European Commission

LIFO: Location Interoperability Framework Observatory

2020 Country Factsheet

Greece

ISA²

This LIFO 2020 publication has been prepared by Deloitte for the European Commission, Joint Research Centre (JRC) as part of the ELISE Action of the ISA^2 Programme.

The publication date is December 2021. The factsheets are published on the Joinup platform and are accessible here.

The monitoring information for Greece has been provided by the *Ministry of Environment and Energy.*

Contents

1. Introduction

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).

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.

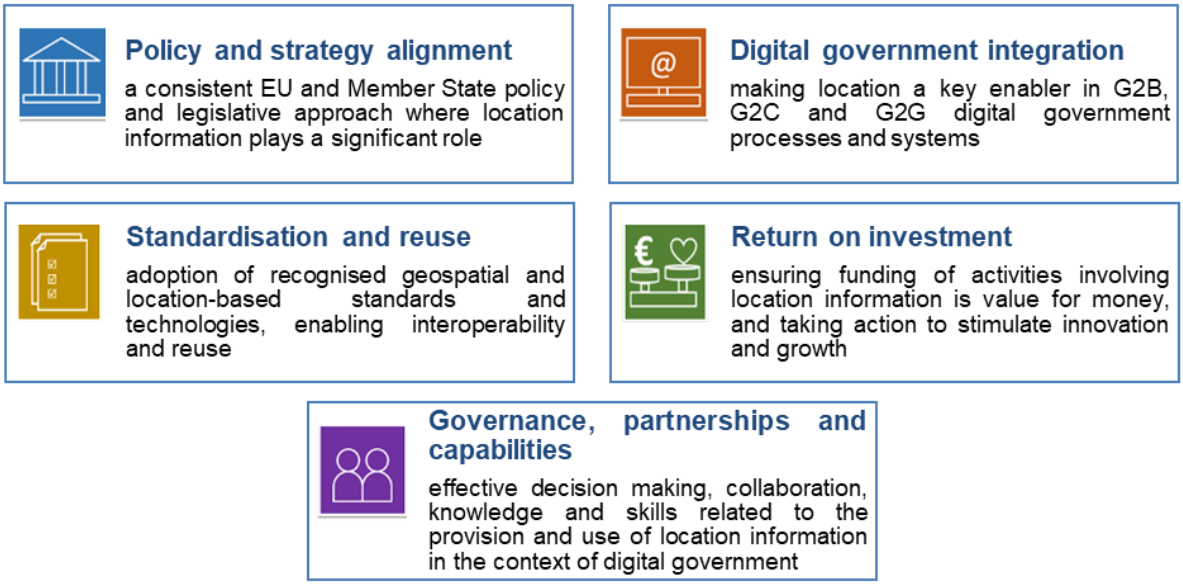

Figure 1 - EULF Blueprint focus areas

[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

[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.

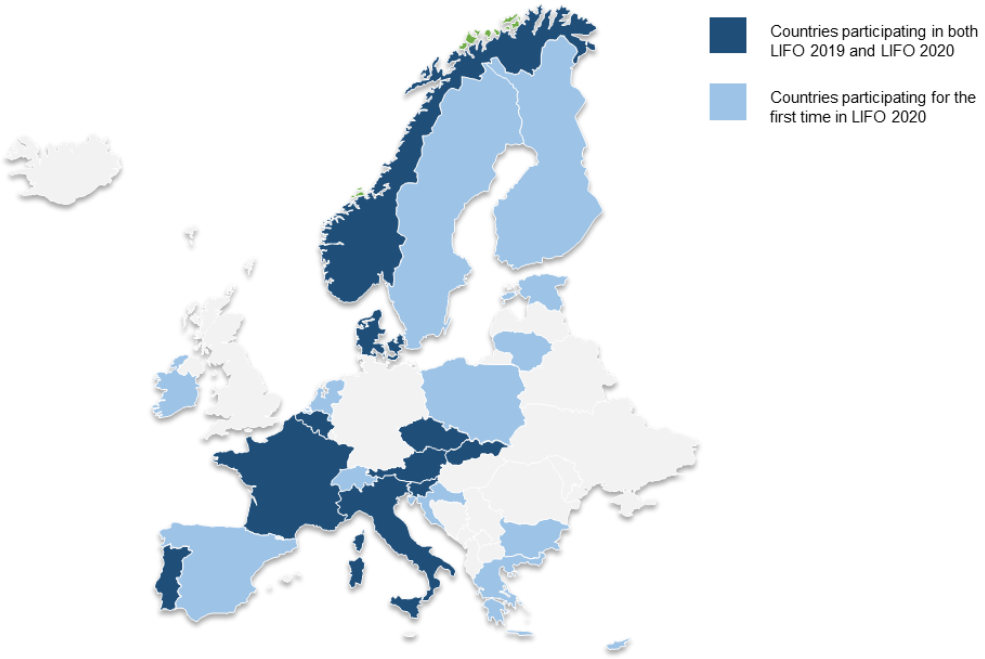

Figure 3 - LIFO participating countries in 2019 and 2020

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].

