



DIGITISATION: ECONOMIC AND SOCIAL IMPACTS IN RURAL AREAS

NATIONAL POLICY ANALYSIS

SPAIN



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Executive Summary

This report presents current policies and initiatives relevant to digitalisation in Spain at a national level. When possible, references and examples from regional initiatives are also included, as the country has important and interesting regional initiatives. We will present on the following pages the relevant policies and initiatives in this context, first in general, then taking a closer look of the strategies targeted to agriculture, forestry and rural areas.

One of the reiterative remarks is that despite the many initiatives towards broadband coverage (and despite the good results of the country, in general), there are still rural areas suffering from grey and white areas, situation that has been clearly exposed with the COVID-19 crisis.

Although Spain is very well positioned in terms of digital public services and open data, digital skills remain an issue for a percentage of the population, being specially an age, gender and rural divide and thus affecting older people and women (specially the aged ones) in general but particularly those living in rural areas. Micro SMEs (with less than 10 workers) are also mentioned, as being the most common volume of businesses in Spain and being also below the performance of the EU average in terms of digitalisation.

The Agriculture and Forestry sectors are supported with a strategy launched in 2019 and a great impulse will be given on the following years because of the number of plans emerging from the sanitary crisis and the recovery plans. The Spanish Digital Agenda, Digital Spain 2025, for example, was presented in July 2020, so it is quite soon to start talking about its results. It is expected that this agenda will help to drive the country's digital transformation by guaranteeing digital connectivity, deploying 5G, strengthening cybersecurity capacity, digitising public administrations and companies, particularly SMEs, promoting Spain as a hub for audiovisual production, developing the data economy and Artificial Intelligence and guaranteeing citizens' digital rights. The first of its axes is specifically focused in rural areas with the promise of adequate digital connectivity for 100% of the population, wherever they live.

Thus, the political framework is set up with a clear roadmap that includes investments and a broad set of structural reforms that respond to the specific recommendations of the European institutions, as well as to the diagnoses made by Spanish institutions and social and civil society agents, collected through sectoral conferences, social dialogue groups and expressions of interest.

In the following years, Spain will have to prove its capacity to implement everything planned.

1. Introduction

Over the last two decades, successive Spanish governments have adopted programmes for digital progress, aligned with European digital agendas, which have served as a framework to promote a process of infrastructure deployment and the development of digitalisation among the different spheres of the territory.

Most of these digital strategies and agendas have been articulated around four main lines of action: the deployment of networks and services for digital connectivity, the digitalisation of the economy, the improvement of eGovernment and digital skills training.

Although progress has been significant in all axes, the public and private investment emphasis has been clearly focused on the extension of physical telecommunications networks.

However, progress has been more limited in the field of digitalisation of industry and business (especially SMEs), in the area of R&D and innovation and in the basic digital skills of the population. There are also differences between sectors, being agriculture and forestry two of the less digitalised ones and, specially, between urban and rural areas as we will see in the following paragraphs.

In general, Spain ranks 11th out of 28 EU Member States in the 2020 edition of the Digital Economy and Society Index (DESI) and it is making good progress in its digital transition: having progressed relatively fast, it is the fourth EU country to have experienced the largest increase in the DESI index over the last five years. Spain stands out in two of the five pillars: connectivity and, especially, digital public services, a component in which Spain ranks second in the DESI 2020. In contrast, Spain is below the EU average on the human capital indicators.

Despite the good numbers for connectivity, as mentioned before, there is still need for improvement when comparing rural and urban areas: only 20% of rural households have 100 Mbps coverage, compared to 83% of urban households.

The population in Spain is 46.94 million inhabitants and is divided into 17 autonomous communities and two autonomous cities. Spain's administrative structure is complex, being a highly decentralised country with various existing levels of administration (local, regional and central).

Around 3.4% of the population live in predominantly rural areas and 33.3% live in intermediate regions. Spanish rural areas occupy 84% of the land.

The Spanish population is more concentrated in Spain than in the rest of the neighbouring countries. The density, weighted by population, is very high in relation to Europe, both in urban and rural areas, ranking the first of inhabitants per km² in urban areas and the third in rural areas.

Besides, the incidence of municipalities at risk of depopulation in Spain is much higher than in the rest of the eurozone as a whole. As can be seen in the following figure, 3.403 municipalities are identified at risk of depopulation, representing 42% of the Spanish municipalities, where 2,3% of the population (that is, approximately 1 million inhabitants) live.

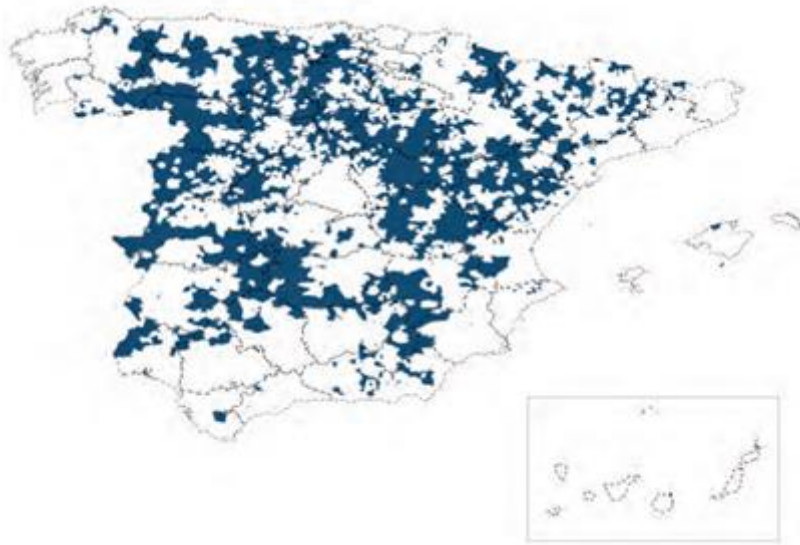


Figure 1: Municipalities at risk of depopulation. Source: Banco de España and National Statistical Institute.

Those divides in terms of access to and use of digital technologies, for example, have become particularly visible during the first months of the COVID-19 pandemic.

The European Commission's recent Next Generation EU proposal includes a new Reconstruction and Resilience Fund that also considers as one of its priorities to finance investments related to the Digital Transformation with a view to boosting a strong economic recovery.

Consequently, the Government has drawn up the Recovery, Transformation and Resilience Plan, *España Puede*, (Spain Can) based on four transversal axes: ecological transition, digital transformation, territorial and social cohesion, and gender equality, which was presented on 30 April 2021. This Plan is strongly aligned with the Sustainable Development Goals (SDGs) and the 2030 Agenda: to contribute considerably to closing the various digital divides that have widened in recent years for socio-economic, gender, generational, territorial and environmental reasons.

The following chapters present the scenario faced by Spain and the policies being implemented.

2. Context for (rural) digitalisation

2.1. Current context for digitalisation

In terms of digitalisation, Spain has different realities because of the digital divide between rural and urban areas mentioned in the previous chapter: connectivity in rural areas is not sufficiently complete and rural municipalities rank worse in terms of accessibility and digital services than urban municipalities. Information published by the Ministry of Economic Affairs and Digital Transformation for 2019 documents a significant deficit in broadband access (and therefore digital services) in rural municipalities. Focusing on the case of broadband at a speed of 100 Mbps (which is the desirable speed considered to hold a videoconference, for example) rural municipalities show a clear deficit compared to urban hubs. Specifically, only 20% of rural households have 100 Mbps coverage,

compared to 83% of urban households according to the “Spatial distribution of the population in Spain and its economic implications, 2020 annual report”.

If we focus on rural municipalities at risk of depopulation, all the rural-urban differences previously described are significantly accentuated.

According to that same report, in 2020 only 5% of households had access to 100 Mbps broadband in municipalities at risk of depopulation. In that sense, ultra-fast broadband coverage is planned to reach 96% by 2023.

Network Readiness Index (NRI).

Regarding digitalisation, the situation of Spain is not satisfactory: it ranks 35 (4.8 points) among the 139 assessed in the Country Connectivity Readiness Index (NRI), prepared by the World Economic Forum¹. Taking into account the countries of the EU-15, according to this classification, Spain is only ahead of Italy and Greece.



Figure 2: NRI Spanish Report

Digital Economy and Society Index (DESI).

Spain ranks 11th out of 28 EU Member States in the 2020 edition of the Digital Economy and Society Index (DESI). This result is worse than the 10th position obtained in the previous ranking of 2018 and 2019 but it is making good progress in its digital transition: between 2015 and 2020 Spain has progressed relatively fast related to the EU average. In fact, Spain is the fourth country (after Ireland,

¹ The Country Connectivity Readiness Index (NRI), prepared by the World Economic Forum, evaluates on a scale of 1 to 7, 53 indicators, grouped into 10 different themes. https://www.mapa.gob.es/es/ministerio/servicios/analisis-y-prospectiva/informe_anual_indicadores2018_tcm30-513683.pdf

the Netherlands and Malta) to have experienced the largest increase in the DESI index over the last five years.

It is important to mark that the DESI 2020 reports are based on 2019 data and assesses the status of the digital economy and society prior to the pandemic. The current crisis is having an important impact on key societal indicators, relating to the use of internet services by citizens.

