



# Digital Economy and Society Index (DESI) 2022

**Spain**

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## About the DESI

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*Since 2014, the European Commission has monitored Member States' progress in digital and published annual Digital Economy and Society Index (DESI) reports. Each year, the reports include country profiles, which help Member States identify areas for priority action, and thematic chapters providing an EU-level analysis in the key digital policy areas. The DESI Index ranks Member States according to their level of digitalisation and analyses their relative progress over the last five years, considering their starting point.*

*The Commission has adjusted DESI to align it with the four cardinal points set out in the Commission proposal for a decision '[Path to the Digital Decade Policy Programme](#)' which is being negotiated by the European Parliament and the Council. The proposal sets targets at EU level to be reached by 2030 to deliver a comprehensive and sustainable digital transformation across all sectors of the economy. Of the DESI 2022 indicators, 11 measure targets set in the Digital Decade. In the future, the DESI will be aligned even more closely with the Digital Decade to ensure that all targets are discussed in the reports.*

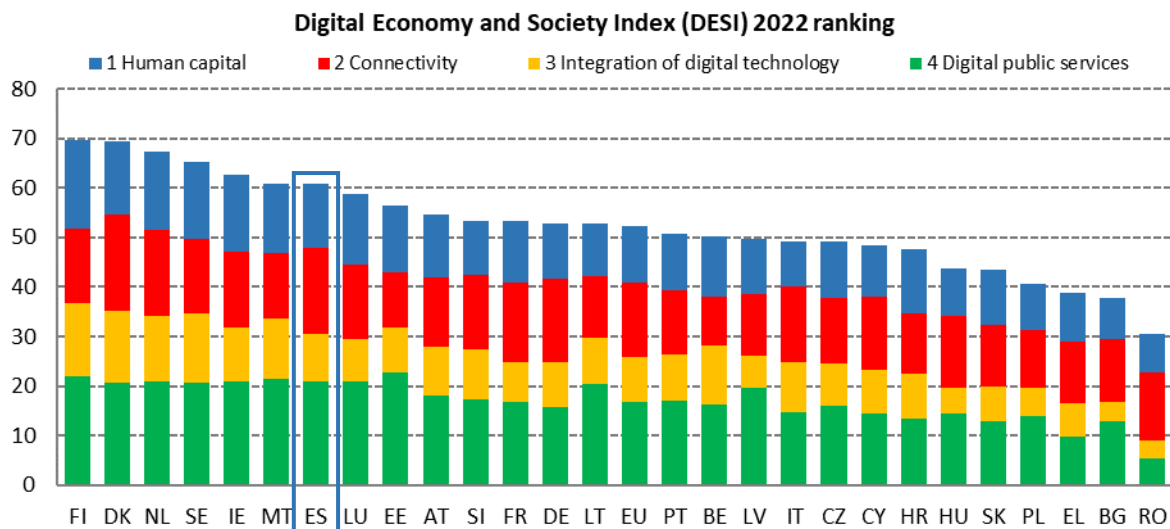
*To date, digitalisation in the EU is uneven, although there are signs of convergence. While the frontrunners have remained unchanged, there is a substantial group of Member States that cluster around the EU average. Importantly, the majority of Member States that had a lower level of digitalisation 5 years ago, are progressing at a faster pace than the rest, indicating an overall convergence in digital in the EU.*

*Reaching the Digital Decade targets depends on a collective effort by all. Each Member State will contribute to this ambitious goal from a different starting point, determined by resources, comparative advantages and other relevant factors such as the population size, the scale of the economy and the areas of specialisation. For example, Member States with large economies or populations will need to perform well to enable Europe as a whole to reach the targets by 2030. Digital frontrunners will need to continue progressing to lead on digitalisation worldwide, while all Member States' digitalisation efforts will be driven by their economic and societal needs.*

*The DESI scores and rankings of previous years are re-calculated for all Member States to reflect changes in the underlying data. For further information, see the [DESI website](#).*

## Overview

DESI 2022	Spain		EU
	rank	score	score
	7	60.8	52.3



Spain ranks 7<sup>th</sup> of 27 EU Member States in the 2022 edition of the Digital Economy and Society Index (DESI). The country is making relative progress<sup>1</sup> and overperforming versus previous years, especially on integration of digital technology (ranking 11<sup>th</sup>, 5 positions above 2021), and also on digital public services (5<sup>th</sup> compared to the 7<sup>th</sup> place in 2021) and human capital (10<sup>th</sup> compared to 12<sup>th</sup>). Spain is an EU leader in connectivity and ranks 3<sup>rd</sup> for the second consecutive year.