[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 Greece 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 the Greece comprising the questionnaire response and the scores and charts based on the response.

The 2020 LIFO monitoring information for Greece has been provided by the *Ministry of Environment and Energy.*

3. Location Interoperability State of Play

3.1. Overview

The information from the LIFO 2020 data collection indicates that Greece scores below the European average, with significant room for improvement, in all the five focus areas. However, positive aspects of Greece's location interoperability practices have been recorded in each focus area.

As per Figure 4, the "Policy and Strategy Alignment" focus area is where Greece has the highest score, thanks to the availability of a good number of core location datasets as open data without restrictions. Less positive aspects are:

- the lack of guidelines on the publication of public sector information, including location data;
- no legislation nor binding agreements regulating the use in digital government of authoritative location datasets and services;
- few organisations are fully compliant with GDPR concerning location data;
- only generic references to INSPIRE or other standards are made in public sector procurements of location information and/or services.

Under the "Digital Government Integration" focus area, a good practice is represented by the use of SDIs and INSPIRE datasets for the delivery of some cross-border digital public services. Location information is used only to a limited extent to optimise key digital public services, and only a limited set of actions are implemented for the integration of location and statistical information in the production of location-based statistics.

In the "Standardisation and Reuse" focus area, Greece is positioned close to the European average with regard to the development of APIs for SDI and INSPIRE datasets: various of location data APIs have been developed, , documented and are accessible. However, only one location information register (cadastral parcels) has been implemented. Limited actions have been taken to ensure data quality, few spatial data sets are in conformity with Regulation (EU) No. 1089-2010 and almost all network services are not yet in conformity with Regulation (EC) No. 976-2009.

In the "Return on Investment" focus area, a considerable array of measures is 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. Conversely, no structured approach to monitoring the performance of location-based services has been adopted. Only basic communication is provided about the benefits of integrating and using location information in digital public services.

Finally, under the "Governance, Partnerships and Capabilities" focus area, while there are some formal agreements between public authorities to build and operate location-enabled digital services, there is considerable room for improvement regarding the governance, partnerships and capacity building dimensions.

The value of the overall LIFO index combining the scores for all focus areas is 0.28, which highlights several gaps of Greece's practices under various areas of location interoperability. This compares with a European average of 0.55.

Figure 4 - Overall EULF Blueprint implementation

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

Focus Area	Strengths	Weaknesses
Policy and Strategy Alignment	• Good number of core location datasets available as open data with no or minimal licensing restrictions	• No legislation or binding agreements regulating the use in digital government of authoritative location datasets and services • Generic references to INSPIRE or other standards made for public sector procurements of location information and / or services • Few organisations fully compliant with GDPR concerning location data
Digital Government Integration	• SDI and INSPIRE datasets used for the delivery of some cross-border digital public services	• Location information used to a limited extent to optimise key digital public services • Limited actions implemented for the integration of location and statistical information in the production of location-based statistics
Standardisation and Reuse	• Several location data APIs developed, documented and accessible	• Only one location information register (cadastral parcels) implemented to date • Few spatial data sets in conformity with Regulation (EU) No. 1089-2010 and

Focus Area	Strengths	Weaknesses
		almost all network services not yet in conformity with Regulation (EC) No. 976-2009 • Limited actions taken to ensure data quality; data quality governance not yet developed
 *Return on Investment*	• Considerable array of measures implemented to make the process of searching, finding and accessing location data and web services as easy as possible	• Approach to monitoring the performance of location-based services not yet being adopted • Basic communication provided about the benefits of integrating and using location information in digital public services.
 *Governance, Partnerships and Capabilities*	• A small number of formal agreements between public authorities to finance, build and operate location-enabled digital services	• Limited level of involvement of relevant communities, domains, administrative levels and sectors in the SDI decision-making process • Limited strategic approach to capacity building and few initiatives implemented to raise awareness and develop geospatial skills