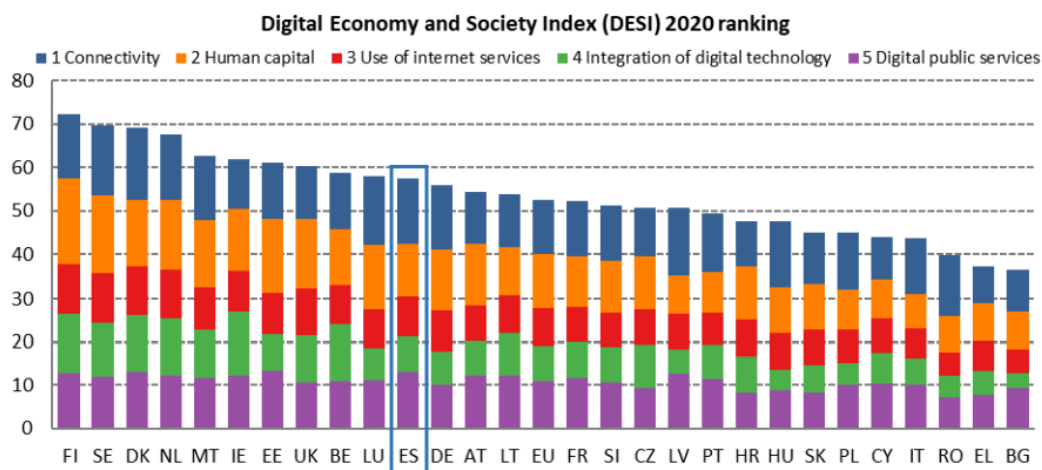


Figure 3: DESI 2020 ranking

If we analyse the components of the DESI index, we see that Spain stands out in two of the five pillars: connectivity and, especially, digital public services, a component in which Spain ranks second in the DESI 2020.

In terms of connectivity, Spain is one of the countries with the highest deployment of very high capacity networks, which covered 89% of households in 2019, compared to 44% of the EU average and the 45% that the country had in 2015. Furthermore, the improvement in high-capacity network coverage over the last five years has been clearly above the European average. Looking ahead, the successful deployment of 5G technology will be crucial, as it is an extremely important technology for the development of the new industrial 4.0 paradigm.

In contrast, Spain is below the EU average on the human capital indicators. Though it is improving its scores, almost half of the Spanish population still lack basic digital skills and 8% have never used the internet. Spain ranks 13th on integration of digital technologies; its score is in line with the EU average, although Spanish SMEs have yet to fully unlock the potential of e-commerce.

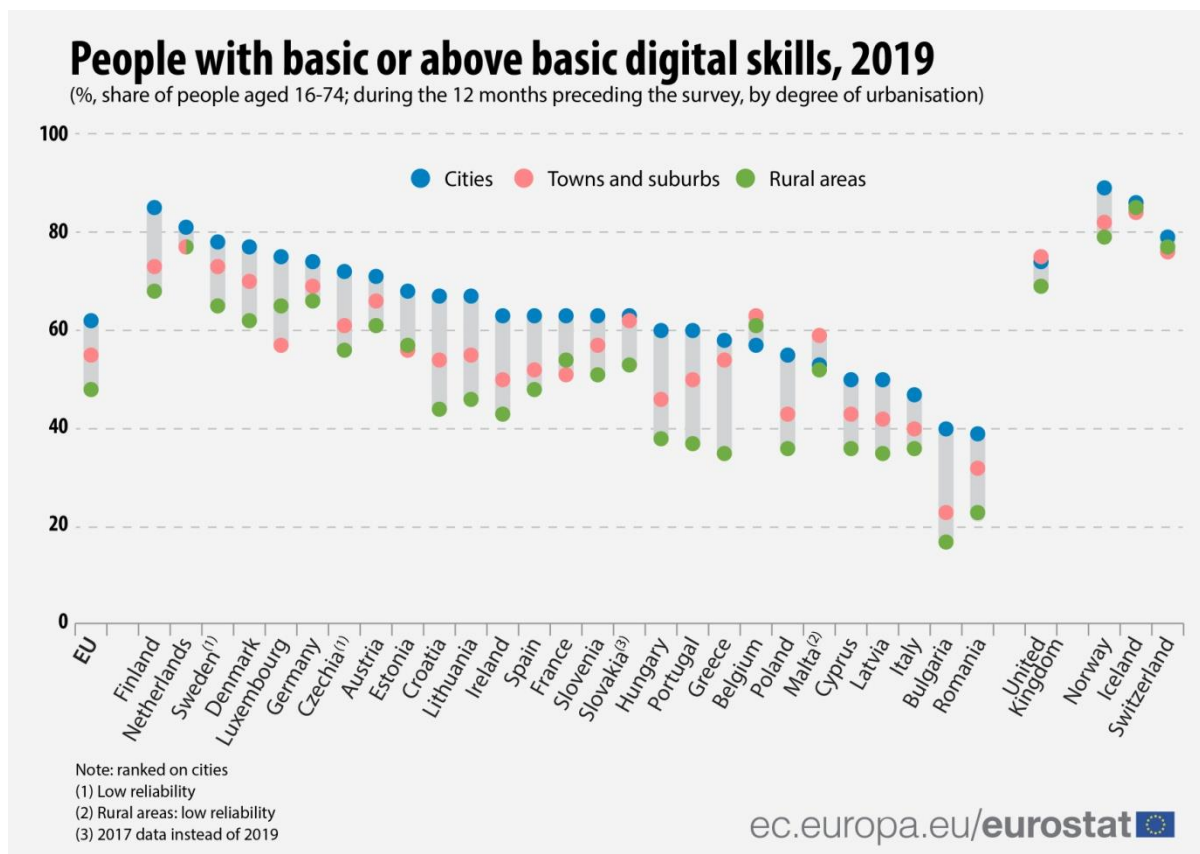


Figure 4: Digital skills divide between adults living in cities and those living in rural areas

Still in the area of human capital, it is noteworthy that one of the objectives of the Spain Digital Agenda 2025 (that will have a dedicated chapter, later on) is that 80% of people should have basic digital skills by 2025, as it is essential to have a workforce with these skills to be able to take advantage of the opportunities offered by new technologies. Moreover, digital skills in the population is another of the elements highlighted by the European Commission (like the aforementioned connectivity) as relevant to ensure a strong and sustained economic recovery over time in the current context.

DESI Report also includes information on connectivity and on the so-called Next Generation Access (access to the following technologies: FTTH, FTTB, Cable Docsis 3.0, VDSL and other superfast broadband (at least 30 Mbps download), differentiating between rural and urban areas.

Spain ranks 13 but the difference between urban and rural areas is large, not reaching the rural ones the 50% of homes with NGA coverage, as can be seen in the following figure:

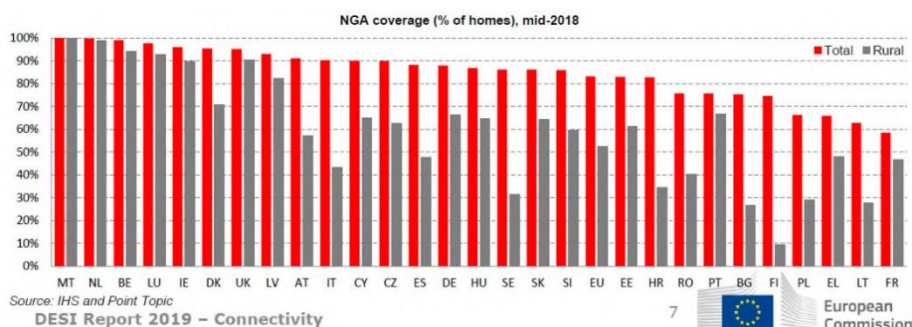


Figure 5: DESI 2020 ranking in terms of NGA coverage showing total vs rural

Women in Digital Scoreboard 2020

Spain is not bad positioned in the women in digital scoreboard compared to the EU average results and holds a tenth position in the general ranking for the year 2020. Just as this report was being revised, in November 2021, the results of the 2021 index were published and they show an improvement, from the tenth to the eighth position compared to the rest of member states. To maintain the coherence with the rest of the countries and partners, we present the results of 2020, which were the originally analysed.

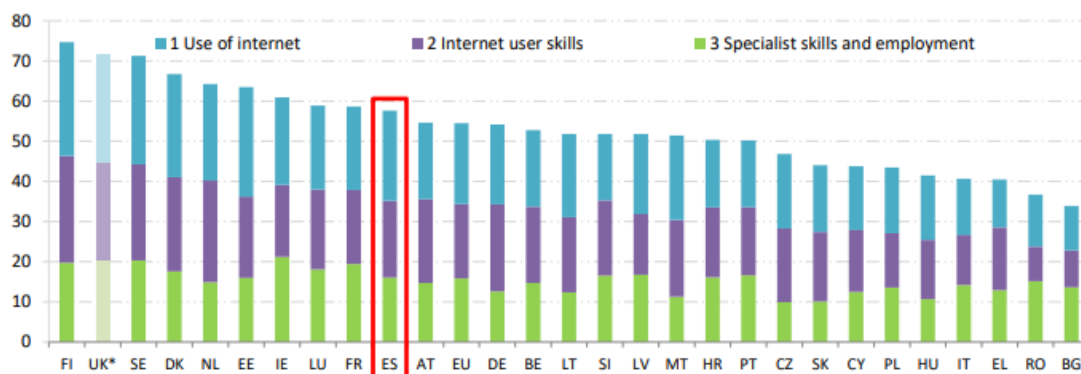


Figure 6: Women in Digital Scoreboard 2020 ranking of Member States.

Compared to the EU average and as can be seen in the following figure, Spain is well positioned in terms of use of internet and internet user skills. Regarding the specialist skills and employment, Spain is below EU average in terms of unadjusted gender pay gap.

The use of men and women of internet is quite similar, the differences grows bigger in terms of internet user skills and even greater when we analyse specialist skills and employment. The participation of women who are specialists in information technologies remains at a standstill.