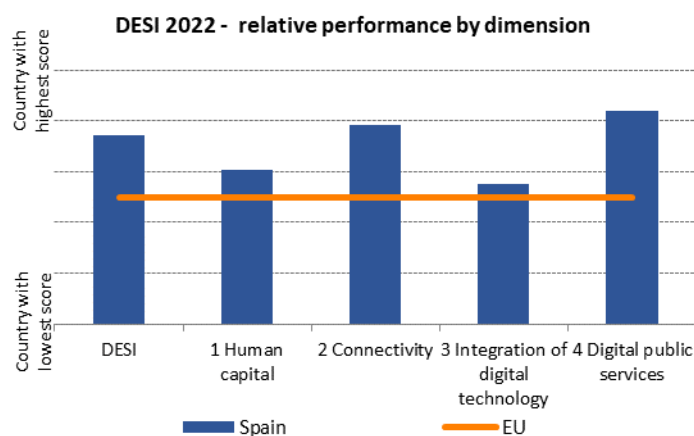
On the human capital dimension, Spain is a relatively good performer on basic digital skills whereas it is below the EU average as regards the proportion of ICT specialists and of ICT graduates. The rate of people in Spain having at least basic digital skills is above the EU average (64% compared to 54%) and has significantly increased during the last years. The number of ICT specialists in employment in Spain is 4.1% compared to the EU average of 4.5%. The shortage of advanced digital experts hampers the country's growth prospects and constrains productivity, especially for small and medium-sized enterprises (SMEs) and micro-enterprises. Several measures outlined in [Spain's Recovery and Resilience Plan](#) (RRP) support the acquisition of digital skills, especially for employees of SMEs. Those measures, together with other technology-specific initiatives such as for cybersecurity or artificial intelligence (AI), are expected to reduce the labour market gap for ICT specialists as well as the ICT gender gap.

On digital connectivity, Spain is one of the top EU performers. It continues its steady progress in the roll-out of very high capacity networks (VHCN) and is pursuing strategic reforms and investments under the Recovery and Resilience Facility (RRF) to help achieve the Digital Decade connectivity targets and reduce the digital gap between urban and rural areas.

<sup>1</sup> Refer to section 1.3 of the DESI 2022 horizontal chapter.

On integration of digital technologies, the percentage of SMEs with a basic level of digital intensity and using social media is above the EU average. But Spain's enterprises are still lagging behind on new and advanced technologies such as cloud or big data. The lack of a critical mass of digitally-trained workers hinders the integration of digital technologies into Spain's enterprises in general, and SMEs and micro-enterprises in particular, who need digital-skilled professionals to develop further and become more competitive in the digital economy. The [SME Digitalisation Plan 2021-2025](#) will help boost disruptive innovations and entrepreneurship in digital fields, together with other relevant policies and strategies already in place (e.g. Spain Entrepreneurial Nation and the [Digital Rights Charter](#)) or under development (e.g. the [Start-ups Law](#)).

On digital public services, Spain has traditionally been a front-runner and it continues to put in place new services and infrastructures to respond to the rapid development of technology and to people's needs. Spain is committed to modernise its public administration in order to make it more accessible for enterprises and the public. It proactively develops new digital services, particularly in the areas of health, digital identification, cybersecurity, mobile apps and integrating AI into the public sector.



Following Russia's invasion of Ukraine, Spain adopted a [national response plan](#) setting out urgent measures (e.g., updated and strengthened the national cybersecurity strategy, and the adoption of measures aligned with EU recommendations to secure 5G deployment). Several important communication campaigns have been put in place to promote cybersecurity awareness and combat disinformation. One campaign was also launched to help people fleeing Ukraine to Spain. In addition, Spain adopted the measures set out in the [Council Decision \(CFSP\) 2022/351](#) concerning restrictive measures in view of Russia's actions destabilising the situation in Ukraine.

#### Digital in Spain's Recovery and Resilience Plan (RRP)

Spain's RRP is one of the largest and most ambitious on digital, devoting 28.2%<sup>2</sup> of the total allocation to digital (EUR 19.6 billion). Particular focus is given to digitalising businesses, including SMEs (25% of the total digital budget), strengthening the digital skills of people across Spain

<sup>2</sup> Each Recovery and Resilience Plan has to dedicate at least 20% of the plan's total allocation to digital objectives. To this end, the plans had to specify and justify to what extent each measure contributes fully (100%), partly (40%) or has no impact (0%) on digital objectives, using Annex VII of the RRF Regulation. Combining the coefficients with the cost estimates of each measure allows assessing to what degree the plan contributes to digital objectives and whether it meets the 20% target.

(22%), improving digital connectivity across the country's territory (15%), continuing the digitalisation of the public services (28%), and supporting digital-related R&D and the deployment of digital technologies (10%).

