LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET

SPAIN

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1. Introduction

Location Interoperability Framework Observatory

The Location Interoperability Framework Observatory (LIFO[1]) monitors the implementation of location interoperability good practices in European public administrations.

The monitoring is based on the level of adoption of the recommendations set out in the five focus areas of the European Union Location Framework (EULF) Blueprint[2] (see Figure 1).

European Union Location Framework Blueprint
EULF Blueprint

The EULF Blueprint provides guidance for implementing the European Interoperability Framework (EIF)[3] in the geospatial domain.

Consequently, the LIFO complements the EIF monitoring mechanism operated by the National Interoperability Framework Observatory (NIFO)[4].

LIFO is coordinated by the European Location Interoperability Solutions for e-Government (ELISE)[5] action in the Interoperability Solutions for European Public Administrations, Businesses and Citizens (ISA[2])[6] programme.

Policy and strategy alignment
a consistent EU and Member State policy and legislative approach where location information plays a significant role

Digital government integration
making location a key enabler in G2B, G2C and G2G digital government processes and systems

Standardisation and reuse
adoption of recognised geospatial and location-based standards and technologies, enabling interoperability and reuse

Return on investment
ensuring funding of activities involving location information is value for money, and taking action to stimulate innovation and growth

Governance, partnerships and capabilities
effective decision making, collaboration, knowledge and skills related to the provision and use of location information in the context of digital government
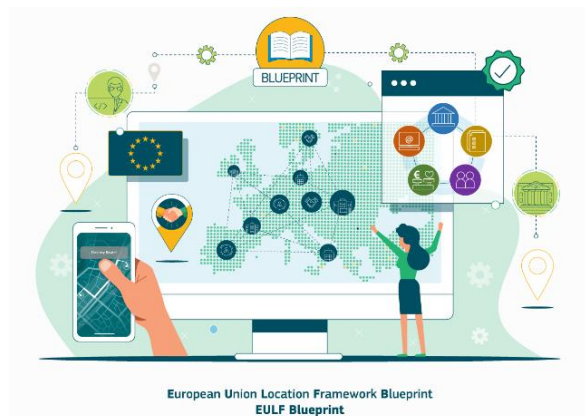
Figure 1 - EULF Blueprint focus areas

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[1] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/lifo-location-interoperability-framework-observatory/about
[2] http://data.europa.eu/w21/8e942bc2-657a-4289-b057-f2a285ee7375
[3] https://ec.europa.eu/isa2/eif_en
[4] https://ec.europa.eu/isa2/solutions/nifo_en
[5] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/about
[6] https://ec.europa.eu/isa2/home_en

The LIFO data collection is carried out through an online questionnaire sent to country representatives for digital government in the geospatial domain. The questionnaire is based on the LIFO analytical model[7]. This model is composed of primary indicators, calculated using information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive[8]. The indicators address good practices in the provision and use of location data in digital government and are shaped by the European policy context. They include measures relating to several EU directives and regulations including, for example, required datasets and means of access under both the INSPIRE Directive and the Open Data Directive[9], obligations under the General Data Protection Regulation (GDPR)[10], approaches under the Public Procurement Directive[11], and factors relevant to the EIF[12].

LIFO involves participating countries that are either EU Member States or other countries implementing the INSPIRE Directive. Results for the non-EU Member States, which apply EU legislative provisions on a voluntary basis, have their own alternatives, or apply the provisions only for specific aspects, must be read taking this into account.

The first LIFO data collection was in 2019 and the second in 2020. The LIFO 2020 model improves the monitoring capabilities of the model used in 2019, while being substantially aligned with it.

LIFO results are published on Joinup (see Figure 2) in the form of *Country factsheets*[13] and a *European State of Play Report*[14] and are available for users to explore in the *LIFO interactive dashboards*[15], which are linked in their turn to the *EULF Blueprint*[16].

Figure 2 - LIFO online resources

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[7] See Annex 1 for the scoring methodology used in the model and Annex 2 for a list of indicators

[8] See https://inspire.ec.europa.eu/inspire-directive/2. As reported in the EULF Blueprint, "Geospatial or location interoperability has been a major feature of both the ISA2 Programme and the predecessor ISA Programme. There was a strong basis for this with the adoption and implementation of INSPIRE. INSPIRE has driven forward the implementation of harmonised pan-European geospatial data for European environmental policy, and has paved the way to stronger location interoperability in other domains where harmonised geospatial data play a significant role.".

[9] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32019L1024

[10] https://eur-lex.europa.eu/eli/reg/2016/679/oj

[11] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014L0024&qid=1428299560152&from=EN

[12] As introduced by the Communication from the European Commission of 23/3/2017: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2017%3A134%3AFIN

[13] https://joinup.ec.europa.eu/node/704194

[14] https://joinup.ec.europa.eu/node/704361

[15] https://joinup.ec.europa.eu/node/704247

[16] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/eulf-blueprint/about

The information collected through LIFO can be used to examine current national and European status, compare countries, identify strengths and areas needing improvement, uncover best practice solutions, and plan appropriate measures, including potential partnerships and reuse of solutions.

The LIFO State of Play and the emerging best practices are incorporated in updates to the EULF Blueprint, ensuring the guidance framework remains up-to-date.
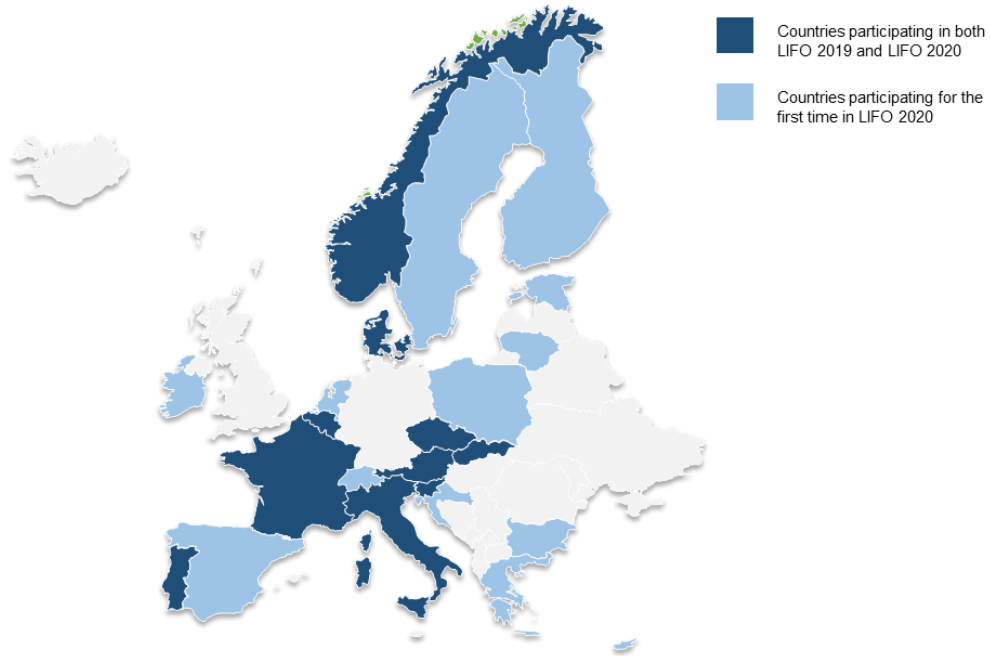

Figure 3 - LIFO participating countries in 2019 and 2020

The LIFO 2019 data collection involved 10 countries, whereas the LIFO 2020 data collection involved 23 countries. Appreciation is given to all participants who contributed to the survey responses and provided further information to ensure the results are representative of the national state of play (see Figure 3)[17].

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[17] Countries participating in both LIFO 2019 and LIFO 2020: Austria, Belgium, Czech Republic, Denmark, France, Italy, Norway, Portugal, Slovakia and Slovenia;
Countries participating for the first time in LIFO 2020: Bulgaria, Croatia, Cyprus, Estonia, Finland, Greece, Ireland, Lithuania, Netherlands, Poland, Spain, Sweden and Switzerland.

2. Structure of the document

This factsheet provides an overview of the information collected on location interoperability in Spain in 2020. It contains the following sections:

- Location Interoperability State of Play where information is provided at two levels:

  - ***Overview of results***: describes the location interoperability state of play in the country across all five focus areas, together with a summary chart and a table with the main strengths and weaknesses;
  - ***Detailed results by focus area:*** organised in five sections; while the overview section gives a bird's eye view of the status across all focus areas, the focus area sections give a more detailed picture, with the vision and recommendations for the focus area, followed by an analysis of the state of play in the country for each of the recommendations. Two focus area charts are included, one displaying the average scores for each recommendation and the other the individual scores for the underlying indicators. In both charts, scores are compared with the average of the monitored countries. The titles of the charts are linked respectively to the table of recommendations in the focus area and to the relevant indicators in Annex 2.

- Best Practices: This section highlights initiatives and applications provided as survey 'evidence' which demonstrate the adoption of EULF Blueprint good practices in one or more focus areas / recommendations.

Lists of abbreviations and definitions, figures and tables: These aid cross-referencing in the document.

Annexes to the document are:

- Annex 1: The method of scoring and normalisation applied to the indicators;
- Annex 2: A list of indicators used for each of the recommendations, together with a summary of 2020 indicator changes;
- Annex 3: Additional information for Spain comprising the questionnaire response and the scores and charts based on the response.

The 2020 LIFO monitoring information for Spain has been provided by the *Ministerio de Transportes, Movilidad y Agenda Urbana.*

3. Location Interoperability State of Play

3.1. Overview

The information gathered through the LIFO 2020 data collection indicates that Spain scores above the European average in almost all focus areas, with only the "Digital Government Integration" focus area falling below the European average. In this focus area, there is margin for improvement, particularly in optimising the use of location information among key digital public services and in the set of actions implemented for the integration of location and statistical information.

In the "Return on Investment" focus area, Spain's strengths are linked to the excellent performance in monitoring location-based services, to the well-established and convincing approach to the communication of availability and benefits of location data and location-enabled digital public services, and to the wide set of measures implemented to make the process of searching, finding and accessing location data and web services as easy as possible.

Spain is also well positioned in the "Standardisation and Reuse" focus area, due to the consistent application of relevant international standards (complemented where necessary by national standards), to a coherent data quality approach and to the extensive and consistent standardisation effort undertaken in the geospatial domain.