	Spain		EU	
	Women value	Men rank	Women value	Men value
1 Use of internet				
1.1 Internet users	88%	10	87%	84%
% individuals, 2019				86%
1.2 People who have never used the internet	8%	12	8%	10%
% individuals, 2019				9%
1.3 Online banking	59%	19	62%	65%
% internet users, 2019				67%
1.4 Doing an online course	17%	4	16%	11%
% internet users, 2019				11%
1.5 Online consultations or voting	12%	12	12%	12%
% internet users, 2019				12%
1.6 e-Government users	82%	8	82%	66%
% internet users submitting forms, 2019				68%
1 Use of internet	67	7	60	
Score (0-100)				
2 Internet user skills				
2.1 At least basic digital skills	56%	15	59%	56%
% individuals, 2019				60%
2.2 Above basic digital skills	35%	10	37%	31%
% individuals, 2019				36%
2.3 At least basic software skills	58%	14	61%	59%
% individuals, 2019				63%
2 Internet user skills	57	11	55	
Score (0-100)				
3 Specialist skills and employment				
3.1 STEM graduates	12.7	15	30.1	14.3
Per 1000 individuals aged 20-29, 2018				26.3
3.2 ICT specialists	1.2%	18	5.0%	1.6%
% total employment, 2019				6.2%
3.3 Unadjusted gender pay gap	12%	6	18%	
% difference in pay, 2018				
3 Specialist skills and employment	48	12	48	
Score (0-100)				
Women in Digital Index	57.6	10	54.5	
Score (0-100)				

Figure 7: Women in Digital Scoreboard 2020. Use of internet, internet user skills and specialist skills.

Talking about the gender divide we could state that for Spain is a gender-age divide in terms of basic digital skills, seeing the results of the following figure: women and men are more or less equal, except on the ages above 55 years.

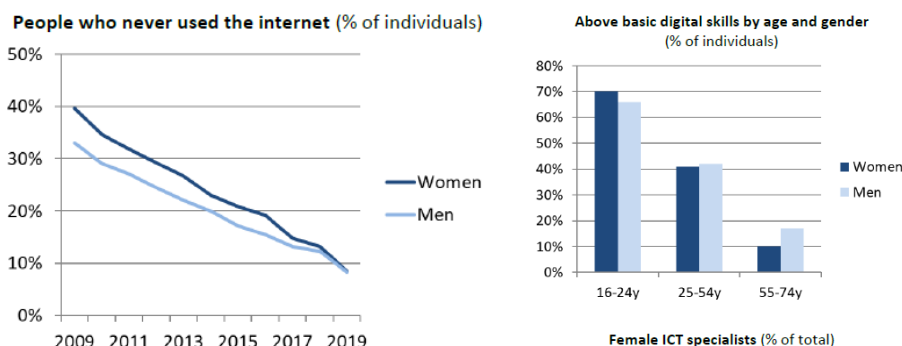


Figure 8: Women in Digital Scoreboard 2020 per gender (left) and digital skills by age and gender (right)

Business

Compared with the EU average, Spain has a good level of digital equipment in companies (above average), but a worse performance in relation to e-commerce (below average), especially in the case of micro-SMEs with fewer than 10 employees, which make up the majority of the business in Spain.

Among the reasons for this low level of digital development are the unequal behaviour between sectors, where the most technological sectors have a digital skill 3 to 4 times higher than the rest of the sectors (agriculture and forestry, for example) and the worse performance of small companies compared to large ones, with worse digitalisation rates and greater differences between the most digitised sectors and the least digitised ones.

However, it is important to add that online sales in Spain during the State of Alarm of 2020 have grown by 80%. Sixty per cent of the population made a purchase on the Internet during the period of confinement and many people have been encouraged to try e-commerce for the first time.

Europe is promoting the Digital Society as the great commitment to recovery with which to advance towards a true European Digital Single Market that will help to expand the growth possibilities of European companies, especially SMEs, and to promote a digital transformation of the productive sectors. In the European context, sustainability and digital skills have become two of the basic and omnipresent elements of business and workers' development. In turn, the challenge of digitising SMEs is also included in the "modernisation and digitalisation of companies and SMEs" lever, for sustainable and inclusive growth, of the Recovery, Transformation and Resilience Plan.

3. Policy framework for (rural) digitalisation

The EU Digital Strategy aims to make the digital transformation work for people and businesses, while contributing to achieve its goal of a climate-neutral Europe by 2050. The degree of digitalisation of the economy and the use of digital technologies influence productivity, innovation and business competitiveness and therefore the levels of development and social and economic well-being of a given territory.

In Spain as a whole, various plans, studies and measures have been carried out to detect possible shortcomings or weaknesses that need to be strengthened in terms of digitalisation and digital technology, as well as to promote and encourage those points where digital transformation is already aligned with what is recommended by the EU.

One of the weaknesses for the past years has been rural digitalisation and Spain still have what is called white and grey areas (areas without connectivity or with service degradation due to the use of obsolete connection technology (VDSL).

Given the low profitability of the development of infrastructures for the companies in charge (and the matrix of being a big territory with very few population), some rural areas still suffer from a very limited supply of digital services, infrastructures and connections and that is why several policies have been emerging for the last years, as can be seen in the following paragraphs.

3.1. European Digital Policies

At the European level, the digital transition is a priority and one of the flagships to make Europe greener, more digital and more resilient. Consequently, several policies and initiatives have been launched to boost it.

Following the **Lisbon Strategy**, the **Digital Agenda for Europe** was conceived as one of the seven flagship initiatives of the Europe 2020 strategy adopted by the Commission in 2010. It sets out to define the key enabling role that the use of ICTs will have to play if Europe wants to succeed in its ambitious 2020 goals.

The European Commission's recent **Next Generation EU** proposal includes a new Reconstruction and Resilience Fund that also considers as one of its priorities to finance investments related to the Digital Transformation with a view to boosting a strong economic recovery from the second half of 2020.

The following chapter analyses the national policies emerged and aligned with the mentioned EU digital policies.

3.2. National Policies boosting digitalisation

In line either with the Lisbon Strategy or with the Digital Agenda for Europe, over the last two decades, successive Spanish governments have adopted programmes for digital progress, which have served as a framework to promote a process of infrastructure deployment and the development of a business and technological ecosystem in a key area for economic productivity, territorial structuring and social progress. Thus, the Info XXI Plan, the España.es Programme, the Avanza Plan and the Strategy 2011-2015 and the Digital Agenda for Spain have enabled a strategic approach that has guided a major public and private investment effort in this area.

Most of these digital strategies and agendas have been articulated around four main lines of action: the deployment of networks and services for digital connectivity, the digitalisation of the economy, the improvement of eGovernment and digital skills training.

The **Avanza Plan**, for example, mobilised more than 12,000 million euros and was aligned with the Lisbon Strategy. It was aimed at achieving the appropriate use of ICTs to contribute to the success of an economic growth model based on increasing competitiveness and productivity, promoting social and regional equality and improving the well-being and quality of life of citizens. One of its main axes was around the digital context, having the objective to extend telecommunications infrastructures in areas where they did not exist, such as promoting the installation of rural internet.

It made important and promising achievements towards the full and effective development of the Information Society in our country. We could highlight the fact that Avanza has been the trigger for an awareness about the importance of the new technologies and, therefore, of the urgent need to adapt them to all areas of business, citizen and institutional activity. Regarding rural digitalisation, 12 million people in rural areas received training and access to the Internet thanks to almost 3000 internet access centres and 2500 connected libraries.

If the first part of the Avanza Plan aimed to catch up with the EU, the strategy of the Avanza Plan 2 was to put Spain in a leading position in ICT development.

Although progress has been significant in all axes, the public and private investment emphasis has been clearly focused on the extension of physical telecommunications networks. However, progress has been more limited in the field of digitalisation of industry and business (especially SMEs), in the area of R&D and innovation and in the digital skills of the population. These are three key levers for the future so that the Digital Transformation results in increased productivity, improved working conditions, connectivity and opportunities for the development and inclusion of society as a whole throughout the country. In addition, there are still areas that do not have reliable and quality digital connectivity, both in rural areas and in certain industrial areas, which generates social and territorial gaps, hinders the digitalisation of industry, or affects the quality of the experience in tourist destinations.

More recently and aligned with the Next Generation EU proposal, the Government has drawn up the National Recovery, Transformation and Resilience Plan, *España Puede* (“Spain Can”), based on four transversal axes: ecological transition, digital transformation, territorial and social cohesion, and gender equality, which was presented on 30 April 2021. This Plan is strongly aligned with the Sustainable Development Goals (SDGs) and the 2030 Agenda: to contribute considerably to closing the various digital divides that have widened in recent years for socio-economic, gender, generational, territorial and environmental reasons.

The lines of investment and reforms are structured around ten policy levers in which digitalisation is very present in many of them, highlighting its importance in levers 4 and 5: Administration for the 21st century and Modernisation and digitalisation of our companies, in the face of the urgent need to support the business fabric and guarantee our industrial competitiveness.

Spain may receive up to 140 billion euros for reforms and investments between 2021 and 2026. Of this, almost 70 billion corresponds to non-refundable transfers, most of which will be implemented between 2021 and 2023.

3.2.1. National Digital Agenda / strategies

In 2020, the Spanish Digital Agenda, **Digital Spain 2025** was presented. An updated Agenda that promotes the Digital Transformation of Spain as one of the fundamental levers for re-launching economic growth, reducing inequality, increasing productivity and taking advantage of all the opportunities offered by these new technologies. One of the key components is to achieve this with respect for constitutional and European values, and the protection of individual and collective rights.

This agenda intends to drive the country's digital transformation by guaranteeing digital connectivity, deploying 5G, strengthening cybersecurity capacity, digitising public administrations and companies, particularly SMEs, promoting Spain as a hub for audiovisual production, developing the data economy and Artificial Intelligence and guaranteeing citizens' digital rights. It also envisages the development of driving force projects for the digitalisation of the production model in strategic sectors.