Most of the milestones and targets satisfactory fulfilled by the end of 2021 concerned major reforms and strategies to facilitate the digital transition of Spain's economy and society. Notably, Spain adopted the [Digital Spain 2025 strategy](#); the [National Digital Competences Plan](#); the [strategy for the promotion of 5G technology](#); the SME Digitalisation Plan [2021-2025](#); and the [national AI strategy](#).

In 2022, relevant policy developments will include the new Law on Telecommunications that will transpose into national law the EU Directive establishing the [European Electronic Communications Code](#), as well as the Law on 5G cybersecurity .

## 1 Human capital

1 Human capital	Spain		EU
	rank	score	score
DESI 2022	10	51.3	45.7

	Spain			EU
	DESI 2020	DESI 2021	DESI 2022	DESI 2022
<b>1a1 At least basic digital skills</b> % individuals	NA	NA	64% 2021	54% 2021
<b>1a2 Above basic digital skills</b> % individuals	NA	NA	38% 2021	26% 2021
<b>1a3 At least basic digital content creation skills<sup>3</sup></b> % individuals	NA	NA	74% 2021	66% 2021
<b>1b1 ICT specialists</b> % individuals in employment aged 15-74	3.7% 2019	3.9% 2020	4.1% 2021	4.5% 2021
<b>1b2 Female ICT specialists</b> % ICT specialists	19% 2019	19% 2020	19% 2021	19% 2021
<b>1b3 Enterprises providing ICT training</b> % enterprises	22% 2019	20% 2020	20% 2020	20% 2020
<b>1b4 ICT graduates</b> % graduates	3.9% 2018	4.2% 2019	4.0% 2020	3.9% 2020

On human capital, Spain ranks 10<sup>th</sup> among the 27 EU countries, slightly above the EU average (45,7%). 64% of the people in Spain have at least basic digital skills, above the EU average (54%) but still far from the [Digital Decade target](#) of 80% of the European population with at least basic digital skills by 2030. The country also performs above the EU average on the above basic digital skills and at least basic digital content creation skills indicators (38% and 74%, respectively). Despite a slight increase of ICT specialists in recent years, Spain still performs well below the EU average (4.1% compared to 4.5%). This shortage of ICT specialists hampers productivity, especially for SMEs. The gender divide is still significant, as female ICT specialists account for 19% of the total number of ICT specialists in Spain, in line with the EU average (19%). The percentage of enterprises providing ICT training has not changed over the last 2 years, standing at the same level as the EU average of 20%, and the share of ICT graduates decreased from 4.2% in 2019 to 4% in 2020 (surpassing the EU average of 3.9%).

One of the 10 objectives of the [Digital Spain 2025](#) strategy is to strengthen the digital skills of people across Spain by 2025, with particular focus on workers. Under this strategy Spain adopted the [National Digital Competences Plan](#) in January 2021 to promote digital skills development of people in Spain, but particularly for workers and ICT specialists. This plan is aligned with the Digital Decade targets of 80% of the EU population with basic skills and 20 million ICT specialists employed, half of whom are women, by 2030.

To contribute to these targets, the National Digital Competences Plan sets out several measures under seven action lines: 1) digital skills training, with special emphasis on population groups at risk of digital exclusion; 2) bridging the digital gender divide; 3) digitalising the education system and developing digital skills for learning; 4) digital skills training throughout working life (focusing on the working

<sup>3</sup> Break in series for indicators 1a1, 1a2 and 1a3. Figures are not comparable with those in earlier DESI reports.

population in the private sector and the unemployed); 5) digital skills training for public sector workers; 6) digital skills training for SMEs; and 7) increasing the supply of ICT specialists (via vocational training and university education). The entire Component 19 (EUR 3.59 billion) is dedicated to digital skills, but part of 5 other components also support the acquisition of digital skills. Digital skills training will be also funded under the [Multiannual Financial Framework 2021-2027](#), in particular through the [European Social Fund](#) (ESF) and the [Digital Europe Programme](#) (DIGITAL).

In addition, the [Educa en Digital](#) programme that started in the 2020/2021 academic year aims at closing the existing gaps in schools on access to technologies by increasing the quality of digital tools and providing teachers with training on digital. This programme (budget: EUR 230 million) will provide the 17 autonomous communities and 2 autonomous cities with around 500 000 electronic devices for educational use, including software, security features and internet connection, to be distributed among vulnerable pupils. The programme also includes assistance platforms for teachers, students and educational authorities through an application of AI.

Although coding and digital skills are not mandatory at school, the Ministry of Education updated the school curricula to introduce digital skills training and programming from earliest ages. Moreover, the Ministry of Education and the autonomous communities are working on the [School of Education and Artificial Intelligence](#) project. This project aims to provide teachers in Spain with open educational resources and training that they can incorporate into their teaching practice through programming and robotics activities. In the 2021 edition of [Code Week](#), 953 events took place across Spain, most of them in schools, attracting 86 708 participants, 48% of whom were girls.