The strengths in the "Policy and Strategy Alignment" focus area are linked to the wide range of location core reference datasets available for general use under an open licence, to the fact that most organisations are fully compliant with GDPR, and to the specific references to the applicable parts of the INSPIRE Directive and/or national/international standards in the procurement documents of location data and services. There is room for improvement in the use of location-based evidence for policy making.

Finally, in the "Governance, Partnerships and Capabilities" focus area, Spain has implemented an extensive range of initiatives to raise awareness and develop geospatial skills. There is margin for improvement in the governance and partnership dimensions.

The value of the overall LIFO index combining the scores for all focus areas is 0.61, which confirms the good performance of Spain in terms of location interoperability. This compares with a European average of 0.55.
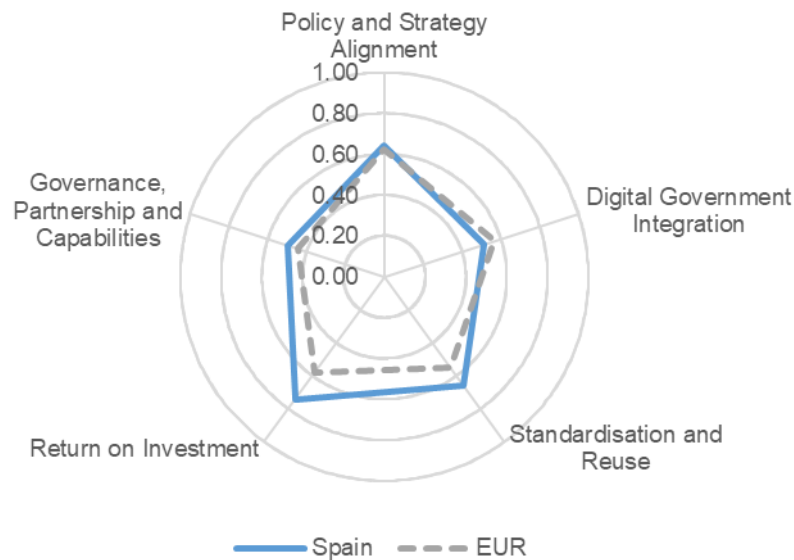
Figure 4 - Overall EULF Blueprint implementation

The following table summarises Spain's main strengths and weaknesses across the five focus areas:

Focus Area	Strengths	Weaknesses
Policy and Strategy Alignment	• Wide range of location core reference datasets available for general use under an open licence • Most organisations fully compliant with GDPR • Specific references to the applicable parts of the INSPIRE Directive and/or national/international standards made in the procurement documents of location data and services	• Limited use of location-based evidence for policy making
Digital Government Integration	• Open and collaborative methodology applied to design and improve location-enabled digital public services at all levels of government (local, regional and national).	• Limited set of actions implemented for the integration of location and statistical information • Location information used in basic or sub-optimal way in delivering key digital public services.
Standardisation and Reuse	• Comprehensive application of relevant standards • Good level of location data quality management • Extensive and consistent standardisation efforts undertaken in the geospatial domain	• Rather ad-hoc approach to monitoring new technological developments

	Return on Investment	• Effective monitoring of the performance of location-based services • Well-established and convincing approach to the communication of availability and benefits of location data and location-enabled digital public services • Ease of searching, finding and accessing location data and web services by companies, research institutions, citizens and other interested parties	• Limited set of actions implemented to support private, non-profit and academic actors in the development of new products, services or research using public sector location data
	Governance, Partnerships and Capabilities	• Extensive range of initiatives to raise awareness and develop geospatial skills	• Limited formal agreements between public authorities to finance, build and operate location data services or digital public services using location data • Limited examples of agreements with public authorities in other countries and public-private partnerships

Table 1 - Strengths and Weaknesses by Focus Area

The following sections present the results in detail for each focus area.

3.2. Policy and Strategy Alignment

Vision	
	There is an aligned and coordinated policy and strategic approach across Europe for the use of location information that enables more efficient and effective integration of cross-sector and cross-border location-based applications, reducing costs and increasing social and economic benefit. Public sector location policies promote accessibility and interoperability. There are simple and consistent approaches to licensing, progressive open data policies that balance the needs of data users and suppliers, and authentic registers in which 'location' has a prominent role.
Recommendation 1	Connect location information and digital government strategies in all legal and policy instruments
Recommendation 2	Make location information policy integral to, and aligned with, wider data policy at all levels of government
Recommendation 3	Ensure all measures are in place, consistent with legal requirements, to protect personal privacy when processing location data
Recommendation 4	Make effective use of location-based analysis for evidence-based policy making
Recommendation 5	Use a standards-based approach in the procurement of location data and related services in line with broader ICT standards-based procurement

Table 2 - Focus Area "Policy and Strategy Alignment" - vision and recommendations
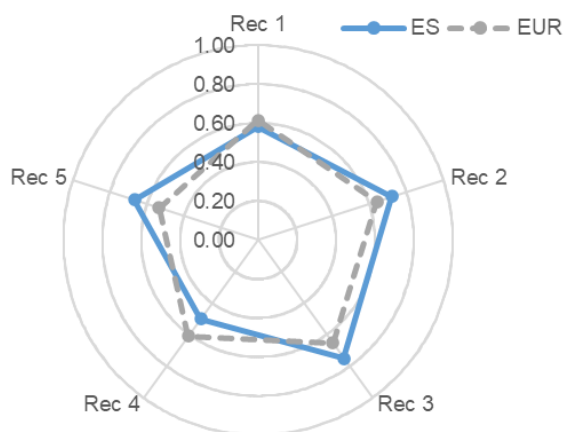

Figure 5 - Policy and Strategy Alignment – scores by recommendation

The scores for each recommendation in the "Policy and Strategy Alignment" focus area are shown in Figure 5 and the underlying indicator scores for each recommendation are shown in Figure 6. In both cases, the country scores are compared to the European average.

The "Policy and Strategy Alignment" focus area index for Spain is 0.64 compared with the European average of 0.62. This result is due to the consistent approaches to location data policies, protection of personal location data and standardised procurement of location data and services. Conversely, the use of location-based analysis for policy making is the dimension with the highest margin for improvement.

The country has reported a good degree of alignment in the location strategy on digital government elements (Recommendation 1). The location strategy is set by the following legislative instruments that regulate the use in digital government of authoritative location datasets and services:

- The law 14/2010 of 5 July, which regulates infrastructures and services of geographic information in Spain (called LISIGE) and incorporates the INSPIRE Directive 2007/02/CE into Spanish legal system, transposing it in Spanish legislation;[18]

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[18] https://www.boe.es/boe/dias/2010/07/06/pdfs/BOE-A-2010-10707.pdf. The law includes the establishment of the Geographical Information Infrastructure of Spain, which integrates interoperable datasets and services of geographical information under Spanish Public Administration responsibility

- The Royal Decree 1545/2007 of 23 November[19], which regulates the National Cartographic System with the objectives of:
  - ensuring homogeneous information produced by the public sector as part of the National Cartographic System;
  - fostering more efficient public spending devoted to cartography and geographic information systems;
  - ensuring publicly available and updated geographical reference data;
  - optimising the quality of the official cartographic production.

Spain's "National Artificial Intelligence Strategy (ENIA)[20]" aims to create an environment of trust regarding the development of inclusive and sustainable artificial intelligence (AI). This strategy implements one of the main proposals of the country's Digital 2025 plan[21]. In particular, the ENIA has six Strategic Pillars, one of which (Strategic Pillar 3) foresees the availability of open data as an essential tool for the proper functioning of artificial intelligence. More precisely, Strategic Pillar 3 foresees the development of data platforms and technological infrastructures, including the Spatial Data Infrastructure (SDI), to provide a support network for artificial intelligence.

There are also regional digital strategies: an example is provided by the "Navarra Digital Strategy 2030"[22], which focuses on digitalisation as a lever for transformation, with the aim of making Navarra a smart regional leader in use of key technologies and provision of digital public services. This strategy explicitly mentions the need to exploit geospatial information to develop new services aimed at improving the knowledge of the territory and facilitating climate transition, utilising artificial intelligence and big data.

Considering the alignment of location information policy with wider data policy in Spain, most location data are available free of charge under an open licence[23] with minimal restrictions (Recommendation 2). Some restrictions are applicable to the following:

- post codes can be downloaded only upon payment of a fee;
- addresses, buildings and cadastral parcels must be subject to a transformation process that gives rise to a different copyrighted work, without the data being altered nor their meaning distorted. The transformed product should not pass itself off as a cadastral product, but only as a product making use of cadastral data;
- health statistics whose reuse is allowed provided that the sense of the information is not altered.

There is no formal common licensing framework, but *de facto*, in most cases, the applicable licence is Creative Commons - Attribution 4.0 International (CC BY 4.0)[24].