It includes nearly 50 measures organised in ten axes which, over the next five years, are intended to drive the country's digital transformation process, in line with the European Union's digital strategy, through public-private collaboration and with the participation of all the country's economic and social agents. One of the axes, the first, is specifically focused in rural areas: *'Ensure adequate digital connectivity for 100% of the population, promoting the closure of the digital divide between rural and urban areas (target 2025: 100% of the population with 100 Mbps coverage).'*

Public investment in the period 2020-2022 is expected to be around EUR 20 billion, EUR 15 billion of which approximately, would correspond to the different programmes and new Community funding instruments of the Next Generation EU Recovery Plan, which establishes digitalisation as one of the main axes for mobilising these resources. In addition, the planned investment by the private sector, is expected to be around 50 billion euros.

Regarding strategies focused on agri-food, forestry and rural areas, in 2017, the Ministry of Agriculture, Fisheries and Food promoted a Focal Group for the Digitalisation and Big Data in the agri-food, forestry and rural sector, made up of experts from the fields involved in the digitalisation process, whose work consisted of identifying barriers, needs, incentives and good practices, and to define the strategic lines of digitalisation of the sector and the rural environment.

Following that, a conference was held on 31 May 2018 in Añora (Córdoba), entitled: "Digitalisation and Smart Rural Territories: for a smart, dynamic and connected rural world". The conclusions of the conference were compiled in the "Añora Declaration".

Taking all that context into account, in March 2019, Spain adopted the **digitalisation strategy for the agri-food, forestry sector and rural areas** with the objective to boost digital transformation in the mentioned areas narrowing the digital divide, fostering data use and boosting business development and new business models with the idea to actively repopulate rural areas, making them more attractive, and dynamic, paying special attention to young people and women.

It is expected to serve as a strategic framework to ensure coherence and foster synergies between all the actions that are developed in the field of digitalisation in rural areas.

It determined as general objective the elimination or reduction of technical, legislative, economic, and training barriers that currently exist. Which shall be addressed by contributing to the leadership of an economically, socially, and environmentally sustainable agri-food sector and to the active population of the rural environment, making it a more attractive, lively, dynamic, and diversified place, generating wealth and quality employment, with special attention to young people and women.

To this end, the following three strategic objectives have been established:

- O1. **Reduction of the digital divide**, both in terms of knowledge and digital tools, considering actions aimed at promoting connectivity in the territory, training, dissemination, and advice actions with a special focus on young people and women as stable inhabitants of rural areas.
- O2. **Promoting the use of data** as a driving force for the sector, addressing the interoperability and openness of data. It places particular attention on the exploitation of big data as a driving force for the development of the agri-food sector and the rural environment, as well as boosting business development and new rural business models.

O3. Promoting business development and new business models, bearing in mind smart agriculture and Industry 4.0, but also the opportunities for economic diversification outside the agri-food sector offered by new technologies. To promote this modernisation of the Spanish agri-food and rural productive fabric, measures are proposed such as strengthening the digital innovation ecosystem, advice for digital adoption in agri-food, forestry and rural knowledge and innovation systems, and the promotion of entrepreneurship and new business models.

It will provide support of € 5-6 million to boost the digital transformation of rural areas through actions related to the promotion of digital tools, the provision of technical advice and training. Rural digital hubs are expected to become a key channel for support.

The second Action Plan at this respect will cover the years 2021-2023.

In addition, the Strategy proposes measures that bring the agri-food and forestry sector and the rural environment closer to other public policies that influence sectoral and territorial digital transformation and that are developed by both the General State Administration and other administrations within the framework of their competences. The Strategy has an integrative approach with other European and national public policies in the context of digitalisation.

3.2.2. Other policies and strategies influencing (rural) digitalisation

Regional digitalisation initiatives

Various Autonomous Regions have regional strategies or digitalisation actions in place, as for example:

Basque Country: Initiatives of the Basque Observatory for Ultra-Fast Broadband, Euskadi Smart Country and Smart Food Country 4.0 (Intelligent digitalisation of the Gastro-Food Value Chain).

Catalonia: A collaborative project of the Generalitat de Catalunya with the citizens, called Cobertura Mòbil (Mobile Coverage), an app that allows the users to check the availability of coverage throughout Catalonia.

Galicia: Galicia's Digital Agenda 2020, (Axis D13 focused on the digitalisation of the primary sector), which includes the Primare Programme, Impulso Oficina Agraria Virtual, CIVIL UAVs Virtual, CIVIL UAVs Initiative, Galicia 2020 Broadband Plan and Galicia 5G Plan.

In addition, the Digital Innovation Pole DATALife, supported by the Galician Agency for Innovation and promoted by the Life Sciences Technological Business Cluster (BIOGA), and the (BIOGA), which focuses on the agro-livestock, agri-food and forestry sectors as priority as a priority focus of attention.

Having reach this point and as a brief introduction to this section, we would like to focus on the Spanish innovation performance and specially on the expenditures made by the agri-food and forestry sectors in R&D, which we think also influence rural digitalisation.

In general, Spain's innovation performance and productivity growth are hampered by low levels of investment in research and development. For this reason, the European Commission's 2019 specific

recommendations for Spain in the area of research and innovation set out the need to focus economic investment policies on fostering innovation and improving the efficiency of research and development.

According to the National Institute of Statistics on Scientific Research and Technological Development, the expenditure made by companies in the agri-food and forestry sector in 2017 was 326 M€, the majority of which corresponded to the agri-food industry (with 232 M€), while in the agricultural sector it is lower (85 M€).

If we analyse the evolution since 2012, it can be seen that this expenditure represents an increase of 6% with respect to 2016 and 19% compared to 2012, mainly due to the higher spending by companies in the sector, as opposed to the public administration, which has decreased its internal spending.

Therefore, there has been a positive trend since 2012 towards an increase in the total expenditure of the agri-food sector on R&D, especially in agriculture, livestock, forestry and fisheries, where it has increased by 59% compared to the previous year.

It is also worth mentioning the existence of a framework instrument for innovation at the national level called the "Spanish Science and Technology and Innovation Strategy 2013-2020". This strategy sets out the general objectives to be achieved during the period 2013-2020 linked to the promotion and development of R&D&I activities in Spain.

These objectives are in line with those set by the EU within the current framework programme Horizon 2020 for the 2014-2020 period, helping to encourage the active participation and coordination of the agents of the Spanish science, technology and innovation system in the European area.

The following table shows National policies of several different ministries, such as the national strategy to address the demographic challenge, the Spanish strategy for science, technology and innovation 2013-2020, the programme for the extension of next-generation broadband, the national plan for smart territories, and the connected industry 4.0 strategy.

Table 1: National Policies

Ministry / Authority	Policy	Objective	Expected Impact
Ministry of Economic Affairs and Digital Transformation	Connectivity and Digital Infrastructures Plan	To promote the deployment of broadband in urban centres and depopulated areas and to become a European data hub.	To expand fiber-optic infrastructure to underserved areas and extending 5G coverage
Ministry of Industry, Trade and Tourism	Industry 4.0 Strategy	To guarantee knowledge and the development of skills	To foster multidisciplinary collaboration.

		in Industry 4.0.	
Ministry of Economic Affairs and Digital Transformation	Programme for the Extension of Next Generation Broadband (PEBA-NGA)	To accelerate the extension of the coverage of public electronic communications networks capable of providing very high speed broadband services to areas without current and planned coverage in the coming years (white areas) as well as to those with single operator coverage (grey areas).	To improve the functionality and quality of digital services needed for the digital transformation and thereby enhance the well-being and quality of life of citizens.
Ministry for the ecological transition and the demographic challenge	National Strategy against Depopulation	This strategy will involve greater cooperation between all the ministries and policies concerned.	Digitalisation is considered essential for retaining and attracting young people to rural areas.
Former Ministry of Energy, Tourism and Digital Agenda	National Plan for Smart Territories	To support industry and local entities during their transformation processes.	Digitalisation of cities, 5G pilots, virtual interoperability laboratory, smart tourism, smart rural territories and 4.0 public services.

3.2.3. Policies and strategies to boost digital literacy and tackle the digital divide

Over the last few years, the country has made significant progress towards developing and implementing strategic plans and initiatives to close the digital divide. These strategic initiatives take place at all administrative levels – national, regional and local – and tackle broadband infrastructure, digital knowledge and skills and digital innovation in rural SMEs and public services.

In January 2021, the government published its **National Digital Skills Plan** announcing joint investments with the **Digitalisation of SMEs Plan 2021-2025** and the **Digitalisation of the Public Authorities Plan**.

Accordingly, the National Digital Skills Plan is aligned around four main lines of action: cross-cutting digital skills, the digital transformation of education, digital skills for employment and digital skills for professionals. The overarching goal is to make public reforms and investments to guarantee digital inclusion, reduce the digital gap between women and men, guarantee the digitalisation of education, promote the acquisition of digital skills of the unemployed and workers, increase the number of ICT specialists and promote the necessary digital skills of companies.

Progress has been limited in the field of digitalisation of industry and business (especially SMEs), in the area of R&D and innovation and in the digital skills of the population. These are three key levers for the future so that the Digital Transformation results in increased productivity, improved working conditions, connectivity and opportunities for the development and inclusion of society as a whole throughout the country.

The Ministry of Economy and Business (MINECO) of Spain, through the public entity Red.es, is developing the "**Creating the Future**" programme, whose final beneficiaries are primarily employed people (and to a lesser extent unemployed or inactive people), interested in acquiring technological skills, personal skills and skills for entrepreneurship in the digital environment. Framed within the lines of action of the Digital Agenda for Spain, it foresees up to 15 MOOCs (Massive Open Online Courses) and more than 1,800 face-to-face training workshops throughout the country.