The [Spanish Coalition of digital skills and jobs](#) is coordinated by AMETIC, the business association of the digital industry. The coalition gathers 200 stakeholders (companies, public administrations, training centres and universities) actively involved in promoting digital skills and closing the gap between the supply and demand side of ICT specialist in Spain. Many stakeholders are also members of the the Digital Skills Hub, recently created under the National Digital Competences Plan to support the government in designing and monitoring digital skills policies.

In 2021, the National Institute of Cybersecurity (INCIBE) organised the second edition of the [Academia Hacker](#) (with over 2 500 participants) to promote learning and technical skills in cybersecurity. Nearly 10 000 participants have already benefited from this programme so far. In February 2022, INCIBE presented the [Cybersecurity Talent Diagnostic](#) to align actions with market demands on ICT specialists.

Significant skills mismatches in enterprises' workforce, especially in SMEs and micro-enterprises, inhibits the ability of Spanish enterprises to innovate and benefit from advanced technologies. Increasing the number of ICT specialists in Spain, closing the gender gap and reskilling the labour force are extremely important if Spain is to take full advantage of the digital economy and increase its contribution to the Digital Decade targets.

## 2 Connectivity

2 Connectivity	Spain		EU
	rank	score	score
DESI 2022	3	69.7	59.9

	Spain			EU
	DESI 2020	DESI 2021	DESI 2022	DESI 2022
<b>2a1 Overall fixed broadband take-up</b> % households	78%	82%	83%	78%
<b>2a2 At least 100 Mbps fixed broadband take-up</b> % households	53%	65%	72%	41%
<b>2a3 At least 1 Gbps take-up</b> % households	<0.01%	<0.01%	0.02%	7.58%
<b>2b1 Fast broadband (NGA) coverage</b> % households	90%	92%	94%	90%
<b>2b2 Fixed Very High Capacity Network (VHCN) coverage</b> % households	89%	92%	94%	70%
<b>2b3 Fibre to the Premises (FTTP) coverage</b> % households	80%	85%	89%	50%
<b>2c1 5G spectrum</b> Assigned spectrum as a % of total harmonised 5G spectrum	30%	65%	65%	56%
<b>2c2 5G coverage<sup>4</sup></b> % populated areas	NA	13%	59%	66%
<b>2c3 Mobile broadband take-up</b> % individuals	85%	85%	94%	87%
<b>2d1 Broadband price index</b> Score (0-100)	52	73	83	73

Spain is one of the EU's top performers on digital connectivity, ranking 3<sup>rd</sup> among the EU Member States. Spain performs particularly well in fixed very high capacity network (VHCN) coverage (94% compared to an EU average of 70%), while being only a mid-performer on 5G coverage, mainly due to some delay in auctioning all 5G pioneer bands. However, the auction of the 700 MHz band ended in July 2021 and the 26 GHz band is expected to be auctioned by the end of 2022. This, along with a wide range of measures outlined in Component 15 of Spain's RRP, should lead to a rapid increase in 5G coverage.

Spain is making progress towards achieving the 2025 gigabit targets and the [Digital Decade connectivity targets](#) for 2030 (i.e., gigabit for everyone and 5G everywhere). Fixed VHCN coverage is still increasing (by 2 percentage points since the previous year) as persistent gaps between urban and rural areas are starting to close (71.5% of VHCN coverage in rural areas, up from 64.2% the previous year). In this context, Spain launched the Universalisation of Digital Infrastructures for Cohesion ([ÚNICO-Banda Ancha](#)) programme in 2021, with the aim of providing fixed broadband networks offering symmetric 300 Mbps speeds, upgradeable to 1 Gbps, to the premises located in rural, remote

<sup>4</sup> The 5G coverage indicator does not measure users' experience, which may be affected by a variety of factors such as the type of device used, environmental conditions, number of concurrent users and network capacity. 5G coverage refers to the percentage of populated areas covered by at least one operator as reported by operators and national regulatory authorities.



and less populated areas. The first call in 2021 should allow these networks to reach 1.2 million premises and another call is planned for 2022 (the programme is financed under the Spanish RRP).

5G spectrum and 5G coverage increased dramatically in 2021 and is expected continue to increase rapidly within the next 3 years. The [auction of the 700 MHz band](#) was completed on 21 July 2021, becoming the second of the pioneer bands to be auctioned in Spain after the 3.6 - 3.8 GHz band in 2018 (the *refarming* of this band to allow operators to use larger contiguous amount of spectrum was completed in February 2022). Spain also launched a [public consultation](#) in December 2021 to assess market interest in the third 5G pioneer band, the 26 GHz band. The auction for this pioneer band is expected to take place in the second half of 2022. Its assignment, along with the coverage obligations imposed on operators with rights of use in the 700 MHz band ([Telefónica, Orange and Vodafone](#)) in municipalities, major airports, ports, train stations and roads (to be fulfilled between 2022 and 2025), should contribute to the rapid increase of 5G readiness and coverage.