A wide range of location core reference datasets are available for general use. These include, for example:

- administrative units;[25]
- addresses, from the CartoCiudad project;[26]
- geographical names.[27]

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[19] https://www.boe.es/boe/dias/2007/11/30/pdfs/A49215-49229.pdf
[20] https://www.lamoncloa.gob.es/presidente/actividades/Documents/2020/ENIAResumen2B.pdf
[21] https://portal.mineco.gob.es/en-us/ministerio/estrategias/Pages/00_Espana_Digital_2025.aspx
[22] https://gcpublica.navarra.es/publica01/EDN2030/Documents/EDN2030_en.pdf
[23] The National Cartographic System website has a list of licenses of all datasets (see http://www.scne.es/)
[24] https://creativecommons.org/licenses/by/4.0/
[25] See http://www.idee.es/csw-codsi-idee/srv/eng/catalog.search#/metadata/spaignLLM
[26] See http://www.idee.es/csw-codsi-idee/srv/spa/catalog.search#/metadata/spaign_cartociudad_addresses
[27] See http://www.idee.es/csw-codsi-idee/srv/spa/catalog.search#/metadata/spaignNGBE

National guidelines on the publication of Public Sector Information are adopted and cover location aspects, such as the National Interoperability Framework (NIF)[28] which embeds interoperability requirements configuring an integrated, coherent and comprehensive legal approach.
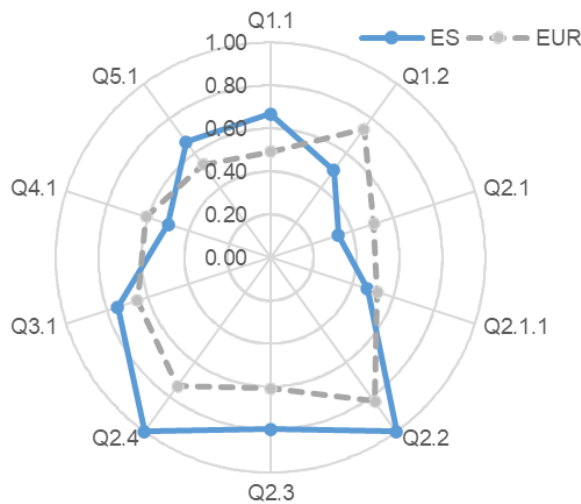

Figure 6 - Policy and Strategy Alignment – scores by indicator

Across Spain, most organisations are fully compliant with GDPR (Recommendation 3). This includes awareness of potential location data privacy issues and processes in place to comply with the rights of data subjects. For example, the Spanish Cadastre has implemented several solutions to protect the rights and freedoms of data subjects[29]. First of all, only data that is not subject to data protection law is visible for all citizens (e.g. surface, location, use, shape, boundaries, cartographic representation, and type of construction). The Cadastre's policy of open access is compliant with the PSI Directive[30] and Law 11/2007 of 22 June on citizens' electronic access to public services[31]. Secondly, the Spanish Cadastre has implemented procedures to handle requests related to the rights of data subjects. Notaries, municipalities and registries can access and change the data directly upon demand by the data subject, with final validation and approval carried out by a cadastre officer. Finally, accesses to publicly available data (either via the website of the Spanish Cadastre, offline directly at an office of the Spanish Cadastre or to one of the cadastral information points), are subject to the identification of the requestor, to the validation of the legal ground for access and to the determination of the data that can be accessed based on the purpose of the access.

Location-based evidence and analysis is used to help in developing relevant policies and monitoring outcomes only in some relevant policy topics (Recommendation 4). For instance, the COVID-19 pandemic has shown how important geolocation of people is in detecting outbreaks or the focus of infection, highlighting the importance of SDIs in achieving this purpose. In this regard, all regional SDIs have published viewers or dashboards that depict the up-to-date COVID-19 situation in the country[32]. Another example is given by the Ministry for the Ecological Transition and the Demographic Challenge (MITECO) that uses data from the National Flood Zone Mapping System (SNCZI) for managing flood risk.[33]

Under Recommendation 5, regarding the procurement of location data and services, the Spanish government requires specific references to the applicable parts of the INSPIRE Directive[34] and / or national / international standards in its approach.

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[28] See https://joinup.ec.europa.eu/collection/egovernment/document/national-interoperability-framework-spain-eni
[29] See JRC, "Guidelines for public administrations on location privacy" Version 2, 2020, p 40-41
[30] See https://www.w3.org/2013/share-psi/lg/Spain/
[31] See https://administracionelectronica.gob.es/pae_Home/dam/jcr:2baa2e22-26d9-4bd9-b1e8-1b29a5a4caae/Ley-11-2007_22Jun_NIPO_000-10-075-0.pdf
[32] See https://www.idee.es/web/idee/covid-19
[33] Viewer available at https://sig.mapama.gob.es/snczi/index.html?herramienta=DPHZI
[34] One example is given by the technical specifications that govern the execution of the contract "Supply for the development of the Salou smart tourism initiative". See https://contrataciondelestado.es/wps/wcm/connect/b2d2f4a8-bd3b-4f9e-b132-32e339995668/DOC20201120115332PPT_095-20-SP_.pdf?MOD=AJPERES

3.3. Digital Government Integration

Vision	
@	Location is well integrated in digital government processing supporting G2G, G2B and G2C interactions, through location related services across government. Users do not have to supply the same mandatory information multiple times. There is visibility of common coordinating and support structures, expert groups and technologies, a strong user voice in the design, evaluation and improvement of location-based services, and good evidence of take-up of services.
Recommendation 6	Identify where digital government services and processes can be modernised and simplified through the application of location-enabled services and implement improvement actions that create value for users
Recommendation 7	Use spatial data infrastructures (SDIs) in digital public services and data ecosystems across sectors, levels of government and borders, integrated with broader public data infrastructures and external data sources
Recommendation 8	Adopt an open and collaborative methodology to design and improve location-enabled digital public services
Recommendation 9	Adopt an integrated location-based approach in the collection and analysis of statistics on different topics and at different levels of government

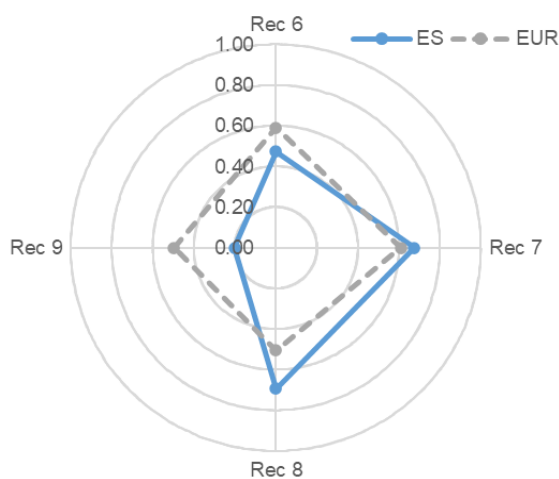*Table 3 - Focus Area "Digital Government Integration" - vision and recommendations*

Figure 7 - Digital Government Integration – scores by recommendation

The scores for each recommendation in the "Digital Government Integration" focus area are shown in Figure 7 and the underlying indicator scores for each recommendation are shown in Figure 8. In both cases, the country scores are compared to the European averages.

The "Digital Government Integration" focus area index for Spain is 0.51, slightly below the European average of 0.57. The reason for this negative deviation is mainly due to the limited set of actions implemented for the integration of location and statistical information in Spain (Recommendation 9). These are:

- the collection of census data based on the location reference framework for statistics.
- the contribution to European projects aiming at establishing a data and production infrastructure for location based statistics (e.g. GEOSTAT).

Service improvement approaches in Spain are adopted in several cases for optimising key digital public services in their use of location information (Recommendation 6). This occurs in sectors such as environment, property and land administration and transport, where there are interesting examples of using location information in a comprehensive or even innovative way. One example are the online services of the General Direction of the Cadastre[35], which are offered for free to the public. The description of properties in the Property Registry may be accompanied by the georeferenced graphical representation of the plot, included in the registry upon request of the owner. Based on that, it is possible to identify the situation, shape and

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[35] See http://www.catastro.meh.es/

surface of the registered property on a plan, overcoming the previous situation in which most of the registered properties were described only verbally. Users can:

- consult cadastral references through web map services (WMS)[36];
- request to incorporate a new graphical representation of a property at any time, for example, on the occasion of a sale transaction;
- provide cadastral information to rectify the registered information.

The data made available by the public registry can improve the trustworthiness of the real estate market by ensuring the consistency of the information on the traded properties with cadastral data.

In contrast, for many other sectors (e.g. agriculture, defence, civil protection, energy, health, marine, regional and urban development), location data is exploited in key digital public services only in a basic or sub-optimal way.
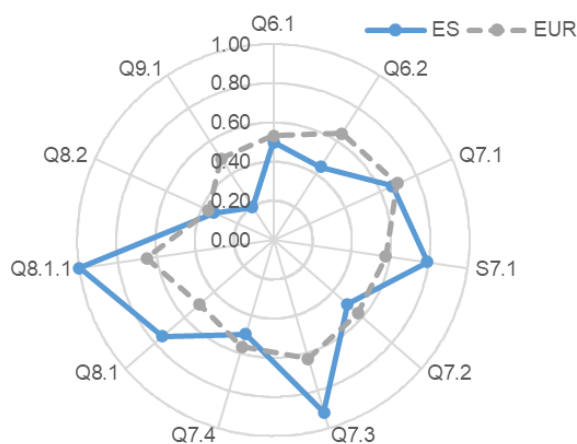

Figure 8 - Digital Government Integration – scores by indicator

Delivery of digital public services is supported by the use of the national SDI, often combined with sector-specific SDIs (Recommendation 7), in various domains such as agriculture, environment, marine and transport.[37] In this context, INSPIRE conformant datasets and services are used in some digital public services, for instance in the Cadastral Electronic Website.

The national SDI is also exploited in some cross-border services. These services use INSPIRE conformant datasets and services only to a limited extent.

Finally, the public sector SDI is sometimes used by the private sector and other organisations (e.g. NGOs) for the delivery of new and innovative applications, products and services. Examples include "Wikiloc – Trails on the Road"[38] - a website used to discover and share outdoor trails for hiking, cycling and many other activities, and "Goolzoom[39]" - a tool for the analysis and study of territorial information.

A point of strength for Spain, with reference to Recommendation 8, is the extensive application of an open and collaborative methodology to design and improve location enabled digital public

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[36] See https://www1.sedecatastro.gob.es/OVCInicio.aspx
[37] The frameworks used in the various sectors are:
- Agriculture: Ministry of Agriculture (MAPA) and regional SDIs
- Environment: the Environment Spatial Data Infrastructure set by the Ministry for the Ecological Transition and the Demographic Challenge (MITECO). See https://www.miteco.gob.es/en/cartografia-y-sig/ide/
- Marine: the SDI of the Spanish Institute of Oceanography. See: http://www.ieo.es/en_US/web/ieo/servicios
- Property and land administration: the Cadastral Electronic Site managed by the Directorate General for Cadastre. See https://www1.sedecatastro.gob.es/OVCInicio.aspx
- Regional and urban development: SDIs of the National Geographic Institute of Spain and regional cartographic organizations
- Transport: the Transport Network (TN) dataset, whose production has been led by the National Geographic Institute of Spain (IGN-Spain) as a seamless geographical information reference data base all over Spain, with a double target:
  - The creation of a seamless, homogeneous and coherent geospatial database of TN data, being both a data product itself and the data source for other cartographical products published by this Institution.
  - To ensure the INSPIRE compliant answer on TN data from Spain.
    See https://www.ign.es/web/redes_transporte/
[38] https://www.wikiloc.com/
[39] https://www.goolzoom.com/

services at all levels of government. An example is the geocoder[40] of the Geographic High Council, which last year began a project in collaboration with several national, regional and local organisations to harvest addresses of Spanish entities and publish them from a central node. At the moment, the geocoder has 22 million addresses from:

- national organisations such as the General Direction of Cadastre, National Institute of Statistics and Post Office Group;
- regional organisations of Madrid, La Rioja, Andalucía, Navarre, Basque Country, Baleares, Cantabria;
- local organisations of Madrid, Barcelona, Cáceres.