In addition, the Ministry of Labour, Migration and Social Security has launched a **Training Plan for Digital and Technological Skills**, with a budget of 60 M€, aimed at workers and unemployed people, with 12 priority areas, some of which are applicable to the agri-food sector, such as drones, robotics, artificial intelligence, advanced analysis, and autonomous driving, among others.²

To give a regional example specifically focused on rural areas we have chosen Guadalinfo: an Andalusian public network of more than 760 centres for digital skills, open innovation and Internet access, co-financed by the Andalusian Regional Government and the eight Andalusian provincial councils. The centres are located in rural municipalities (less than 20,000 inhabitants) and in certain neighbourhoods of larger cities where they serve groups at risk of social exclusion. The focus of Guadalinfo is to empower people (using ICT as a tool) so that they can be the driving force behind the transformation of their communities: training adapted to different ages and profiles in digital skills, entrepreneurial skills, technological and professional skills, and community awareness and cohesion, with special attention to the prevention of digital, gender and social gaps.

More examples are included in Table 2:

² Call for the award of grants under the Digital and Technological Skills Training Plan <https://www.fundae.es/convocatorias/en-ejecuci%C3%B3n/convocatoria-tic#normativa>

Table 2: Policies and initiatives addressing digital literacy and digital divide. (*) International, National, Regional or Local

Initiative	Objective	Key words	Period	Area of impact	Link	Public / Private	Scale of action *	Rural / General
Educa en Digital	Boosting the technological transformation of education in Spain	Devices, connectivity, vulnerable students	2020-2021	National	https://www.educacionyf.p.gob.es/en/prensa/actualidad/2020/06/20200616-educaendigital.html	Public	National	G
Plan UniDigital	Boosting digitalisation processes in higher education	Innovation, inter-university cooperation, digital context, open access tools	2021-2023	National	https://www.universidades.gob.es/portal/site/universidades/menuitem.43f867cc076c14d185cacc2c026041a0/?vgnnextoid=bbc4ab427e8d7710VgnVCM1000001d04140aRCRD&vgnnextchannel=cc3cd58bc3350710VgnVCM1000002006140aRCRD	Public	National	G
Reportero Escolar	Increasing skills in the use of new technologies and digital tools	Digital diary, audiovisual report video	2018-2019	Regional: La Rioja	http://reporteroescolar.unir.net/2019/	Private	Regional	G
Andalucía Compromiso Digital	Population to acquire basic digital skills	Digital Literacy	2008-	Regional: Andalucía	https://www.andaluciacompromisodigital.org/formacion/	Public	Regional	G
Youth e-Perspectives on Migration	Digital skills will be developed in parallel with skills for civic participation in dealing with current social issues	e-perspectives, migration, digital skills of young people, active citizenship, social entrepreneurship, digital literacy in local communities	2016-2017	International: Croatia, Belgium, and Spain	http://www.yep4europe.eu/	Private	International	G

3.2.4. Policies and strategies that incentivise digital innovations

The pandemic has highlighted the importance of digitalisation and connectivity in sustaining the economic, personal, social and professional lives of all individuals and communities. This process of digitalisation was already at a slow but steady pace of implementation, but since the onset of the COVID-19 health crisis it has been reinforced and accelerated significantly. As a direct consequence of the pandemic, inequalities have come to light, further accentuating the digital divide that exists within the Spanish business fabric, labour market and households. Therefore, it can be said that digital technology is changing the lives of people and their environment, but not with the same intensity and impact in all territories or on all people.

And that is why the following policies and strategies have arisen:

SME Digitalisation Plan (2021-2025)

The digitalisation of SMEs takes on particular urgency given the circumstances arising from the COVID-19 pandemic, the impact of which is especially severe on SMEs, particularly due to their higher levels of vulnerability and lower levels of resilience related to their size.

Digitalisation Plan for Public Administrations 2021 -2025; Digital Government and Digital Public Services Strategy

The exceptional situation generated by the COVID-19 pandemic has highlighted the urgency and need to speed up the development of a Digital Administration that can respond to citizens' needs in a more agile and effective way. The challenge, therefore, lies in being able to develop more inclusive, efficient, personalised, proactive and quality digital public services for citizens, citizens and businesses.

Plan for Connectivity and Digital Infrastructures

The first Axis of the Plan includes measures to encourage the deployment of broadband in urban centres, depopulated areas, reference and care centres. The second Axis contains actions to reinforce connectivity associated with business environments and the third Axis of the Plan includes measures to project our country as a pole of attraction for investment in data infrastructures and to become a cross-border connection point for the European Union.

5G Technology Promotion Strategy

In order to make the coexistence of a huge number of new technologies and multiple electronic devices viable and efficient, the hyperconnectivity provided by 5G is a key element. Furthermore, the EU has made digitalisation a priority for the period 2021-2027, as well as the drive towards investment in 5G networks and the creation of new innovative ecosystems.

National Artificial Intelligence Strategy

This strategy has the objective to boost scientific research, technological development and innovation in AI; promote the development of digital skills, enhance national talent and attract global talent; promote the development of digital global talent; develop data platforms and technological infrastructures to support AI; integrate AI into value chains to transform the economic

fabric; enhance the use of AI in public administration and in national strategic missions and establish an ethical and regulatory framework that strengthens the protection of individual and collective rights, in order to ensure social inclusion and welfare.

Prospecting report and detection of training needs 2020

This study highlights the importance of digitalisation in the working environment. It highlights the relevance of digital skills both for access to employment in new occupations arising from the process of digitalisation of the economy, and for the exercise of traditional occupations whose processes have been digitised.

The following Table 3 includes policies influencing digitalisation in rural areas:

Table 3: Policies influencing digitalisation in rural areas

Initiative	Brief Description	Objectives	Area of impact	Period of implementation	Budget (if any)	Public / Private	Are rural areas specifically mentioned or addressed? Y/N	Link
National Digital Skills Plan	Roadmap to identify the necessary measures to ensure that all citizens have the necessary tools to acquire and develop digital skills.	To substantially increase the level of basic digital skills of the population.	National	2021-2027	€3.750 million	Public	Y	210127 plan nacional de competencias digitales.pdf (mineco.gob.es)
Digitalisation of SMEs Plan	Plan for the improvement of SMEs digitalisation.	To achieve basic digitalisation for SMEs, to promote business training in digital skills, to enhance disruptive innovation and entrepreneurship, to support sector digitalisation, with special focus on industry, tourism and trade.	National	2021-2025	€4.66 billion	Public	N	Plan IMPULSA digitalización PYME 01 Optimizado (mineco.gob.es)
Plan for the Digitalisation of Public Administration	Plan designed to ensure that Spain continue working towards the development of e-government to respond to citizens' needs in a faster and more effective way	To improve the quality of public policies and services to citizens, adapting them to the specific needs of citizens and to achieve the same quality and range of services throughout the territory by contributing to territorial integration and the fight against depopulation.	National	2021-2025	€2.6 billion	Public	Y	PAe - Plan Digitalización AAPP (administracionelectronica.gob.es)
Plan 300x100	Plan to bridge the digital divide and the digital transformation of the economy.	To position Spain "as a global leader in the access to digital infrastructure".	National	2018-2021	€150 million	Public	Yes	Ministry of industry, trade and tourism - Agenda Digital publica la primera convocatoria del Plan 300x100 (mincotur.gob.es)

3.3. Contributions from the Structural and Investment Funds and the Cohesion Policy

Spain, through 64 national programmes, benefits from European Structural and Investment Funds (ESIF) funding of € 39.8 billion. This represents an average of 856 euro per person from the EU budget over the period 2014-2020.

The ESIF that apply in Spain in the 2014-2020 period are the European Regional Development Fund under the European territorial cooperation objective (ERDF), the European Social Fund (ESF), the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF).

In the 2014-2020 period, Spain managed 22 operational programmes with funding from the European Regional Development Fund (ERDF): one for each of the nineteen regions plus 3 national programmes and 23 operational programmes with funding from the European Social Fund (ESF): one for each of the nineteen regions plus 4 national programmes.

3.3.1. Broadband infrastructure

In terms of broadband, we could mark the result of the 2007-2013 period that helped Spain to extend access to broadband to 1.3 million more people thanks to the ERDF.

There are several policy initiatives to support broadband connectivity in Spain. The most important is the **Plan 300x100** (2018-21)³, which focuses exclusively on the deployment of broadband infrastructure for the whole country. Led by the Ministry of Industry, Trade and Tourism, the plan aims to position Spain "as a global leader in the access to digital infrastructure".

High speed broadband networks already cover 76% of the national population. However, many rural areas remain as white spots on the digital map due to their remoteness and the dispersion of the population.

