ecosystems focused on environmental protection and biodiversity. These include initiatives in marine science, wetlands conservation, plastic pollution mitigation, hydrological data management, and urban environmental sustainability, all aligned with the European Green Deal objectives.

The Spanish government has equipped over 140.000 public administration professionals with next-generation digital tools that enable remote work, helping to reduce emissions and support sustainable mobility. On plans to address the issue of planned obsolescence, the government will collaborate on incorporating Directive (EU) 2024/1799 into national law, which promotes the repairability of goods. The deadline for implementation is mid-2026, although it will not lead the process.

In the area of sustainable smart cities, the AENOR Technical Standardisation Committee CTN 178, promoted by the Secretariat of State for Telecommunications and Digital Infrastructures, is working to implement technological infrastructure that supports a new urban management model based on efficiency, sustainability, and resilience. The committee will develop and disseminate over 30 standards

covering areas such as energy efficiency, mobility, water management, city platforms, and smart destinations.

According to the Digital Decade Eurobarometer 2025, 76% Spanish people consider digital technologies important to help fight climate change (standing slightly above the EU average of 74% and showing an increment of four percentage points since last year), while 84% 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 80%).

2024 recommendation: 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.

Spain has made effort to address the recommendation through new policy actions in 2024:

As described above, the Spanish authorities have put in place several programmes to address the synergies between the digital and green transition, in particular, the Sectoral Data Spaces programme, where several projects have been selected to create data-sharing ecosystems focused on environmental protection and biodiversity.

2024 recommendation: 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.

Spain has made some effort to address the recommendation:

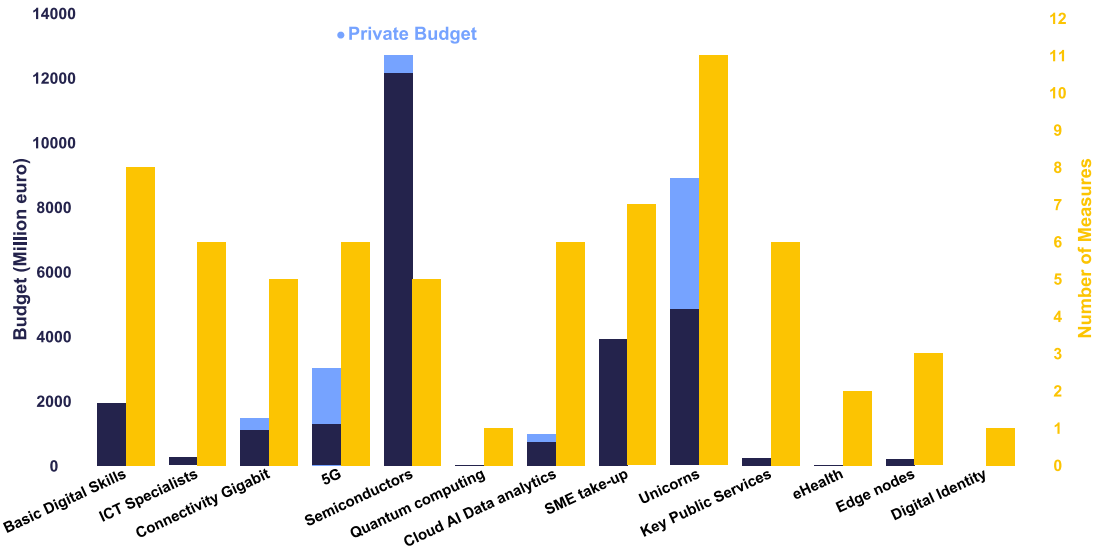
Although Spain has not put in place a system to monitor and quantify the emission reductions of the digital solutions deployed, the Spanish administration highlights the need for establishing key performance indicators and EU-wide objectives, agreed with Member States, to monitor and reduce the environmental footprint of the digital sector and infrastructures.

Annex I – National roadmap analysis

Spanish's national Digital Decade strategic roadmap

Spain did not submit an adjustment to its national Digital Decade roadmap. Spanish authorities expressed their intention to formally adjust the national roadmap, submitted in January 2024, in accordance with Article 8 (3) of the Decision establishing the Digital Decade Policy Programme, but in a later stage The initial roadmap is composed of 67 measures with a budget of EUR 33.8 billion, comprising EUR 26.7 billion from public budgets (equivalent to 1.68 % of GDP).However, Spain has worked on addressing the recommendations made in 2024, modifying existing measures and implementing new ones that will be integrated into a further roadmap adjustment. The Spanish authorities published the initial national roadmap in March 2025.

Measures and budget in national roadmap[9]



[9] When referring to national roadmaps, data used in this report are those declared by the Member States in their national roadmaps, on the basis of the Commission's guidance (C(2023) 4025 final). Data might reflect possible variations in reporting practices and methodological choices across Member States. No systematic assessment of the extent to which Member States followed the guidance was carried out.

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

MCP and EDICs

Spain is a member of the three established EDICs; the Alliance for Language Technologies EDIC, the Local Digital Twins towards the CitiVERSE EDIC and of the EUROPEUM EDIC. Spain is a candidate host to an EDIC in the making in the area of cancer imaging and is also working towards setting up EIDCs in the area of genomics and mobility and logistics. Moreover, Spain is actively promoting the transformation of the Europe Startup Nations Alliance (ESNA) into an EDIC, aiming to reinforce coordinated support for startup-friendly policies across the EU. Spain is directly participating in the IPCEI on Microelectronics and Communication Technologies (IPCEI-ME/CT) and in the IPCEI on Next Generation Cloud Infrastructure and Services (IPCEI-CIS). Spain is also a participating state of the EuroHPC Joint Undertaking (JU) and of the Chips JU.