Furthermore, when developing or delivering location-based digital public services, external parties are involved by:

- contracting services to the private sector or NGOs under public sector accountability;
- collecting location data from those parties through an agreed process or service and later making the data open.

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[40] See https://www.iderioja.larioja.org/geocoder/test-ign/

3.4. Standardisation and Reuse

Vision	
	Core data has been defined and a funding model has been agreed for its ongoing maintenance and availability. Consistent use of geospatial and location-based standards and technologies, enabling interoperability and reuse, and integration with broader ICT standards and technologies, including the standards and solutions promoted by the ISA[2] programme. Use of these standards in all areas related to the publication and use of location information in digital public services, including metadata, discovery, view, exchange, visualisation etc.
Recommendation 10	Adopt a common architecture to develop digital government solutions, facilitating the integration of geospatial requirements
Recommendation 11	Reuse existing authentic data, data services and relevant technical solutions where possible
Recommendation 12	Apply relevant standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate integration in digital public services
Recommendation 13	Manage location data quality by linking it to policy and organisational objectives, assigning accountability to business and operational users and applying a "fit for purpose" approach

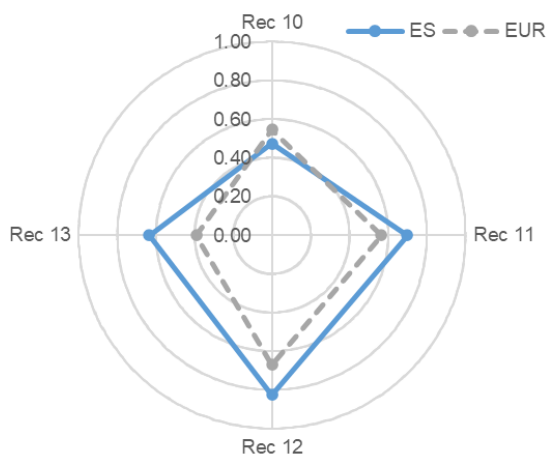*Table 4 - Focus Area "Standardisation and Reuse" - vision and recommendations*

Figure 9 - Standardisation and Reuse – scores by recommendation

The scores for each recommendation in the "Standardisation and Reuse" focus area are shown in Figure 9 and the underlying indicator scores for each recommendation are shown in Figure 10. In both cases, the country scores are compared to the European averages.

The "Standardisation and Reuse" focus area index for Spain is 0.66, well above the European average of 0.55. This is due in combination to the extensive application of relevant standards, to the good level of location data quality management, and to the reuse of authentic data registers and common technical solutions.

Spain is well positioned in respect to the European average for the reuse of authentic data registers and common technical solutions (Recommendation 11). For example, national generic ICT solutions such as the IDEE registry[41], the INSPIRE registry for Spain, are reused in the SDI.

All main registers of location information are implemented, namely: addresses, geographical names, administrative units, cadastral parcels, buildings, hydrography, transport networks glossary and code lists.[42]

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[41] https://registro.idee.es/registry
[42] The relevant registers are:
- Addresses, Cadastral parcels and Buildings: ATOM Feed service of Directorate General for Cadastre for example: CP http://www.catastro.minhap.es/INSPIRE/CadastralParcels/ES.SDGC.CP.atom.xml; access to all cadastral information and property finder: https://www.sedecatastro.gob.es/
- Codelist about buildings and transport networks (Aerodrome): http://registro.idee.es/codelist/ BuildingNatureValue and http://registro.idee.es/codelist/AerodromeTypeValue

Another reason for Spain's outstanding positioning with regards to the European average is the extensive and consistent standardisation efforts undertaken in the geospatial domain. Under Recommendation 12, Spain presents a significant number of spatial data sets in conformity with Regulation (EU) No. 1089-2010 and a good number of INSPIRE network services in conformity with Regulation (EC) No 976/2009.

To connect geospatial data and general data, a number of international geospatial standards are used in various domains:
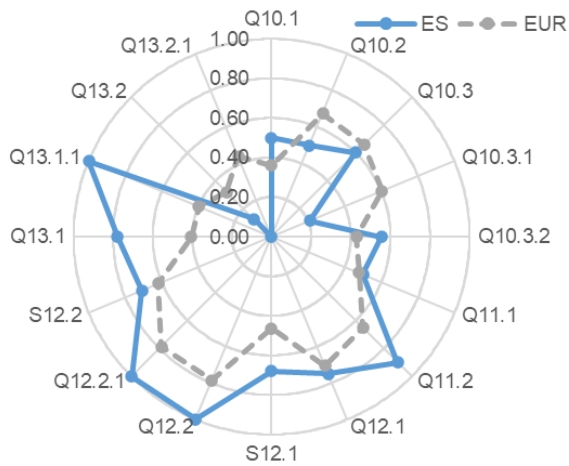

Figure 10 - Standardisation and Reuse – scores by indicator

- network services are based on INSPIRE, ISO 19128, ISO 19142, WMS, CSW, WCS, WFS of OGC;
- metadata are based on INSPIRE and ISO 19115, ISO 19139;
- data sets are based on INSPIRE, ISO 19136, UML;
- data specification are based on ISO 19131:2007, "Geographic information — Data product specifications";
- GIS is based on ISO 19111:2019, "Geographic information — Referencing by coordinates" and 19107:2019, "Geographic information — Spatial schema";
- gazetteers are based on ISO 19112:2019, "Geographic information — Spatial referencing by geographic identifiers";
- quality assurance is based on ISO/TS 19158:2012, "Geographic information — Quality assurance of data supply";
- nautical charts use IHO standards S-57 "Transfer Standard for Digital Hydrographic Data" and S-52 "Specifications for chart content and display aspects of ECDIS" for the exchange of digital hydrographic data between national hydrographic offices;
- Imagery uses ISO 19121:2000, "Geographic information — Imagery and gridded data".

In addition to the international standards mentioned above, the Spanish Association for Standardisation (AENOR) has published the Spanish Standard UNE 148004: 2018 "Open Geographic Data".[43]

- Facility inventory: PRTR-España is the Spanish Register of Emissions and Pollutant Sources. It provides information on pollutant releases to air, water and land, and off-site transfers of waste not only from the main industrial facilities but also emissions from other points and diffuse sources, according to the international (Kiev Protocol and Aarhus Convention), European (E-PRTR Regulation) and Spanish regulation (Real Decreto 508/2007 and its amendments). Information is available by facility and in an aggregated way by industrial activity, pollutants and geographically: http://www.en.prtr-es.es/
- Glossary: Pan-Hispanic version of the ISO/TC 211 Glossary: https://www.ign.es/web/ign/portal/ide-glosario-panhispanico
- Geographical names, Administrative units, Hydrography, Transport networks: The Download Centre (CdD) is a web site of the National Centre for Geographic Information (CNIG) that supplies free downloads of geography-related digital files, generated by the Directorate General for the National Geographic Institute (IGN), provided that such files are accessible and re-usable, as set out in Order FOM/2807/2015, on the policies for public dissemination of Geographic Information generated by the IGN. The Download Centre, as per relevant agreements, also makes available geographic information owned by other public administrations. All data are available as open data: http://centrodedescargas.cnig.es
- Hydrography: Water Activity Area Downloads of Ministry for the Ecological Transition and the Demographic Challenge (MITECO): https://www.miteco.gob.es/es/cartografia-y-sig/ide/descargas/agua/default.aspx
- Transport networks Real-time traffic information: http://infocar.dgt.es/etraffic/

[43] See best practice ES2

An open data portal[44] is also used in addition to National and International / European specifications and tools to connect spatial and non-spatial data.

Location data quality (Recommendation 13) is another point of strength under this focus area. Various actions are typically implemented to assure data quality. In terms of design, these actions include:

- development and application of a framework for analysis of data quality;
- linking of data quality standards to data standards;
- inclusion of the different dimensions of data quality in the standard, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards / legislation.

In terms of measurement, the actions implemented are:

- measurement of conformance of data to quality parameters set out in the data policy on an agreed frequency;
- data quality dashboards for critical information such as authentic data;
- ex-post evaluation of existing data quality issues;
- assessment of the current business value in terms of the existing data quality level.

Among the examples of relevant data quality initiatives, the National Geographic Institute (IGN) and the Regional Cartographic Agencies have reached consensus on a common data specification for the topographical databases: the Harmonised Topographic Database (BTA). This specification includes a quality section with parameters of data quality, thresholds, methods and measurements.

The Spanish SDI has proposed and obtained the approval of some recommendations on services and client applications (for example the "Recommendations on WMS services" and the "Recommendations on geo-portals and viewers") to increase the availability, flexibility and interoperability of those resources. A control list based on such recommendations has been used informally by the experts of the SDI unit of the IGN to verify and inform regarding problems in the existing resources.

The main standards applied to ensure location data quality are "ISO Standard 19157 on Data Quality"; "(W3C) Data Quality Vocabulary (DQV)" and "ISO/IEC 25012 Software engineering - Software product Quality Requirements and Evaluation (SQuaRE) - Data quality model". In the publication of data through the Network services, the concept of quality of service defined in the Regulation Nº 976/2009 is used.

Data quality governance relies only on the definition of a data quality review process. However, the Spanish IGN has a Strategic Plan that includes a project labelled "Quality" with the objective of implementing the EFQM model.[45] Another point of improvement concerns the few actions that have been implemented to ensure the quality of metadata.

Only Recommendation 10 is slightly below the European average in this focus area. Though the location data architectural approach in Spain fits within a broader national ICT architectural framework, a rather ad-hoc approach is in place to discover, explore and incorporate new technological features or emerging technologies.