³ [Ministry of industry, trade and tourism - Agenda Digital publica la primera convocatoria del Plan 300x100 \(mincotur.gob.es\)](https://www.mincotur.gob.es/Agenda-Digital-publica-la-primera-convocatoria-del-Plan-300x100)

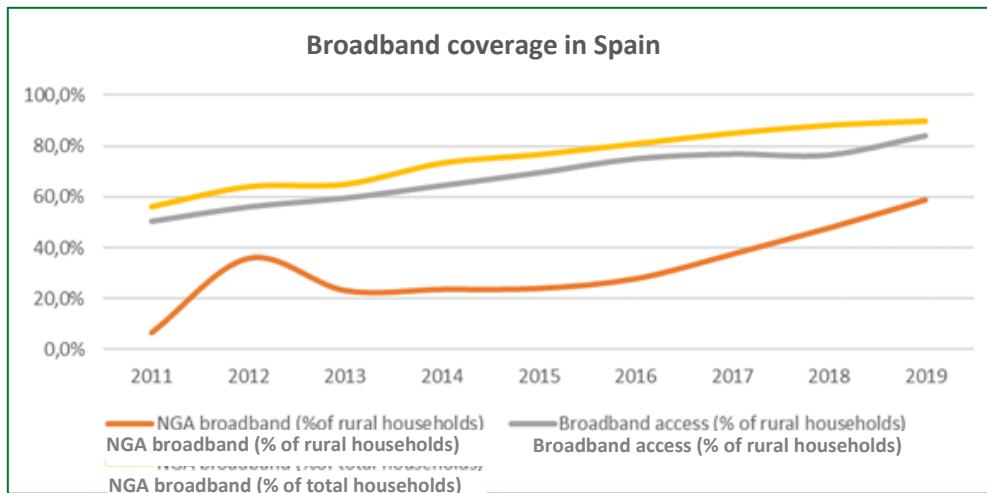


Figure 9: European Commission. *Digital Economy and Society Index*. DESI individual indicators – 1b1 Fast BB (NGA) coverage [[desi_1b1_fbbc](#)]

In October 2018, the government announced the named **Plan 800** (2018-20), specifically targeted at rural areas. It aimed to provide access up to 30 Mbps speed or more to at least 90% of the population settlements with less than 5000 inhabitants by 2020, covering at least 85% of the population in each Spanish region. This plan is implemented by three private operators without public subsidies.

A third national initiative is the **Connect by Satellite Plan**. This aims to provide satellite connectivity to white spots with no internet access, which are mostly located in remote rural areas. The target is to cover 300,000 homes in 2500 settlements with less than 5000 inhabitants. The aid will cover the expenses related to service registration, equipment and installation. The user will only meet the monthly service fee.

3.3.2. Digital Public Services

According to DESI, Spain ranks 2nd in the EU on digital public services, well above the EU average. This is the chapter in which the country performs best. Indicators show a high level of online interaction between public authorities, citizens and businesses. Spain performs very well on the open data indicator, ranking second with 90% of the maximum score. 82% of Spanish internet users actively engage with e-government services, 6% more than the previous year. In 2019, Spain continued to improve its rating on pre-filled forms to reach 80 points, well above the EU average of 59 points. Spain also scored above the EU average on the availability of e-government services for businesses, with 93 points, ranking 11th. Lastly, Spain scored 96 points on online service completion, ranking 8th in the EU and 6 points above the EU average.

The provision of public services to citizens through the deployment of digital technologies (public services 4.0.) was supported by the **National Plan for Smart Territories**, launched in 2017.

Over 98% of all services are digital-ready thanks to the implementation of the **ICT strategic plan for 2015-2020** and the use of sufficient funds to develop the IT architecture. Interoperability with sub-national levels of the administration is now key to ensure a smooth transition to regional and local levels and to avoid overlap.

Spain can amplify its good results on e-Government by reaching a consensus between all public administrations in Spain to develop the same digital-by-default interoperable infrastructure and by increasing the use and the number of digital identities, not very much extended and with a residual use. Steps are being given, however, and European projects for cross-border recognition of electronic identities, aimed at facilitating mobility and borderless digital life in the EU have been implemented, such as STORK and STORK 2.0.

In this field, Spain published in 2020 the first model of Decentralised Identity Management and is working in a coordinated way on the design of the Framework for a European Digital Identity.

Table 4: Digital Public Services usage

		Extremely common	Very common	Fairly common	Not common for most of the population	It is not a possibility nowadays
e-Administration procedures	In general in the country				X	
	In rural areas				X	
e-Health	In general in the country			X		
	In rural areas				X	
e-Education	In general in the country			X		
	In rural areas				X	
Digital identity	In general in the country	X				
	In rural areas	X				
Digital signature	In general in the country	X				
	In rural areas	X				
On-line banking (account management, payments)	In general in the country		X			
	In rural areas			X		

Bills (council taxes, water, electricity)	In general in the country	X				
	In rural areas	X				

3.3.3. Research and Innovation Strategies for Smart Specialisation (RIS3)

In the context of the Cohesion Policy 2014-2020, in 2013 the Commission presented the legal basis defining the Research and Innovation Smart Specialisation Strategy, RIS3 with the aim of making innovation a priority for all regions, concentrating on creating synergies and on improving the innovation process and getting all parties involved. The Strategies, defined on a national or regional scale, set out priorities for creating competitive advantages by developing and adapting the strengths of research and innovation to business needs in order to tackle the emerging opportunities and advances in the market coherently while at the same time avoiding duplicating and fragmenting the efforts.

Taking into account that regional smart specialisation strategies are based on the idea that it is not possible to bet on everything and that regions must identify areas of technological and knowledge specialisation under the national framework for digitalisation, the 17 Spanish regions and the 2 autonomous cities are also developing specific initiatives within each RIS3 strategy, promoted by the European Cohesion Policy.

They generally focus on improving the efficiency of public administration in managing and providing public services through the use of ICT tools and integrated platforms. Local participation and engagement in the design of these tools has been found to be essential to ensure that the services fit local needs.

The Aragonese Strategy for Smart Specialisation in Research and Innovation (RIS3 Aragon 2014-2020), for example, had among its objectives to make Aragon a smart, sustainable and inclusive territory to take better advantage of economic opportunities.

ICT and the digital economy is one of the priorities of the Andalusian RIS3, to give another example, and it is followed by four action lines: new ICT developments, ICT for business development, development of new instruments for E-Governance and digital content innovation.

These guidelines, supported by the European Commission, have been taken up at international level in the reference framework for R&D&I and Information Society policies, the Europe 2020 Strategy, as well as in the flagship initiatives that aim to stimulate Europe's innovative capacities: the Innovation Union and the Digital Agenda for Europe.

At national level, these premises are reflected in the Spanish Science and Technology and Innovation Strategy 2013-2020 and in the Digital Agenda for Spain.

3.3.4. Digital Innovation Centres (DIH)

In Spain there are 24 recognised Digital Innovation Centres (DIH), linked to the agri-food, forestry, and rural sectors, and spread throughout the national territory. There are also European projects such as SmartAgriHubs that leverage, strengthen, and connect local European DIHs to create an interconnected ecosystem in which stakeholders will work together in the different phases of innovation.

The Regional Ministry of Agriculture, Livestock, Fisheries and Sustainable Development of Andalusia leads the Regional Cluster Iberia (RCI), coordinating the actions of the project in this territory in which 20 DIHs from Spain and Portugal participate. Moreover, it also coordinates the development of a European observatory of DIHs, expecting the participation of more than 400 digital innovation ecosystems.

The Regional Cluster Iberia aims at fostering a digitalisation network open to all agrifood businesses, creating an ecosystem where innovation can anticipate the sector's needs. To achieve this objective the Regional Cluster is based on three pillars:

- 3 Flagship Innovation Experiments (FIE) as a tool to promote new agritechnological business models.
- Young farmers as main actors of this network, considering their digital capacities.
- Open calls planned within the project representing a great opportunity for agrotechnological innovation through Digital Innovation Hubs.

Most of these DIHs have emerged in the framework of collaborative clusters funded by the Commission itself or by different European initiatives, with different types of management and the joint participation in these clusters of the University, science parks, technology centres, the Administration itself or business associations in the sector, among others. Particularly relevant is the "DIH Andalucía Agrotech" initiative which, with a regional vision and agri-food specialisation, stems from the experience of the thematic partnership in Traceability and Big Data of Smart Specialisation.

Another example from the other region of our LL is the Aragón DIH, which is a Centre for Digital Innovation (CID) in High Performance Computing in the Cloud and Cognitive Systems for Intelligent Manufacturing Processes, Robotics and Logistics. Aragón DIH is also i-Space, which means that it is part of these European reference centres in Artificial Intelligence and Big Data. They have been awarded the BDVA Gold label, which only 9 DIHs in Europe do have.

3.4. CAP National Strategic Plans

The programming process of the CAP Strategic Plan (SP) is divided into two main phases consisting of a first stage of diagnosis and needs analysis and a second phase of intervention strategy. Spain is currently in the second phase, which aims to define the intervention strategy of the Plan.

The Ministry of Agriculture, Fisheries and Food (MAPA) leads the work and is responsible for planning, designing and the inclusion in the CAP Strategic Plan of the national interventions and of

the common definitions of interventions (national and regional) while the regions are responsible for planning, designing and the inclusion of the regional interventions within the whole plan.

As stated in the Commission recommendations for the CAP strategic plan, the Spanish farming sector faces low productivity growth. It has a low level of investment in research and innovation, a low level of investment by farmers and weak uptake of new technologies.

The shift towards a greener and more modern agricultural sector needs to be done in a way that preserves the territorial balance, stimulates generational renewal and generates growth and employment in rural areas. The proportion of young farmers in Spain is one of the lowest in the EU. It also has a low entrepreneurial activity rate and social imbalances in its rural areas. Also, there must be careful consideration of the specific needs of women in agriculture and rural areas in order to deliver on gender equality and close the existing gender gaps.

The transition of the Spanish agricultural sector towards a sustainable knowledge-based model is a key challenge for the future. The low level of investment in research and innovation (it represents less than 4% of total Spain's R&I investments, and has fallen by 9% during the period 2008-2016 - while it increased around 33% at EU level⁴-), the low uptake of new technologies and low level of digitalisation are key challenges that currently hamper both the competitiveness and long-term sustainability of Spanish farms. At the same time, there is potential to address the current fragmentation of the Spanish agricultural knowledge and innovation system (AKIS) as well as reduce the administrative burden and improve the performance of the existing farm advisory services.