The national roadmap for the implementation of the [Connectivity Toolbox](#) sets out 30 measures to improve the rollout of fixed and mobile VHCN while helping network operators to reduce the costs of deployment. The roadmap, was launched on 30 April 2021, but some of the measures are still in the development phase. Rapidly implementing these measures would enable a speedy and efficient deployment of 5G and VHC networks.

The take-up of fixed broadband (83%) is steadily increasing, especially the at-least 100 Mbps fixed broadband (72%), with Spain scoring well above the EU average on both indicators (78% and 41%, respectively). A high degree of market competition and relatively low prices facilitated significant broadband take-up in the previous years, especially during the COVID-19 pandemic and due to an increased demand for broadband products (mostly bundled) and pay-TV services (both IPTV and OTT). To stimulate further broadband take-up, Spain's RRP includes a EUR 30 million project, which will provide connectivity vouchers temporarily to vulnerable groups ([Royal-Decree 989/2021](#)). High degree of VHCN coverage was achieved mainly through private investment so far. Public funding, mainly RRF funding, is now earmarked for the deployment of 5G and VHC networks, especially in rural areas, in case market failures on unmet users' needs are proved. The market's consolidation continued in 2021 through mergers (the fourth Spanish operator MásMóvil launched a takeover bid for Euskaltel). In March 2022, Orange and MásMóvil announced the start of [exclusive discussions to create a 50/50 joint venture](#).

### Main market & regulatory developments

Telefónica, Orange and Vodafone maintain their significant, albeit steadily decreasing, market share in the fixed broadband market (79% in Q2 2021, almost 4 percentage points less than the previous year). MásMóvil, the fourth largest national operator, acquired Euskaltel in 2021 (the merger was cleared by Spain's national regulatory authority Comisión Nacional de los Mercados y la Competencia (CNMC) on 16 June and approved by the government on 22 June).

Market competition in Spain is very intense. Low-cost operators, such as MásMóvil and Digi (through its new low-cost brand Virgin Telco) remain very active, and the three main operators pursue a multi-brand retail strategy, offering 4P and 5P bundles<sup>5</sup> not only to the high-end segment but also to the low-end segment through their secondary brands. Convergent bundles continue to be the most common way of selling fixed broadband services, accounting for up to 13.6 million lines (almost 85%

<sup>5</sup> This category includes 4 Play (fixed and mobile telephony and broadband) and 5 Play (4P plus pay TV)

of the total active broadband lines). 4P and 5P remain the most common type of bundles (41% and 37% respectively).

On pay-TV, sports (especially football), premium series, and films, are the key drivers but only Telefónica (owner of La Liga broadcasting rights in Spain) and Orange provide football content. The remedies CNMC introduced to the merger between Telefónica and DTS in 2015 are set to expire in 2023. In December 2021 DAZN acquired 45% of LaLiga rights from season 2022/23 until 2026/27. Telefónica owns the rest of those rights and will also broadcast DAZN's games (agreed in March 2022). OTTs' market share (streaming services) is steadily growing, and more than a half of Spanish households (53%) are subscribed to at least one OTT pay-TV service.

In October 2021, CNMC increased from 66 to 696 the number of municipalities it considered to be "competitive zones" (covering around 70% of Spain's population), meaning that Telefónica is no longer obliged to provide access to its fibre network in this areas. CNMC also reviewed the prices of Telefónica's reference offer for wholesale access to physical infrastructure (a 20% reduction in monthly fees and a 13.7% increase in non-recurring fees due to increased labour costs).

The copper switch-off process is still ongoing. The number of decommissioned copper exchanges increased from 476 to 1 010 (since the first closures in 2015), out of 2 990 exchanges scheduled. In January 2022, it was announced that Telefónica sold part of its copper to Macquarie (the largest shareholder of Spain's wholesale operator Onivia). In February 2022, Telefónica announced that it is acquiring (pending regulatory and competition approval) together with Pontegadea (the real estate arm of Inditex's chairman Amancio Ortega) KKR's 40% stake in the infrastructure group Telxius Telecom (specialised in submarine cables). This [transaction](#) will increase Telefónica and Pontegadea's stake in the group to 70% and 30%, respectively.

In November 2021, the Council of Ministers approved the draft General Law on Telecommunications, which was sent to the Parliament for approval. The government expects the law to be approved by the second quarter of 2022.

In July 2021, Spain launched a [public consultation](#) on the draft Royal Decree regulating emergency communications. The Decree aims to align national rules with the European Electronic Communications Code (EECC) and implement the advance mobile location (AML) system.