The architecture includes a series of location data APIs that have been developed, documented and are accessible. Several steps are commonly taken in order to stimulate their take-up and ensure their usefulness:

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[44] https://datos.gob.es/en
[45] www.efqm.org/index.php/efqm-model/

- user communities are consulted in development / enhancement of APIs;
- APIs are based on recognised standards (e.g. OGC API - Features, OGC Sensor of Things API);
- API design best practices are used (e.g. REST APIs);
- APIs are discoverable in both public sector catalogues/portals and external catalogues (alongside non-public sector APIs);
- APIs have simple standard licences that specify their use.

Certain high value location datasets can be accessed using APIs, namely: addresses, administrative units, buildings and geographical names.

3.5.   Return on Investment

Vision	
	There is a strategic approach to national and European funding, procurement, and delivery of location information and location-based services to minimise costs and maximise benefits for government, businesses and citizens, recognising best practices, and building on INSPIRE and standardisation tools. The funding and sourcing model for collection and distribution of core location data takes into account user needs from different sectors and the strategic importance of continued supply of data at a suitable quality. Procurement recognises INSPIRE and other standardisation tools in a meaningful way. There are compelling impact assessments and business cases, a rigorous approach to targeting and tracking benefits, and good evidence that benefits are being achieved.
Recommendation 14	Apply a consistent and systematic approach to monitoring the performance of location-based services
Recommendation 15	Communicate the benefits of integrating and using location information in digital public services
Recommendation 16	Facilitate the use of public administrations' location data by non-governmental actors to stimulate innovation in products and services and enable job creation and growth

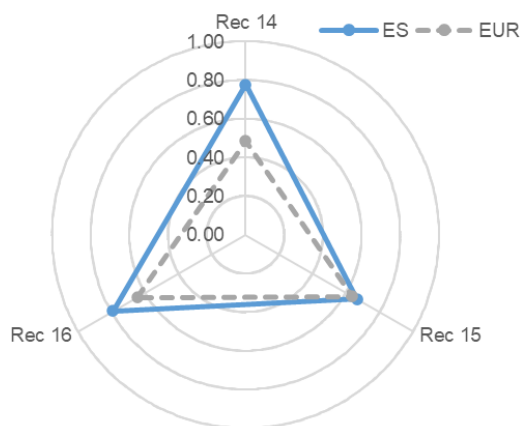*Table 5 - Focus Area "Return on Investment" - vision and recommendations*

Figure 11 - Return on Investment – scores by recommendation

The scores for each recommendation in the "Return on Investment" focus area are shown in Figure 11 and the underlying indicator scores for each recommendation are shown in Figure 12. In both cases, the country scores are compared to the European averages.

This is the focus area where Spain is best positioned, both in absolute terms and compared with the European average. The focus area index for Spain is 0.74, well above the European average of 0.58. All recommendation indexes are above the respective European averages. The biggest difference is in monitoring of the performance of location-based services (Recommendation 14). In this respect, the assessment of the efficiency and effectiveness of location-based services considers all the elements potentially used for such assessments. Furthermore, such assessments are made at all relevant levels (project level, organisational level and national level).

The actions implemented to improve location-enabled processes and services include the identification and monitoring of benefits of location information, as well as regular monitoring of "upstream" (i.e. production and dissemination) and "downstream" (i.e. use) aspects of location data and services. For example, the information coming from a simple monitoring website on the availability of network services on the Spanish SDI[46] is used to identify the need for interventions on those services. Moreover, in 2018, the Spanish SDI implemented a simple approach for cost-benefit evaluation on the creation of metadata[47] and network services[48], and

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[46] https://www.idee.es/web/idee/monitorizacion-de-servicios
[47] https://bit.ly/38zDcAm
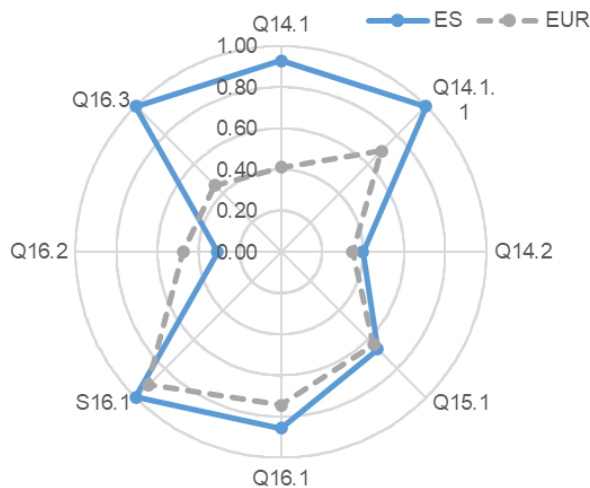[48] https://bit.ly/38uneYu

Figure 12 - Return on Investment – scores by indicator

is currently working with KU Leuven to estimate the value of WMTS. To achieve this goal, a methodology for comparing the central Spanish SDI-node with the Google business model (which is the leader of web cartography) has been proposed.

There is a well-established and convincing approach to the communication of availability and benefits of location data and location-enabled digital public services to raise awareness and understanding, enforced by the Act 19/2013 on Transparency, Access to Public Information, and Good Governance[49] (Recommendation 15). An example of the implementation of this approach is the *General State Administration Transparency Portal[50].*

Many measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties as identified in Recommendation 16[51]. These include:

- a national data portal merging location data and non-location data;
- a national discovery (geo)portal integrating INSPIRE and non-INSPIRE data;
- a geoportal harvested by the European Data Portal;
- thematic portals complementing general search facilities with "specialist" search options;
- websites with exposition of data;
- availability of spatial data sets on web search engines.

The actions implemented to support private, non-profit and academic actors in the development of new products and e-services include:

- "Innovation labs" or "Innovation hubs": an example is the Advanced Information Systems Laboratory, part of the Aragón Institute of Engineering Research at the Universidad Zaragoza, which works on technologies for open and interoperable distributed systems in the area of spatial data and services, including geographic information systems, remote sensing, location-based services and SDIs.[52]
- government sponsorship of "innovation" pilot projects, potentially with grants / funding: an example is provided by the Spanish SDI which has financed the following projects:
  - linked geographical data;[53]
  - "GeoPackage" for INSPIRE by Universidad Zaragoza;[54]

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[49] https://www.legislationline.org/documents/id/21142
[50] https://transparencia.gob.es/transparencia/en/transparencia_Home/index/MasInformacion/Portal-en-cifras.html
[51] The relevant portals and websites are:
   - National data portal: https://datos.gob.es/en
   - National discovery: the catalogues available on Spanish SDI https://www.idee.es
   - Regional discovery: Each region has its own SDI catalogue and data portal open. See regional SDI geoportal https://www.idee.es/en/proyectos-idee/autonomico or local SDI geoportal https://www.idee.es/en/web/idee/proyectos-idee/local
   - The website https://www.idee.es/en/centros-de-descarga/estatal contains all the geographic data download open data portals at national, regional and local level.
[52] https://www.iaaa.es/papers/
[53] https://github.com/IDEESpain/SGT-DGE
[54] https://www.dgterritorio.gov.pt/jiide2020/pdfs/resumos/JIIDE2020_GeoPackage_INSPIRE_Francisco_JLopez-Pellicer.pdf

- "Developing a National Persistent Identifiers (PIDs) System" by Universidad Zaragoza[55];
- a method for checking the quality of geographic metadata based on ISO 19157 by Universidad Zaragoza;[56]

- training in necessary skills to exploit the SDI: since 2005, the Spanish SDI has been running both face-to-face and online courses[57] on metadata, services, regulation on INSPIRE, open data (etc.). On top of that, specific courses on SDI have been given to university teachers and the SDI has also became a subject in university careers.

It must be highlighted, also, that Spain has a strategic approach to funding public sector location reference data along with other important public sector authentic datasets. In this regard, the Geographic High Council is investing in a project to harvest the country's addresses and publish them from a central node. The aim of the project is to define basic specifications for the implementation of an address geocoding service in order to have a reference street map for all administrative procedures and for the provision of distribution services, as well as for a large number of commercial activities, geostatistical studies and spatial analysis. In this context, national organisations such as the General Direction of the Cadastre, the National Institute of Statistics and the Post Office Group, as well as regional and local organisations, are collaborating in this project.

For the Spanish SDI, stakeholder participation and dissemination of information is fostered by various measures, namely:

- publication of the Spanish SDI (IDEE) Blog[58];
- bulletin on SDIs[59];
- SDI e-learning courses[60].

Any company can publish its work about the SDI through those channels.

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[55] https://inspire.ec.europa.eu/sites/default/files/presentations/273_Presentation_ratio_16-9.pdf
[56] https://www.tandfonline.com/doi/full/10.1080/13658816.2018.1515437
[57] https://cursos.cnig.es/
[58] http://blog-idee.blogspot.com/
[59] https://www.idee.es/web/idee/bolet%C3%ADn-sobreides
[60] https://cursos.cnig.es/

3.6. Governance, Partnerships and Capabilities

Vision	
	There is high level support for a strategic approach to the funding and availability of location information at Member State and EU level, based on INSPIRE and other tools to achieve interoperability. Effective governance, partnerships, work programmes, responsibilities and capabilities to progress such an approach have been established, taking into account the needs and expectations of stakeholders at Member State and EU level. Governments recognise the importance of 'location' understanding and skills and invest in awareness raising, training and resourcing.
Service design takes account of user capabilities. Specialists form communities to share knowledge and develop new ideas related to location information. As a result, there is a sufficient level of understanding and skills to develop, deploy and use effective location-based services.	

Recommendation 17	Introduce an integrated governance of location information processes at all levels of government, bringing together different governmental and non-governmental actors around a common goal
Recommendation 18	Partner effectively to ensure the successful development and exploitation of Spatial Data Infrastructures
Recommendation 19	Invest in communications and skills programmes to ensure sufficient awareness and capabilities to drive through improvements in the use of location information in digital public services and support growth opportunities

Table 6 - Focus Area "Governance, Partnerships and Capabilities" - vision and recommendations
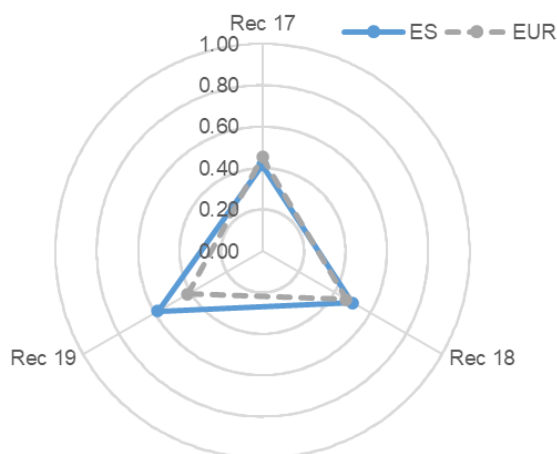

Figure 13 - Governance, Partnerships and Capabilities – score by recommendation

The scores for each recommendation in the "Governance, Partnerships and Capabilities" focus area are shown in Figure 13 and the underlying indicator scores for each recommendation are shown in Figure 14. In both cases, the country scores are compared to the European averages.