Spain has contributed to the Best Practice Accelerator[10] by sharing one best practice under the Digital Skills cluster (The Generation D Pact was launched in November 2022).

EU funding for digital policies in Spain

Spain allocates 26% of its total recovery and resilience plan to digital (EUR 40.4 billion)[11]. In addition, under cohesion policy, EUR 5.0 billion (representing 14% of the country's total cohesion policy funding), is dedicated to advancing Spain's digital transformation[12]. According to JRC estimates, EUR 42.8 billion directly contribute to achieving Digital Decade targets (of which EUR 39.4 billion comes from the RRF and EUR 3.4 billion from cohesion policy funding)[13].

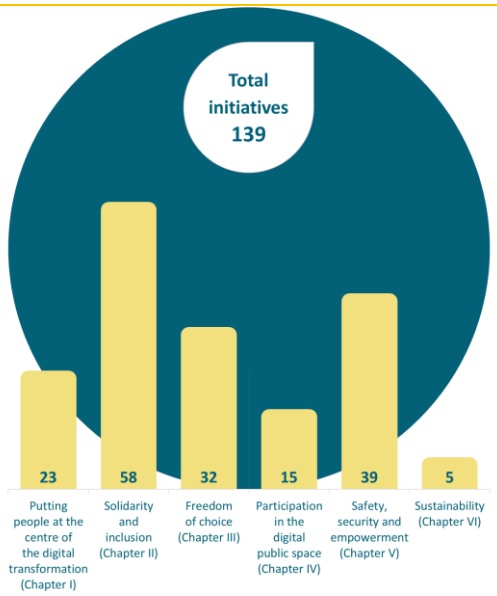
[10] Best Practice Accelerator (BPA) is a platform that enables Member States to share successful measures and challenges encountered in their efforts to meet their Digital Decade targets and objectives. Best practices are made available to Member States via the BPA Repository and showcased in regular workshops, currently focused on three thematic clusters: Digital Skills, Green IT, and the Uptake of Digital Technologies.

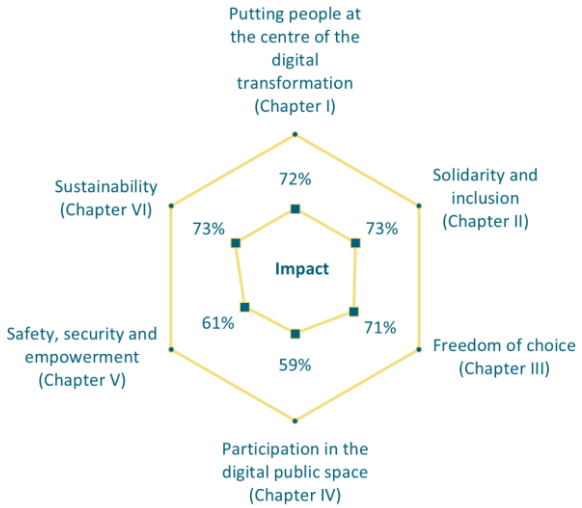
[11] The share of financial allocations that contribute to digital objectives has been calculated using Annex VII to the Recovery and Resilience Facility Regulation. Last data update: 16 May 2025.

[12] 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.

[13] Joint Research Centre, Nepelski, D. and Torrecillas, J. Mapping EU level funding instruments 2021-2027 to Digital Decade targets – 2025 update, Publications Office of the European Union, Luxembourg, 2025, JRC141966. Last data update: 10 March 2025.

Annex III – Digital Rights and Principles[14]





Activity on Digital Rights and Principles (figure 1)

Spain has been one of the most active Member States in implementing digital rights and principles, with over 100 initiatives overall and 30 new initiatives launched in 2024, showing significant progress towards its commitments. Spain is most active in the area of Digital education, training and skills (II), however, less activity has been identified regarding Sustainability (VI).

Impact of Digital Rights Initiatives (figure 2)

Quantitative impact indicators developed by the support study illustrate the level of implementation of digital rights initiatives on the ground. Based on available data, they estimate the impact of measures implemented by key stakeholders in Spain (mainly national government) and how these are perceived by citizens.

The indicators suggest that Spain is most successful in implementing commitments related to Solidarity and inclusion (II). However, the country could review and strengthen efforts in areas where the impact of digital rights initiatives appears to be limited despite relative activity, notably on Participation in the digital public space (IV).

According to the Special Eurobarometer on the 'Digital Decade' 2025, 40% of citizens in Spain think that the EU protects their digital rights well (a 4% increase since 2024). This is below the EU average of 44%. Citizens are particularly confident about getting an affordable high-speed internet connection for everyone in the EU and getting basic and advanced digital education, training and skills (62%, above the EU average of 57% and 60% respectively). They are most worried that their right to a safe digital environment and content for children and young people is not well protected (53%, above the EU average of 48%).

[14] Based on a study to support the Monitoring of the Implementation of the Declaration on Digital Rights and Principles, available here. For a more detailed country factsheet accompanying the study, click here.