In March 2022, Spain approved the [Royal Decree-Law 7/2022](#) setting up requirements to guarantee the security of 5G electronic communications networks and services.

Spain continues to make steady progress on the roll-out of VHCNs and is pursuing strategic reforms and investments under the RRF that should help it to achieve the Digital Decade connectivity targets and reduce the gap between urban and rural areas. The major stimulus that Spain is introducing in market failure areas, both on the supply and demand side, together with its transposition of the EECC, is expected to foster the necessary pro-investment conditions, facilitating speedy and more efficient deployment of 5G and VHC networks, and meeting the Digital Decade connectivity targets.

#### **Highlight: 5G spectrum assignment and 5G regulatory framework**

Following the adoption of Spain's 2020's [strategy for the promotion of 5G technology](#), in October 2021, Spain assigned the 700 MHz band by [Order ETD/1141/2021](#). Now two of the three 5G

pioneer bands have been already assigned and the 26 GHz band is expected to be actioned in Q3 2022.

Satisfactory progress on the assignment of the 5G pioneer bands and the implementation of the connectivity toolbox, is helping to create the favourable conditions for an effective development of the fifth-generation ecosystem that will help people in Spain and enterprises to benefit further from the digital economy. The adoption of the new law on Telecommunications (transposing the EECC) and the law on 5G Cybersecurity (incorporating the 5G cybersecurity toolbox), expected by Q2 2022 and Q3 2022 respectively, will help consolidate this process.

## 3 Integration of digital technology

3 Integration of digital technology	Spain		EU
	rank	score	score
<b>DESI 2022</b>	<b>11</b>	<b>38.5</b>	<b>36.1</b>

	Spain			EU
	DESI 2020	DESI 2021	DESI 2022	DESI 2022
<b>3a1 SMEs with at least a basic level of digital intensity</b> % SMEs	NA	NA	60%	55%
			2021	2021
<b>3b1 Electronic information sharing</b> % enterprises	43%	43%	49%	38%
	2019	2019	2021	2021
<b>3b2 Social media</b> % enterprises	29%	29%	39%	29%
	2019	2019	2021	2021
<b>3b3 Big data</b> % enterprises	11%	9%	9%	14%
	2018	2020	2020	2020
<b>3b4 Cloud</b> % enterprises	NA	NA	27%	34%
			2021	2021
<b>3b5 AI</b> % enterprises	NA	NA	8%	8%
			2021	2021
<b>3b6 ICT for environmental sustainability</b> % enterprises having medium/high intensity of green action through ICT	NA	76%	76%	66%
		2021	2021	2021
<b>3b7 e-Invoices</b> % enterprises	33%	33%	33%	32%
	2018	2020	2020	2020
<b>3c1 SMEs selling online</b> % SMEs	19%	24%	25%	18%
	2019	2020	2021	2021
<b>3c2 e-Commerce turnover</b> % SME turnover	9%	10%	9%	12%
	2019	2020	2021	2021
<b>3c3 Selling online cross-border</b> % SMEs	7%	7%	9%	9%
	2019	2019	2021	2021

On integration of digital technologies by businesses, Spain ranks 11<sup>th</sup>, just above the EU average. Spain performs well on some indicators, especially on SMEs with at least a basic level of digital intensity (60% compared to an EU average of 55%), electronic information sharing (49% of enterprises compared to an EU average of 38%), and ICT for environmental sustainability (76% compared to 66%). Uptake is lower for certain advanced technologies, such as big data (9%) and cloud (27%), whereas Spain's performance on AI is in line with the EU average (8%). Spanish enterprises are rapidly increasing their social media presence (39% of enterprises in 2021, up from 29% the previous year), and the share of SMEs selling online is well above the EU average (25% compared to 18%). By contrast, SMEs' e-commerce turnover dropped by 1 percentage point to 9% (EU average: 12%). On e-invoices, Spain's score stagnates at 33% but it is expected to overperform rapidly as e-invoicing will be compulsory for all Spanish enterprises with more than EUR 8 million annual turnover by the end of Q3 2022.

Under [Spain Digital 2025](#) strategy (adopted in July 2020), the [SMEs Digitalisation Plan 2021-2025](#) (adopted in January 2021) sets out a wide range of measures to boost the digital transformation of enterprises, particularly SMEs, micro-enterprises and the self-employed. Most of the measures are being developed or are in the implementation phase.

On digital innovation for SMEs, Spain's RRP includes the provision of digital tools and other measures under Component 13. These includes the Digital Toolkit initiative, renamed as Kit Digital (budget: EUR 3 067 million) and "Agents of Change" programme (budget: EUR 300 million), which are expected to begin in 2022. Both will be entirely financed under the RRF, with at least 30% of their budgets committed in 2022. The Kit Digital approved by [Orden ETD/1498/2021](#) promotes scalable, high-impact, and public-private collaboration mechanisms to accelerate the digitalisation of more than 1 million SMEs, especially micro-enterprises and the self-employed. The Agents of Change programme focuses on providing SMEs with grants to hire digital transformation experts.