The "Governance, Partnerships and Capabilities" focus area index for Spain is 0.50, compared with the European average of 0.45. Although the overall score is above the average, there are margins for improvement across the focus area).

Regarding the governance of location information processes (Recommendation 17), the level of involvement of relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society) in the decision making process is relatively strong. However, such involvement does not currently concern all relevant stakeholders.

In Spain, the development of the SDI is carried out at each of the three administrative levels: national, regional and local. The Spanish SDI structure is coordinated by the Directive Council of Geographic Information Infrastructure (CODIIGE). The Council is made up of representatives from the three administrative levels, experts from the Commissions of the High Geographic Council, and experts in environmental policies. The Council is assisted by the Working Group of the Spanish SDI (GTIDEE)[61], an open technical group that is composed of experts and producers of thematic and referenced geographic information either at national,

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[61] https://www.idee.es/en/web/idee/gtidee

regional and local level. Academia and private sector are also represented in this Working Group. The Group is tasked with the analysis of existing geographic data for its possible integration into the IDEE, proposing actions to complete the IDEE, studying the quality and accessibility of available metadata, promoting the implementation of metadata and catalogues and proposing architectures, standards, and technical specifications for the establishment of the IDEE.
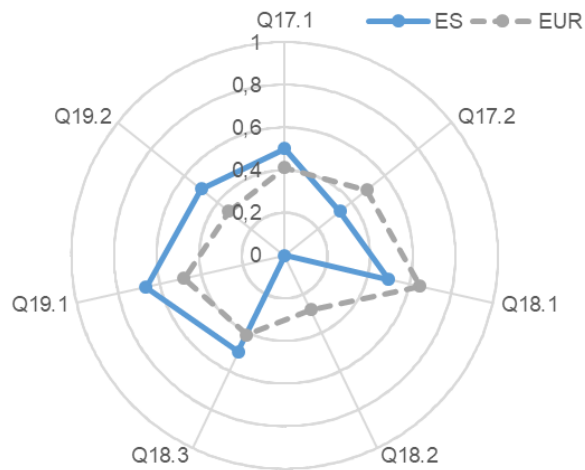

Figure 14 - Governance, Partnerships and Capabilities – scores by indicator

Regarding Recommendation 18, there are only limited formal agreements between public authorities to finance, build and operate location data services or digital public services using location data and with public authorities in other countries. Similarly, there are limited numbers of public private partnerships to build and operate location data services or digital public services using location data. An example of a formal agreement in place is the project of the Geographic High Council, for harmonisation and integration of the main sources of geographical information at national, regional and local level, referenced under paragraphs 3.3 and 3.4. One of the main sources is the "CartoCiudad" project, which integrates many official sources of addresses.

Training and awareness raising on geospatial skills are undertaken by some organisations, such as the National Geographic Institute (IGN Spain) and the National Center of Geographic Information (CNIG), as part of a recognised geospatial competency framework (Recommendation 19). Several initiatives are organised to raise awareness and develop geospatial skills, such as:

- spatial literacy awareness raising for non-specialists, e.g. policy makers, legal advisers, project managers;
- training for specialists, e.g. developers, data analysts;
- special interest group for knowledge sharing within the geospatial community;[62]
- public or cross-government events specialising in location information / GI topics;[63]
- INSPIRE training modules;
- online self-learning tools.

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[62] For example, the IDEE Working group mentioned above

[63] Among which also cross-border events such as the Iberian workshop of Spatial Data Infrastructures (JIIDE), held once a year (autumn) since 2010. It is organized in collaboration with Portugal and Andorra. In 2020, the JIIDE have been virtual and there were 777 registrations (see https://www.idee.es/en/web/idee/jiide)

4. Best practices

Best Practice ES1	Availability of geological spatial data held by in the framework of the One Geology-Europe project (1G-E)

Policy domain: Geology; Disaster Management and Civil Protection

Process owner: Spanish Geological Survey (IGME)

Short description: This project has made the data held by the Geological Surveys of Europe more easily discoverable, accessible and shareable. It has provided a significant contribution to the progress of INSPIRE, by developing systems and protocols to better enable the discovery, viewing, downloading and sharing of core European spatial geological data. In the case of Spain, the national Geological Map at 1:1.000.000 scale shows the spatial distribution of the sedimentary, igneous and metamorphic rock units and the superficial deposits in Spain. Each unit depicted on the map has been allocated a geological age and its lithological composition. All of the mapped units are depicted as polygons.

Recommendations: Digital Government Integration (7); Standardisation and Reuse (11); Governance, Partnerships and Capabilities (18)

Link: https://www.eurogeosurveys.org/projects/onegeology-europe/

Best Practice ES2	Spanish Standard UNE 148004:2018 "Open Geographic Data"

Policy domain: Open data

Process owner: Spanish Association for Standardisation (AENOR)

Short description: The Spanish Standard UNE 148004:2018 "Open Geographic Data", published by AENOR, defines geographic data as those data "that implicitly or explicitly refer to an Earth´s location". The standard goes on to define open geographical data, which is a little longer and more complex. The open data explanation, elaborated by the Technical Standardisation Committee 148, is based on multiple sources, although one of its main pillars is the definition established by Open Knowledge International and published at http://opendefinition.org/. UNE 148004:2018 enriches this definition based on 3 principles:

a) Principle of minimisation of barriers: Data must be made available to citizens free of charge, avoiding any technical, administrative or legal barrier that prevents or limits their use;
b) Principle of non-discrimination: Data access conditions must be equal for all users, without any privileges for particular user groups;
c) Principle of technological neutrality: According to the National Interoperability Scheme, described by RD 4/2010, of January 8, 2010, it is necessary to use open standards, which operate independently of the operating system and any communications or software layer. This helps to avoid user discrimination by technology, as the previous principle indicates.

Once these principles are defined, the UNE 148004:2018 Standard details what requirements open geographic data must meet. In accordance with the Standard, geographic data can be considered to have "free access" if they are: available, documented, under an open licence and in an open format.

The fact that these requirements help in determining if a geographic dataset is open or not is a useful guide for all those public organisations that want to open this kind of information,

facilitating standardisation and interoperability. UNE 148004:2018 is, therefore, a necessary standard.

Recommendation: Standardisation and Reuse (12)

Link: https://www.une.org/encuentra-tu-norma/busca-tu-norma/norma?c=N0059630

Best Practice ES3	Spanish SDI governance model

Policy domain: SDI governance

Process owners: Directive Council of Geographic Information Infrastructure (CODIIGE)

Short description: CODIIGE has the following main tasks:

1. To establish an Action Plan that guarantees the implementation of the INSPIRE Directive in Spain within the established deadlines, identifying the Spatial Data Sets and services catalogued in the Official Catalogue of Inspire Data and Services (CODSI). Action Plan (only in Spanish) https://www.idee.es/resources/documentos/PlandeAccion_CODIIGE.pdf
2. To inform the European Commission about the existing Spatial Data Sets and services in Spain, in compliance with the INSPIRE framework.
3. To organise the Iberian SDI workshops: https://www.idee.es/en/jiide
4. To disseminate the Regulations establishing the technical specifications corresponding to the interoperability of geographical data and geographical information services not considered in the National Interoperability and Security Schemes and monitor their compliance.
5. To oversee the activity of the Working Group of the Spanish SDI (called GTIDEE in Spanish) and the Technical Working Groups (see below) CODIIGE embraces the main tasks related with the adoption, reporting, transformation, dialoguing between entities, etc. for all INSPIRE themes.

The Working Group of the Spanish SDI (GTIDEE) assists the CODIIGE from a technical perspective. Its main lines of activity are:

- Analyse existing and appropriate geographic information for possible integration in the SDI of Spain.
- Propose actions to be taken by public administrations to complete the infrastructure.
- Analyse metadata of geographic information and its availability, promoting the generation of the descriptive databases of geographic information as well as the preparation of proposals in this context.
- Define architecture, rules and technical specifications for the integration in the SDI of Spain including the most suitable technologies.
- Analyse policies related to prices, licences and data distribution extracting conclusions and preparing proposals for actions.