Regarding the budget, there will be a territorial distribution among the different autonomous communities of a total of 145,048,752.72 Euros, corresponding to different action programmes to promote environmental sustainability and the competitiveness of the agricultural and livestock sector (115.3 million Euros) and for the co-financing of rural development programmes (29.6 million Euros).

The main amount, 115,358,752.72 Euros, is made up of funds from the European recovery framework and will be used to grant aid to projects for "environmental and digital transformation of the agri-food and fisheries sector", included in Component 3 of the Recovery, Transformation and Resilience Plan managed by the MAPA.

3.4.1. CAP Integrated Administration and Control System (IACS)

In Spain, during the 2014-2020 CAP programming period, the introduction of digitalisation has been effectively implemented, for example in the Integrated Administration and Control System, under the responsibility of the Spanish Agricultural Guarantee Fund (FEGA).

⁴ 2018 Report of the Observatory on the Spanish agri-food sector in the European context. <https://www.cajamar.es/es/pdf/observatorio-sector-agro.pdf>

The Integrated System or IACS is the system by which all direct aid and rural development measures granted per area or head of livestock are managed. The system is based on two elements: computer databases and control systems. Among the databases, the most important is SIGPAC for surface areas and SITRAN for livestock aid.

Spain counts also with traditional control systems which are carried out on all files and on the on-site controls that are conducted to a percentage of the total files. Regarding aids per area, such controls can be either physical field inspection or by using remote sensing (from satellite images or orthophotographs).

IACS is a very efficient system that has been very reliable in securing European agricultural expenditure. However, it is a complex system that entails significant administrative burdens, both for citizens and for the administration. One of the major challenges for the coming period is to achieve simplification through digitalisation.

In this context, the **NIVA Project** in which Spain is participating stands out. This is an innovation project financed by the Horizon 2020 programme, with the participation of CAP paying agencies from 9 Member States, with 9 pilots, which aims to modernise and digitalise the IACS with two fundamental objectives:

- Simplification: reduction of administrative burdens. In short, the aim is to achieve what has been called an "application-free" system for area-based aid.
- To promote policies for sharing IACS data for statistical purposes and for monitoring agricultural and environmental policies.

Spain, through FEAGA, is leading the pilot on farm registration. Spain also participates in other pilots such as agri-environmental monitoring, pre-completed applications, use of precision agriculture data or detection of changes in SIGPAC.

Furthermore, monitoring controls have been carried out in Spain since the 2019 campaign. The successful experience of 2019, together with the new focus on digitalisation and modernisation that the future CAP reform will entail, has encouraged new communities to carry out monitoring controls in the 2020 campaign, which has been the second year of gradual implementation provided for by EU regulations. These area-based checks shall replace classical physical field visits and are based on the continuous observation of all agricultural parcels, of all dossiers, based on the automated processing of SENTINEL satellite images. If necessary, the farmer will be contacted to allow him either to modify his application or to provide additional evidence such as geotagged photos. All this communication will be done electronically and in a highly interactive way. Only as a last resort, exceptionally, a physical field visit would be necessary.

3.5. Data management

Spain has a National Interoperability Framework, which specifies guidelines for public bodies that use Open Data. The Royal Decree 1495/2011 on the Reuse of Public Sector Information also provided legal basis to the Spanish National Open Data Portal.

Open Data

Open data is defined as digital data that is made available with the necessary technical and legal characteristics so that it can be freely used, reused and redistributed by anyone, anytime, anywhere.

Spain is considered among the top European countries best prepared to assimilate and implement open data policies, according to the annual report of the European Public Data Portal⁵.

The country offers a big community of open data publishers and open data portals. There are state portals such as <http://datos.gob.es> that serve as a full open datasets catalogue. The catalogue is divided into categories: public services, demography, society, economy, environment, education, healthcare...

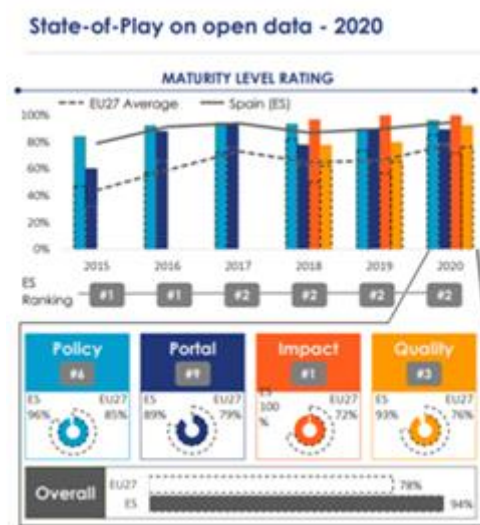


Figure 10: Open Data Maturity Report in Europe. EU average vs Spain

The Ministry of Industry, Trade and Tourism is carrying out the Aporta Project⁶, which aims to place Spain at the forefront of the reuse of public sector information in Europe, with the initiative Datos.gob.es, the Public Sector Information Catalog. This project is framed within the previously mentioned Avanza2 Plan, which faces the challenge of making the use of Information and Communication Technologies (ICT) increasingly provide benefits to citizens. In addition, the Avanza2 plan seeks to contribute to the economic recovery of the country thanks to the intensive and widespread use of ICT, promoting business development in key sectors such as digital content. It is hoped this will have a clear effect on rural areas.

Regional examples

The “Energy Datahub” dashboard offers detailed information about energy consumption of venues managed by the Castile and Leon Regional Government, such as educational and health centres, administrative offices, hospitals, etc., by energy type (electricity, gas, diesel) and by geographic

⁵ Bello.A “Datos abiertos y participación en el gobierno social” source = <https://www.mincotur.gob.es/Publicaciones/Publicacionesperiodicas/EconomiaIndustrial/RevistaEconomiaIndustrial/405/BELLO%20GARC%C3%8DA.pdf>

⁶ <https://datos.gob.es/es/acerca-de-la-iniciativa-aporta>

location. The dashboard includes information on more than 1 500 venues and offers various types of visualisations to support the user's understanding of the data.

Cybersecurity

Spain implemented its National Cybersecurity Strategy in 2019, replacing the first version published in 2013. It covers the following strategic goals: cybercrime, security and privacy balance, citizen awareness, critical information infrastructure protection, national cyber contingency plans, international cooperation, public-private partnership, incident response capability, institutionalised form of cooperation between public agencies, baseline security requirements, incident reporting mechanisms, R&D, cybersecurity exercises, incentives for private-sector investments, training and education programmes.

National Initiatives

is4k - Internet Security for Kids is the Spanish initiative to encourage the safe use of the internet amongst children, including actions against cyber bullying. The project received co-funding from the European Commission and sees the involvement of red.es, which executes plans of the Spanish Digital Agenda as part of the drive towards digital convergence with Europe, and INCIBE, which is the reference entity for the development of cybersecurity and digital trust for citizens, academia and research, professionals, companies and strategic sectors.

Women4Cyber Spain (W4C Spain) is the national initiative seeking to build a safer and more inclusive digital world. Its aim is to become a benchmark in promoting and making the role of women in cybersecurity visible in Spain, increasing gender diversity in the sector.

Spain is also part of the **Fourteen Eyes network**, which is an intelligence alliance between major countries around the world, including the United States, the United Kingdom, France, and Australia. This alliance allows the intelligence agencies from these countries to make use of various techniques to monitor cyber data and then exchange it with one another, with the aim being to prevent terrorist attacks and to protect the people.

4. Challenges and Opportunities

4.1. Barriers to digitalisation

In Spain, the COVID-19 crisis has highlighted the relevance of digitalisation in disruptive contexts such as the current one. Economic and educational activities have been able to continue in the most digitised territories: businesses have continued to operate remotely or have been able to go online, the public sector has helped those households and businesses most in need more efficiently and quickly, and, within households, digitalisation has enabled remote working and education in a less complex way.

The main barriers identified have been the ones mentioned across the report: there is a technical barrier in terms of connectivity of rural areas, as well as connection speed; a legal barrier in terms of data ownership; a training barrier in terms of lack of digital skills; an economic barrier in terms of

lack of resources and investments towards a digital transition, as well as other impacts as the social one, visualised as a result of COVID-19.

Table 5: Barriers to digitalisation

Barriers to digitalisation		Influence of COVID-19
Technical	Low interoperability of services and information	Improved as a result of COVID-19
	Low connectivity in rural areas	COVID-19 crisis has highlighted the digital divide between rural and urban areas
Legal	Conflict over data ownership and profitability	
Training / Education	Lack of digital skills, need of training	COVID-19 crisis has highlighted the lack of digital skills
Economic	Lack of resources and investment in R&D	Accelerated by COVID-19 and the lockdowns
	Limited development of remote work	Accelerated by COVID-19 and the lockdowns
Others	Lack of public data to enable the development of digital business models	Improved as a result of COVID-19
	Social impact	Visualised as a result of COVID-19

4.2. Actions to boost sustainable digitalisation

The following table address some ideas of actions that could be implemented in order to boost or achieve a sustainable digitalisation and it identifies 4 key rural development domains as human capital, innovation, investments and governance.

Table 6: Actions to boost sustainable digitalisation

	Key rural development domains			
	Human capital	Innovation	Investments	Governance
Creating the basic conditions for digitalisation	Favouring basic digital skills	Really achieving broadband	Investing in R&D	Favouring the Digitalisation of the Public Authorities
Anchoring digitalisation to sustainable development	Favouring professional digital skills focusing on the gender divide	Reversing low level of digital innovation within SMEs and bridging the gap of low innovation within rural	Investing both in Green and Digital transitions	Following the Sustainable Development Goals (SDGs) and according to the 2030 Agenda

		sectors		
Adapting digitalisation to different context	Focusing on digital literacy	Boosting rural digital hubs	Supporting rural areas, specially	Aligning national plans with the specific regional contexts
Favouring digital inclusion	Mapping vulnerable groups	Encouraging peer-to-peer networking	Support to vulnerable groups	Monitoring DESI indicators progress
Developing digital ecosystems	Encouraging Hubs and DIHs			
Developing adaptive governance models	Reaching a consensus between all public administrations in Spain (due to the nature of the territory and its structure) to develop the same digital-by-default interoperable infrastructure.			
Designing policy tools for sustainable digitalisation	Digital facilitators: the Internet of Things (IoT), big data, blockchain and artificial intelligence.			