The SME Digitalization Plan 2021-2025 sets out some measures expected to be carried out in 2021-2023 that will enhance innovative business clusters and digital innovation hubs. Spain confirmed its participation in the multi-country project for the [EU-wide network of European Digital Innovation Hubs](#) (EDIHs) and under its RRP up to 25 Digital Innovation Hubs (DIH) will receive financial support. The selection of Digital Innovation Hubs that will participate in the network of EDIHs is ongoing. Twelve Spanish European Digital Innovation Hub proposals have a successful evaluation result<sup>6</sup> and eleven additional proposals have received a Seal of Excellence.

Spain continues to develop its digital regulatory framework. In July 2021, it published its [Digital Rights Charter](#), which seeks to guarantee the same rights online as those that already exist offline. In December 2021, the government also approved the bill for the [Start-ups Law](#) that is currently under parliamentary discussion. Its objective is to boost the number of 'unicorns' in Spain by streamlining requirements and providing considerable tax incentives. This law, together with [Spain Entrepreneurial Nation](#) strategy published in 2021, intends to support start-ups.

Spain participates in the [Important Projects of Common European Interest \(IPCEI\) on Microelectronics](#) that aim to increase the EU's capabilities in electronics design and help deploy the next generation of trusted processors and other electronic components. Such capabilities would enable the EU to meet the target of 20% world production value in semiconductors. It would also ensure broader EU autonomy in critical digital infrastructures and less dependence on non-EU countries.

On edge computing, Spain participates in the [IPCEI Next Generation Cloud Infrastructure and Services](#) initiative, which aims to secure competitive, fair, trustworthy and sustainable access to cloud and edge capabilities from anywhere in the EU. This would help the EU meet its target of deploying at least 10 000 climate-neutral, highly secure edge nodes. Under the initiative, Spain launched the [Gaia-X national hub](#) to create and coordinate the data-sharing ecosystem and to help enterprises solve business problems and create value in the data economy. To date, 5 working groups have been set up in the areas of tourism, health, mobility, agri-food, and industry 4.0, and two more will be set up in 2022 in the areas of environment and energy.

In 2021 Spain launched [Quantum Spain](#), a project aimed to create a quantum computing ecosystem and develop the first high-performance quantum computer in Spain. Planned measures cover space secure communications (aligned with the EuroQCI guidelines) due by Q4 2025. Although Spain has shown interest in the EuroQCI multi-country project, it has not yet confirmed its involvement.

Spain is also very proactive on AI, which supports the country's contribution to the Digital Decade target of 75% of EU enterprises using AI. Under the [National AI Strategy](#) presented by Spain in December 2020, measures to support the development and uptake of AI include the programmes: 1) elements of AI MOOC (i.e., massive open online course); 2) missions in AI; 3) University Chairs in AI; 4)

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<sup>6</sup> i.e. are invited for grant agreement preparation (which is not a formal commitment for funding).

trust environment in AI; 5) use of AI in public administrations; 6) AI and data in management of grants and subsidies; and 7) Spanish Agency for the Supervision of AI.

Spain plays an active role in the [European Blockchain Partnership](#), where it coordinates the working groups on: 1) technical governance; 2) European sovereign digital identity (ESSIF); and 3) diplomas. Under the CEF Telecom Blockchain programme, a Spanish project was awarded to promote [European Blockchain Services Infrastructure](#) use cases on credentials in official and non-official diplomas. As part of the [Early Adopters Programme](#), Spain is working on the use case for sovereign identity and diplomas and will present the results in June 2022. The National Institute of Cybersecurity (INCIBE) is very active in raising awareness on cybersecurity among the public, enterprises, and other stakeholders. In 2021 it launched more than 350 marketing campaigns, targeted to citizens, minors, and SMEs, as well as other institutional campaigns).

Spain will host the MareNostrum 5 supercomputer (located in Barcelona's Supercomputing Centre), which is funded by the EuroHPC Joint Undertaking. Spain is also an active member of the European Cloud Federation initiative, which promote an Iberian space with Portugal and should stimulate the development of advanced data computing technologies, especially in high-performance computing.

There is room for Spanish enterprises to benefit further from digitalisation and new technologies, especially SMEs and micro-enterprises. Integrating advanced technologies could help Spanish enterprises improve productivity, scalability, and reach new markets.