Recommendation: Governance, Partnerships and Capabilities (17)

Link: https://www.idee.es/en/web/idee/codiige; https://www.idee.es/en/web/idee/gtidee

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
AENOR	Asociación Española de Normalización y Certificación
API	Application Programming Interface
BTA	Base Topográfica Armonizada
CNIG	Centro Nacional de Información Geográfica
CODIIGE	Consejo Directivo de la Infraestructura de Información Geográfica de España
CODSI	Catálogo Oficial de Datos y Se rvicios INSPIRE
CSW	Catalogue Service – Web
CTN	Comité Técnico de Normalización - Technical Standardisation Committee
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
ECDIS	Electronic Chart Display and Information System
EFQM	European Foundation for Quality Management
EIF	European Interoperability Framework
ELISE	European Location Interoperability Solutions for e-Government
ENIA	Estrategia Nacional de Inteligencia Artificial
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
GTIDEE	Grupo de Trabajo IDEE
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
IDEE	Infraestructura de Datos Espaciales de España
IGME	Instituto Geológico y Minero de España
IGN	Instituto Geográfico Nacional
IHO	International Hydrographic Organization
INSPIRE	Infrastructure for Spatial Information in the European Community
ISA[2]	Interoperability Solutions for European Public Administrations, Businesses and Citizens Programme
ISO	International Standard Organisation
LIFO	Location Interoperability Framework Observatory
LISIGE	Ley sobre las infraestructuras y los servicios de información geográfica en España
MITECO	Ministerio para la Transición Ecológica y el Reto Demográfico
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
NMA	National Mapping Agency
OGC	Open Geospatial Consortium
PSI	Public Sector Information
REST	Representational state transfer
SDI	Spatial Data Infrastructure
SNCZI	Sistema Nacional de Cartografía de Zonas Inundables
UNE	Una Norma Española
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

Abbreviation	Meaning
WMTS	Web Map Tile Service

Definitions

Term	Meaning	Link
Application Programming Interface (API)	A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.	Application Programming Interface | Joinup (europa.eu)
Authentic data	Data that provides an accurate representation of reality with quality parameters that are fit for the intended purposes.	Authentic data | Joinup (europa.eu)
Authoritative data	Data from officially regarded sources. A subset of spatial data may be described as 'authoritative data', where it has legal value because it is defined by a competent authority.	Authoritative data | Joinup (europa.eu)
Core location dataset / High value dataset	Open Data Directive introduces the concept of 'high-value datasets' as datasets holding the potential to (i) generate significant socio-economic or environmental benefits and innovative services, (ii) benefit a high number of users, in particular SMEs, (iii) assist in generating revenues, and (iv) be combined with other datasets. Given this, the Directive requires that such datasets are available free of charge, are provided via Application Programming Interfaces (APIs) and as a bulk download, where relevant, and are machine-readable. The Directive does not include the specific list of high-value datasets—which is expected in the future—but only their thematic categories, one of which is 'Geospatial'. The 'high value dataset' concept is also considered in national data policy and programmes in different European countries, typically incorporating 'core' datasets, including geospatial data.	High Value Dataset | Joinup (europa.eu)
Core reference dataset	Core reference dataset can be defined as the minimum set of authoritative, harmonised and homogeneous framework data needed to either meet common requirements for applications at cross-border, European and global levels or to geo-reference and locate other thematic data. In the latter case, core data may be used as a framework on which other richer, more detailed, thematic geospatial and statistical data would rely.	http://ggim.un.org/meetings/GGIM-committee/documents/GGIM5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf
Digital government	Government designed and operated to take advantage of information in creating, optimising, and transforming, government services.	Digital government | Joinup (europa.eu)

Term	Meaning	Link
ESPD	The ESPD (European Single Procurement Document) is a self-declaration by economic operators providing preliminary evidence replacing the certificates issued by public authorities or third parties. As provided in Article 59 of Directive 2014/24/EU, it is a formal statement by the economic operator that it is not in one of the situations in which economic operators shall or may be excluded; that it meets the relevant selection criteria and that, where applicable, it fulfils the objective rules and criteria that have been set out for the purpose of limiting the number of otherwise qualified candidates to be invited to participate. Its objective is to reduce the administrative burden arising from the requirement to produce a substantial number of certificates or other documents related to exclusion and selection criteria	Commission Implementing Regulation (EU) 2016/7 of 5 January 2016
Evidence-based policy making	The development of public policy which is informed by objective evidence, e.g. through data related to the content of the policy.	Evidence-based policy making	Joinup (europa.eu)
GeoDCAT-AP specification	Data Catalogue vocabulary (DCAT) Application Profile extension for describing geospatial datasets, dataset series, and services.	GeoDCAT-AP	Joinup (europa.eu)
Geographical Information (GI) Champion	The GI Champion can be appointed to drive through the changes related to running a major GI improvement programme, promoting public sector modernisation through the use of GI, and ensure that the organisation is aware of and convey the benefits of geospatial information and technologies. A GI champion may also be appointed with a pan-government remit.	LIFO Guidelines and Recommendations
Key digital public services	The most frequently accessed and sometimes mandatory public services which are delivered with the extensive use of ICT, e.g. registration of land and property, health and welfare, civil status registration, transport, environmental protection, energy production and distribution, public safety, transport, public education etc. National legislation may define which services must be considered key.	https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/document/recommendation-6
Location data framework	Location data framework describes all the elements – including data assets, standards and technologies, policies and guidance, people and organisations – that are required to unlock the power of location. An SDI is a location data framework	LIFO Guidelines and Recommendations Unlocking the Power of Location: The UK's geospatial strategy 2020 to 2025
Location information strategy	A strategic approach for managing and maximising the value of location information.	Location information strategy	Joinup (europa.eu)

Term	Meaning	Link
Open and collaborative methodology	Any system of innovation or production that relies on goal-oriented yet loosely coordinated participants who interact to create a product (or service) of economic value, which they make available to contributors and noncontributors alike. Prominently used for the development of open source software.	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1096442
OpenAPI	Specification for machine-readable interface files for describing, producing, consuming, and visualising RESTful web services.	https://swagger.io/specification/
Open licence	An open licence is a way for the copyright holder (creator or other rightholder) to grant the general public the legal permission to use their work. The applied open licence is usually indicated directly on the work and wherever the work is shared. As in the case of other licences, open licences do not imply a transfer of copyright or other intellectual property rights. Someone granting an open licence for their work still remains the copyright holder of their materials and can themselves use the materials as they wish, e.g. to commercialise their project outcomes.	https://ec.europa.eu/programmes/erasmus-plus/programme-guide/part-c/important-contractual-provisions/open-licence-intellectual-property-rights_en
RESTful web services	Web services built on Representational State Transfer (REST) principles, where resources used by the services are made available through URIs (Uniform Resource Identifier) and can be updated without affecting the service	https://docs.oracle.com/javaee/6/tutorial/doc/gijqy.html
Sector legislation	Legislation about a particular domain (e.g. health, environment) or sub-domain (e.g. hospitals, water). Within INSPIRE, reference can be made to the nine thematic clusters, which have associated legislation, e.g E-PTRT (European Pollutant Release and Transfer Register) IED (Industrial Emissions Directive).	https://inspire.ec.europa.eu/call-facilitators-%E2%80%93-thematic-clusters/50
Spatial Data Infrastructure (SDI)	In general terms, a Spatial Data Infrastructure (SDI) may be defined as 'a framework of policies, institutional arrangements, technologies, data, and people that enable the effective sharing and use of geographic information' [Bernard et al, 2005]. INSPIRE as an SDI for European environmental policy is defined as 'metadata, spatial data sets and spatial data services, network services and technologies, agreements on sharing, access and use, and coordination and monitoring mechanisms, processes and procedures, established, operated or made available in accordance with the Directive'.	Spatial Data Infrastructure	Joinup (europa.eu)

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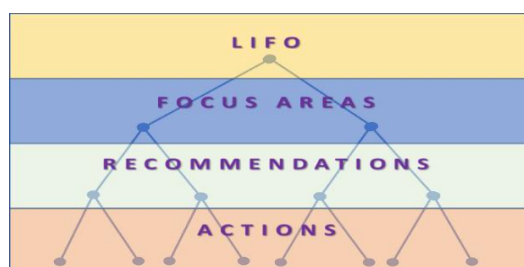
Annex 1: LIFO 2020 Scoring methodology

Figure 15 – Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*[64], is based on a hierarchy of indicators and indexes, as represented in Figure 15: from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

(Action) Indicators: A number of actions[65] have been selected in the EULF Blueprint as being representative of the scope of the recommendations to which they belong. An indicator has been designed to measure how monitored countries are progressing towards the "vision" outlined in the EULF Blueprint for each of these actions. Each primary indicator is represented by a code **Qx.y.z** where *x* is the recommendation number, *y* the progressive indicator number for that recommendation and *z* (where applicable) a second-level indicator providing additional information on the corresponding Qx.y first level indicator. Information to calculate each primary indicator is collected through the replies provided by participating countries to a question for each indicator. The model also includes secondary indicators, represented by a code **Sx.y**. These latter are computed reusing information from existing sources, for example, the INSPIRE monitoring. See Annex 2 for a list of the indicators and pertinent questions for each recommendation.

Each indicator is calculated on a specific scale, which best reflects the nature of the action (e.g. if it can be measured over a continuous or a discrete scale, if it is a binary phenomenon, i.e. yes/no or similar, etc.). Indicators are then normalised over a scale of 0-1, as follows:

Score attributed to the answer / maximum applicable value, where the maximum applicable value is the upper end of the scale that the non-normalised value of the indicator can reach.

Note: Optional questions in the LIFO survey capture supplementary information relevant to corresponding mandatory questions about the actions. The mandatory questions (i.e. those marked '*' in the survey) are scored, whereas the optional questions are not scored.

(**Multi-level) indexes:** indexes aggregate the action indicators at the levels of recommendations, focus areas, and LIFO overall to represent each country's performance at the respective levels. The relationships between (action) indicators, recommendation indexes, focus area indexes and the overall LIFO index are described in Table 7.

Level	No.	Scoring method
LIFO	1	Average of the 5 focus area indexes
Focus area	5	Average of scores for all recommendations associated with a focus area
Recommendation	19	Average of normalised scores for all indicators associated with a recommendation
Action	48	Scores calculated using different scoring methods converted to standard normalised scores in range 0-1.

Table 7 – Relationships between indicators and indexes

Action indicators, *recommendation indexes* and *focus area indexes* are thus equally weighted in the calculation of their respective upper-level indexes.

Note: Some questions have a "*don't know*" response as an option. Respondents are encouraged to provide answers wherever possible. Where a "*don't know*" response is given, the indicator gets a null score. This is shown as zero in the indicator charts, and the indicator is ignored in calculating the index scores.

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[64] https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf

[65] Described in the "How" section of each Recommendation.