5. Conclusions

In the last 10 years, Spain has provided important plans, strategies and agendas towards digitalisation and to cover the digital divide, such as the Spanish Strategy for Science, Technology and Innovation 2013-2020, the Programme for the Extension of Next Generation Broadband (PEBA-NGA); the National Plan for Smart Territories; the Agenda for Change, the Connected Industry 4.0 Strategy.

The years 2020 and 2021 have been crucial for the COVID-19 crisis and for the instruments, plans and agendas designed to recover from the crisis.

This could be seen as one of the beneficial side effects of the situation caused by the COVID-19: according to the *Telefónica* Foundation's Digital Society 2020 report, Spain has accelerated its digitalisation in all areas. In the first few weeks of lockdown, we advanced in the use of technology by the equivalent of a five-year period under normal conditions. We will be able to see the real results in the next few years.

However, despite the high degree of development of connectivity infrastructures in Spain and despite of the fact that policies have been running from several years, the problem of grey and white areas persist in Spain and the sanitary crisis has highlighted some aspects that still need to be improved in order to achieve equal opportunities and capacity to access networks for all territories, social groups and companies. This process needs to be supported by an acceleration of the broadband coverage and an increase in basic digital skills. In this respect, it is essential to have the necessary digital skills to ensure effective and responsible use of the digital tools available.

Networks already reach 94% coverage for access speeds of 30 Mbps and 85% for access speeds of 100 Mbps, but still do not reach remote areas of the territory and small towns with the necessary quality. This is a major constraint for population settlement, business projects and access to basic public and private services. Moreover, capacity needs to be strengthened in key areas, such as industrial parks, because of their impact on economic activity.

The digital divide in terms of access to and ability to use networks is increasingly acting as a vector for a new cause of social exclusion, especially affecting the most vulnerable groups. During the COVID-19 crisis, the need to continue remotely with economic activity, education or access to medical or social services, among others, has highlighted this new factor of inequality. Remote working has been shown to be a great opportunity to favour a lower concentration of population, provided that it is accompanied by access to a range of social and economic services available in large urban concentrations. Fixing the population in less populated or declining areas, whether older or younger, requires the availability of access to essential services in digital form.

The transition of the Spanish agricultural sector towards a sustainable knowledge-based model is also a key challenge for the future. The low level of investment in research and innovation, the low uptake of new technologies and low level of digitalisation are key challenges that currently hamper both the competitiveness and long-term sustainability of Spanish farms.

Plans are in place to bridge that gap between rural and urban, to really achieve desired access speeds and connections and to give the population basic skills to benefit from the infrastructure provided. We will have to wait a few years to see if this time, Spain has anchored digitalisation, rural areas have equal rights and rural sectors really benefits from the investments and innovations.

6. Annex

6.1. Bibliography

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6.2. Annex A

Table 7: Policies influencing digitalisation in your country

Areas being addressed / supported by the policies	Policy	Brief Description	Objectives	Area of impact	Period of implementation	Budget (if any)	Public / Private	Address rural areas (Y/N) Specify how	Link
Rural access to technologies	National Digital Skills Plan	Roadmap to identify the necessary measures to ensure that all citizens have the necessary tools to acquire and develop digital skills.	To substantially increase the level of basic digital skills of the population.	National	2021-2027	€3.750 million	Public	Y	210127_plan_nacional_de_competencias_digitales.pdf (mineco.gob.es)
Broadband, connectivity, affordability	Plan 300x100	Plan to bridge the digital divide and the digital transformation of the economy.	To position Spain "as a global leader in the access to digital infrastructure".	National	2018-2021	€150 million	Public	Y	Ministry of industry, trade and tourism - Agenda Digital publica la primera convocatoria del Plan 300x100 (mincotur.gob.es)
Creation of digital innovation ecosystems in or with influence in rural areas	Galicia Digital Agenda 2020	Strategy coordinated and aligned with national and European strategies in terms of ICT use, which aims to reinforce and reaffirm the Galician Growth Strategy. Includes the Primare Programme, the Virtual Agricultural Office, the CIVIL UAVs Initiative, the Galicia Broadband Plan 2020 and the Galicia 5G Plan. In addition, the DATA Life Digital Innovation Pole, supported by the Galician Innovation Agency and promoted by the Life Sciences Business Technology Cluster (BIOGA), which has the agro-livestock, agri-food and forestry sectors as priority focuses of attention.	Aimed at transforming the digital scenario into the driving force for a better society, committing to a growth model linked to the digital economy, solidarity, and inclusiveness, and to transparency and citizen participation. Axis D13 focused on the digitalisation of the primary sector	Regional: Galicia	2015-2016	€324 million	Public	Y	https://amtega.xunta.gal/es/agenda-digital-de-galicia#:~:text=La%20Agenda%20Digital%20de%20Galicia,eI%20impacto%20de%20las%20Opol%C3%ADticas
New digital business models in rural areas, agriculture, and forestry	Digitalisation of SMEs Plan	Plan for the improvement of SMEs digitalisation.	To achieve basic digitalisation for SMEs, to promote business training in digital skills, to enhance disruptive innovation and entrepreneurship, to support sector digitalisation, with special focus on industry, tourism and trade.	National	2021-2025	€4.66 billion	Public	N	Plan IMPULSA digitalización PYME 01 Optimizado (mineco.gob.es)

Funding of digitalisation (access to technologies, digital education, broadband access, etc.) in rural areas, agriculture, and forestry.	Digitalisation agenda for the agri-food and forestry sectors and rural areas	Strategic framework to ensure coherence and foster synergies between all the actions that are developed in the field of digitalisation in rural areas.	This Agenda defines the strategic lines and measures for the digitalisation for the agri-food and forestry sectors and rural areas. It places particular attention on the exploitation of big data as a driving force for the development of the agri-food sector and the rural environment, as well as boosting business development and new rural business models.	National	2019	€ 5-6 million	Public	Y	Estrategia de Digitalización del Sector Agroalimentario y Forestal y del Medio Rural (mapa.gob.es)
National rural development networks' initiatives	Red Española de Desarrollo Rural	The Spanish Network for Rural Development (REDR) is a non-profit association established in 1995 with the generic objective of promoting an integrated and sustainable rural development model.	The REDR is currently made up of Territorial Networks comprising more than 180 Rural Development Groups throughout Spain, which manage Programmes and Initiatives related to Rural Development and the LEADER methodology within the framework of the European Agricultural and Rural Development Fund (EAFRD).	National	1995	Not available	Public	Y	REDR
Digital Literacy and Digital Divide	MITTIC: innovative solutions based on ICT tools for agriculture, ranching, agri-food and forestry	In order to incorporate technological innovation into the traditional economic sectors of Spain's Extremadura region and Portugal's Centro and Alentejo regions, the MITTIC project developed and implemented a number of innovative proposals and tools. As a result, it successfully updated the regions' traditional productive sectors by increasing ICT capabilities, applying new business models, improving knowledge management and optimising resources. It was founded by the European Regional Development Fund.	The MITTIC project took a long-term approach aimed at transforming these traditional economic sectors into larger, more competitive companies by investing in research, innovation, entrepreneurship, knowledge transfer and the use of ICT.	Regional: Extremadura	2013-2015	€ 1.6 million	Public	Y	MITTIC: innovative solutions based on ICT tools for agriculture, ranching, agri-food and forestry- Projects - Regional Policy - European Commission (europa.eu)
Open data, standardisation of data, data access, etc...	Plan of measures to promote Re-use of Information	Plan designed with the objective to contribute to a greater transparency and in order to provide companies and citizens an easier, more immediate and more useful access to the data available for reuse, whether for commercial or non-commercial purposes, and to contribute to the progress and reactivation of the economy.	To provide the lines of action in the field of Re-use of Public Sector Information to be carried in order to comply with the provisions of Royal Decree 1495/2011, of 24 October and Law 37/2007, of 16 November 2007.	National	2012	Non specified	Public	N	https://portal.mineco.gob.es/es-es/ministerio/sedelectronica/datosabiertos/Paginas/03_Datos_abiertos.aspx
Cybersecurity	National Cybersecurity Strategy	The document set directives and general lines of action to tackle the challenge that cyberspace vulnerability represent for the country.	Helping promote secure and reliable cyberspace.	National	2019	Non specified	Public	N	Estrategia Nacional de Ciberseguridad 2019 DSN
Rural development networks' initiatives	Rural Development Groups	Local Action Groups or Rural Development Groups are non-profit public-private associations, with an assembly-based operation and a regional scope whose main function is the design, implementation and	To satisfy the economic, social and environmental needs of a region, as well as to reinforce and increase its potential through its endogenous resources, i.e. the territory itself. To this end, the weaknesses, threats,	Regional: 13 territorial networks of local action groups		Non specified	Public-Private	Y	Grupos de Acción Local - Red Rural Nacional

	management of Participatory Local Development Strategies.	<p>strengths and opportunities of the area are analysed, through the involvement of local actors, given their knowledge of the area and the importance of their participation in its governance. The strategy is elaborated jointly, involving the community in its development.</p> <p>Thus, the aim is not only to make the area more dynamic, but also to create infrastructures, generate businesses and employment and maintain and/or expand the range of services on offer.</p>							
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