## 4 Digital public services

4 Digital public services <sup>7</sup>	Spain		EU
	rank	score	score
<b>DESI 2022</b>	<b>5</b>	<b>83.5</b>	<b>67.3</b>

	Spain			EU
	DESI 2020	DESI 2021	DESI 2022	DESI 2022
<b>4a1 e-Government users</b> % internet users	<b>63%</b> 2019	<b>67%</b> 2020	<b>73%</b> 2021	<b>65%</b> 2021
<b>4a2 Pre-filled forms</b> Score (0 to 100)	<b>NA</b>	<b>NA</b>	<b>78</b> 2021	<b>64</b> 2021
<b>4a3 Digital public services for citizens</b> Score (0 to 100)	<b>NA</b>	<b>NA</b>	<b>87</b> 2021	<b>75</b> 2021
<b>4a4 Digital public services for businesses</b> Score (0 to 100)	<b>NA</b>	<b>NA</b>	<b>94</b> 2021	<b>82</b> 2021
<b>4a5 Open data</b> % maximum score	<b>NA</b>	<b>NA</b>	<b>95%</b> 2021	<b>81%</b> 2021

On digital public services, Spain ranks 5<sup>th</sup>, performing above the EU average for all indicators. The number of internet users that actively engage with e-government services has increased considerably (from 67% in 2020 to 73% in 2021) and is well above the EU average (65%). On pre-filled, Spain shows a relatively high degree of reuse of information across administrations, scoring considerably above the EU average (78 versus 64). Spain also performs well on digital public services for citizens (87), significantly above the EU average (75); businesses (94 points versus 82); and open data (95% versus 81%).

The Digital Spain 2025 strategy embeds the digitalisation of public administration, particularly in the areas of employment, justice (developed through the [Justice 2030](#) plan) and social policies, into its 10-pillar digital agenda. The [Plan for the Digitalisation of Spain's Public Administration 2021-2025](#) develops the digital agenda further, setting out measures on: 1) digital transformation of the State administration; 2) high-impact projects for the public sector digitalisation and trust; 3) the digital transformation and modernisation of the Ministry of Territorial Policy and Public Function as well as the regional and local administrations.

The first pillar aims to improve the usability, quality and accessibility of digital public services. To that end, Spain is setting up an app factory to develop mobile apps and user-friendly services for the public. Expectations are that at least 50% of digital public services will be accessible through a mobile app by the end of 2025 (budget: EUR 8.67 million).

Strengthening the health system is one of the primary measures in the plan to digitalise public administration. Spain is facilitating interoperable health systems and information exchange between autonomous communities, who are responsible for healthcare provision. This includes a vaccination registry and a monitoring system for electronic prescriptions. Spain is also developing a data space,

<sup>7</sup> There is break in the series for indicators 4a2, 4a3, 4a4 and 4a5. As a result, no comparison of indicator and dimension results is possible over time.

where regional administrations can stock healthcare information for design purposes, in full respect of data protection rules. The project will be completed by the end of 2022.

In its RRP, Spain confirmed its participation in the multi-country [Genome of Europe](#) project, but has not allocated a budget so far. The project aims to create a federated European genomic reference data resource for public health, healthcare and research purposes. Spain is making progress on digital identification solutions. Updates of [Cl@ve](#) and other certified identification systems will align with the EU guidelines on electronic identification, authentication and trust services (eIDAS). This will enable reuse and interoperability with other EU public administrations. Spain also participates in the [European Self Sovereign identity](#) (ESSIF) project, where it presented in October 2021 the results of its digital identity pilot project, whereby a classic digital certificate can be stored in a person's digital wallet to verify their identity and credentials. There are 3 alternative eID schemes in Spain that can be used both for interactions with public administrations and private use. 34 million people in Spain (over 72% of the total population) have at least one eID scheme, especially the [DNIE](#) (issued by the government and mandatory since the age of 14, although available sooner). The 3 schemes are notified under the eIDAS regulation and none of them can be used via smart mobile. Only [TSL Spain](#) is issued by a private company, while [CERES](#) is issued by a private entity in collaboration with the government.

Setting up a cybersecurity operations centre in Spain, as outlined in its Plan for the Digitalisation of Public Administration 2021-2025, will help to ensure safe digital infrastructures, communications and public services provided by public administrations, in line with the National Cybersecurity Strategy. The centre will put in place a national cybersecurity monitoring system to help the State administration and its public bodies to protect themselves against cybersecurity threats.

Spain is in the process of launching the Spanish Artificial Intelligence Supervision Agency in order to minimise the potential risks of the use of AI systems on people's health and safety and fundamental rights. The Agency, approved in the 2022 General State Budget Law (budget: EUR 5 million), will be the first of its kind in Europe.

Spain is at the forefront in e-government and digital public services in the EU. It continues to update its services and infrastructure to bring them in line with rapid technological developments and with the needs of people and businesses. Interoperability at national, regional and local levels will be key to ensure a smooth and efficient digital transition across administration levels, maximising resources and avoiding overlaps.