Annex 2: LIFO 2020 Indicators

Focus Area: Policy and Strategy Alignment			Changes vs 2019
No.	Indicator	Question	
Recommendation 1			
Q1.1	Alignment between location and digital government strategies	Is there a location strategy in your country that is closely connected to your digital government strategy?	Change in scale
Q1.1.1	Link to strategies	Please supply links to the location strategy and digital government strategy.	
Q1.2	Use in digital government of authoritative location datasets and services	To what extent is the use in digital government of authoritative location datasets and services regulated by legislation and/or binding agreements?	
Recommendation 2			
Q2.1	Licensing policy	To what extent is location data available free of charge under an open licence without restrictions or with minimum restrictions?	Change in scale
Q2.1.1	Licensing policy – covered datasets	Which of the following core location datasets with high importance for multiple external users (also known as "high value datasets" in national and European open data strategies) can be accessed (e.g. through APIs or downloads) free of charge under an open licence without restrictions or with minimum restrictions?:	New question
Q2.2	Core reference data policy on location data	Are core location reference datasets (for the list of core location datasets please refer to Q2.1.1) made available as part of a broader core reference data policy (which also includes people, businesses, vehicles etc.)?	Change in scale
Q2.3	Use of common data licensing frameworks	To what extent is location data available under a common licensing framework for all government data?	Change in scale
Q2.4	Coverage of location data by national guidelines on the publication of Public Sector Information	Do your pan-government guidelines on the publication of public sector data cover location aspects? "Cover location aspects" means that in the guidelines some specific geospatial topics are highlighted (e.g. formats, encoding, accessibility trough specific web services, specific legislation,).	
Recommendation 3			

Q3.1	Preparedness for GDPR under location aspects	How well-prepared are controllers and processors of public sector location data in your country for GDPR, including awareness of potential location data privacy issues and processes in place to comply with the rights of data subjects?	
Recommendation 4			
Q4.1	Use of location-based analysis for evidence-based policy making	Is location-based evidence and analysis used to help in developing relevant policies and monitoring outcomes?	
Recommendation 5			
Q5.1	References to INSPIRE and relevant standards in procurement documents	For public sector procurements of location information or services, what references are made to INSPIRE and relevant standards in the procurement documents?	

Focus Area: Digital Government Integration			**Changes vs 2019**
No.	**Indicator**	**Question**	
Recommendation 6			
Q6.1	Improvement of location information use in digital public services	To what extent is there a process for identifying opportunities and implementing improvements to key digital public services in their use of location information, including considering new business and delivery models?	Change in scale
Q6.2	Optimal use of location information is used optimally in key digital public services	Please select up to 6 sectors where location information has the most significant role to play in digital public services. For these sectors, please specify how well 'optimised' is the use of location data in digital public services. In this respect, 'optimisation' relates to extent of use and contribution to innovation and quality of service.	Change in scale
Recommendation 7			
Q7.1	Use of SDI in cross-government digital services	To what extent is the SDI used in delivering digital public services across government (in different sectors and levels of government)?	Change in scale
S7.1	Implementation status of the INSPIRE directive	Average of indicators for the five actions in the INSPIRE country fiche: - Availability of spatial data and services - Conformity of metadata - Conformity of spatial data sets	Change of calculation method for the INSPIRE country fiche

No.	Indicator	Question	Changes vs 2019
		- Accessibility of spatial data sets through view and download services - Conformity of the network services	
Q7.2	Use of SDI in cross-border services	Is the country actively involved in delivering cross-border digital public services using their spatial data infrastructure (SDI)?	Change in scale
Q7.3	SDI approach used	Please specify the main SDI approach used for delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by private sector and other organisations (e.g. NGOs)	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of 'new and innovative' applications, products and services?	
Recommendation 8			
Q8.1	Use of an open and collaborative methodology in location-enabled digital public services	To what extent is an open and collaborative methodology applied, to design and improve location-enabled digital public services at local, sub-national or national level (e.g. through consultations, user groups, feedback requests, iterative development)?	
Q8.1.1	Level of government where a collaborative approach is used	At what level of government is the collaborative approach applied?	Single choice in 2019, multiple choice in 2020
Q8.2	Collaboration with external parties in service delivery	When developing or delivering location-based digital public services, in what ways are external parties involved? This includes the private sector, NGOs and citizens.	Change in scale
Recommendation 9			
Q9.1	Approach for integration of statistical and location information	What actions are implemented for the integration of location and statistical information in the production of location-based statistics?	

Focus Area: Standardisation and Reuse			Changes vs 2019
No.	Indicator	Question	
Recommendation 10			
Q.10.1	Adoption of a common architectural approach	In your country, does the architecture for location data and services in the SDI fit within a broader national ICT architecture approach that is applied in the	

		design, re-engineering, interconnectivity and reuse of ICT and data in digital public services?	
Q10.2	Procedure to incorporate new technological features	Please describe the approach (if any) to discover, explore and incorporate new technological features or emerging technologies.	
Q10.3	Status of development of APIs for INSPIRE / SDI	Please describe the status of development of APIs for SDI / INSPIRE.	
Q10.3.1	Access to high-value location datasets through APIs	Which core "high value" location datasets can be accessed using APIs?	New question
Q10.3.2	Action to foster APIs take-up	Where there are APIs for location datasets, what steps are commonly taken to stimulate take-up and ensure they are as useful as possible?	New question
Recommendation 11			
Q11.1	Reuse of generic ICT solutions in the SDI	Please describe the reuse status of generic ICT solutions in the SDI.	Single choice in 2019, multiple choice in 2020
Q11.2	Implementation of location information registers	What registers of location information are implemented?	
Recommendation 12			
Q12.1	Use of geospatial standards	What type of geospatial domain standards are used in your country?	Change of question
S12.1	Conformity of spatial data sets to INSPIRE implementing rules	Conformity of spatial data sets with Regulation (EU) No 1089/2010 (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in the question Q16.1?	New question
Q12.2.1	Use of specifications for combining spatial and non-spatial metadata	Where an approach to facilitate a joint discoverability of spatial and non-spatial data is adopted, what specifications and tools are used to a significant degree to combine spatial with non-spatial metadata in national implementations?	New question
S12.2	Conformity of the INSPIRE network services with INSPIRE implementing rules	Conformity of the INSPIRE network services with Regulation (EC) No 976/2009	
Recommendation 13			
Q13.1	Approach to location data quality	What actions are typically implemented to assure quality of location data in your country?	
Q13.1.1	Use of data quality standards	What data quality standard is applied to location data?	New question

| Q13.2 | Approach to location data quality governance | What type of actions relating to location data quality governance are put in place in your country? | |
| Q13.2.1 | Collection of feedback from users | Where feedback is obtained from users, what approach is taken? | |

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: [ ] At a project or service level [ ] At an organisational level [ ] At an SDI / national level [ ] A combination of the above	
Q14.2	Approach to impact-based improvement	What actions are implemented for impact-based improvement in location-enabled processes and services in your country?	
Recommendation 15			
Q15.1	Approach to communication of benefits	Is communication delivered on the availability and benefits of location data and location- enabled digital public services to raise awareness and understanding using, for example, factsheets, news articles, web-based communication, videos, events?	Change of question
Recommendation 16			
Q16.1	Ease of searching, finding and accessing location data	What measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties?	
S16.1	Existence of policies supporting the reuse of PSI	Existence of policies supporting the reuse of Public Sector Information by the private sector (from the Open Data Maturity Report)	
Q16.2	Support to the development of products and services by external parties	Which of the following actions are implemented in your country to actively support private, non- profit and academic actors in the development of new products, services or research using public sector location data?	Change of scale
Q16.3	Existence of a strategic approach to funding location reference data	Is there a strategic approach to funding public sector location reference data to make access at point of use cost effective?	

Focus Area: Governance, Partnerships and Capabilities			Changes vs 2019
No.	Indicator	Question	
Recommendation 17			
Q17.1	Involvement of stakeholders in decision making on location information in digital government	To what extent are all relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society) involved in decision making on the role of location information in Digital Government?	Multiple choice in 2019, single choice in 2020
Q17.2	Coordinated governance of SDI and digital government	To what extent do organisations responsible for SDI and Digital Government coordination deal jointly with the governance of the SDI in the context of Digital Government?	Multiple choice in 2019, single choice in 2020
Recommendation 18			
Q18.1	Use of formal agreements between public authorities in the country to operate location data services	To what extent do formal agreements exist between public authorities in the country to finance, build and operate location data services or digital public services using location data?	
Q18.2	Use of formal agreements to operate cross-border location data services	To what extent do formal agreements exist with public authorities in other countries to finance, build and operate cross-border location data services or digital public services using location data?	
Q18.3	Use of public–private partnerships to operate location data services	To what extent do public-private partnerships exist to finance, build and operate location data services or digital public services using location data?	
Recommendation 19			
Q19.1	Use of a strategic approach to geospatial capacity building	To what extent is there a strategic approach to skills and training for innovative geospatial solutions?	Multiple choice in 2019, single choice in 2020
Q19.2	Awareness raising initiatives in the geospatial domain	What type of initiatives are organised to raise awareness and develop geospatial skills?	Change in scale

Note: Some indicators have been modified in LIFO 2020 compared with LIFO 2019[66], with the aim to improve the capability of the LIFO analytical model to represent consistently the state

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[66] LIFO 2019 indicators are listed at https://joinup.ec.europa.eu/node/704929, while LIFO 2020 indicators are listed at https://joinup.ec.europa.eu/node/704251

of play of location interoperability at country and European level. The main changes and the focus areas / recommendations impacted are:

- Digital Government Integration:
    - Reduced focus on INSPIRE as reference SDI for the delivery of location-enabled services (Recommendation 7);
    - Changes in the calculation of INSPIRE country fiche indicators (Recommendation 7).
- Standardisation and Reuse:
    - More emphasis on the use of APIs for access to and reuse of location data, with new indicators (Recommendation 10);
    - New indicators on the use of metadata for joint discoverability of spatial and non-spatial data (Recommendation 12).
- Governance, partnerships and capabilities:
    - Questions on governance (approaches to joint involvement of all relevant stakeholders in the governance of SDI – Recommendation 17) and capabilities (approaches to geospatial training and skills - Recommendation 19) have passed from multiple choice to single choice

Where changes have been made to the indicators from 2019 to 2020, they are classified as follows:

- "Change in scale": one or more options of reply have been added (or eliminated);
- "Change of question": the question has been completely redrafted;
- "New question": the question was not included in LIFO 2019 questionnaire;
- "Single choice in 2019, multiple choice in 2020": in 2019 it was possible to select only one option as reply, in 2020 more than one option can be selected;
- "Multiple choice in 2019, single choice in 2020": in 2019 it was possible to select more than one option as reply, in 2020 only one option can be selected.

Annex 3: LIFO 2020 Additional information: Spain

Title	Attachment[67]
LIFO Survey questionnaire 2020 – Spain	📎 LIFO Survey 2020 Spain
LIFO Survey questionnaire 2020 scores and charts – Spain	📎 LIFO 2020 scores and charts Spain

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[67] Attachments can be accessed by clicking on the respective icon when opening the factsheet in Adobe Acrobat Reader, provided that the application preferences are set to do so.