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

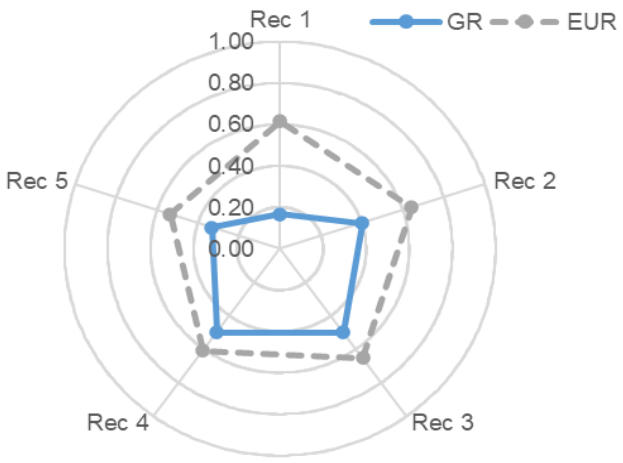

Figure 5 - Policy and Strategy Alignment - scores by recommendation

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 with the European averages. The “Policy and Strategy Alignment” focus area index for Greece is 0.38 compared with a European average of 0.62.

Recommendation 4 is where Greece is best positioned relative to the European average. The use of location-based evidence and analysis to help in developing relevant policies and monitoring outcomes covers some relevant topics. In particular, the Greek Cadastre[18] is the major processor of location-based evidence for developing policies. It cooperates on a regular basis with the Ministry of Finance and other public services that use the geospatial data of the Land Registry for decision making purposes. An example is the Αναζήτηση Αιγιαλού (Coastal land search) portal[19], which provides information about Greece’s foreshore area and coastal zone. The portal is built upon the geospatial information provided by the Hellenic Cadastre, and is owned and maintained under the responsibility of the General Secretariat of Public Property (Ministry of Finance).

[18] See https://www.ktimatologio.gr/
[19] See https://www1.gsis.gr/gspp/dhpe/publicgis/faces/homeShore;jsessionid=3OcY8-L-ZA9xSHt0wmjFRCFZtX5wk60qHSY8Ybhpz4eHwvD09SbJ!1425187616

Another example is provided by the General Secretariat for Civil Protection[20], which uses location data in collaboration with data-producing public services for monitoring the spread of COVID-19, the prediction of floods, forest fires, earthquakes and other natural disasters in order to create policies for prevention and immediate intervention against such events.

Greece displays some good practices under Recommendation 2, which concerns the alignment of location information policy with the wider data policy. In particular, the country obtained its highest score in this focus area, due in part, to the good number of location datasets available free of charge under an open licence without restrictions. These datasets are: administrative units, air quality, health statistics, land cover, population distribution and demography, protected sites, statistical units, transport timetables, water quality and weather observations. Certain other location datasets are available free of charge under an open licence with minimum restrictions, namely: cadastral parcels, elevation and land use. A common licensing framework[21] exists but is not used to make location datasets available.

Some location core reference datasets are available for general use through the INSPIRE Geospatial Data Portal of the Hellenic Land Registry (GEOINEK)[22]. Examples are:

- the Digital Surface Model (DSM)[23];
- the Digital Soil Model (Digital Elevation Model-DEM)[24];
- orthoimages[25];
- cadastral parcels[26].

Greece does not have national guidelines on the publication of Public Sector Information specifically treating location aspects. Laws 4305/14 and 4727/20 codify the use of open public sector data, but do not include references to geospatial data.

The country reports some alignment in the location strategy on digital government elements or in the digital strategy on location elements (Recommendation 1).

The location information strategy is set by the following documents:

- the National Reference Sets Act (Law 3882/2010)[27], which calls for the implementation of the National Geospatial Information Infrastructure (EYGEP) and identifies the need to define a common digital background that will be used by the entire Public Administration in order for the geospatial data produced to be used in a combined way. The creation of geospatial datasets (or the selection of existing ones) that will act as the National Reference Sets should be one of the first actions to be carried out in order to implement the EYGEP.
- the strategy for the development of the National Geospatial Information Infrastructure[28], which concerns the creation of a fully functional and productive system for the provision of geospatial information to the entire public administration, at all levels of government, to the

[20] https://www.civilprotection.gr/en
[21] See http://elib.aade.gr/elib/DesktopModules/PdfViewer/web/viewer.html?file=/elib/DesktopModules/ViewModule/Documents/gr-act-2014-4305-4305_2014.pdf and https://www.secdigital.gov.gr/wp-content/uploads/2020/09/secdigital-nomos-4727-2020.pdf
[22] See https://www.ktimanet.gr/geoportal/catalog/main/home.page
[23] See https://www.ktimanet.gr/geoportal/catalog/search/resource/details.page?uuid=%7BDF5B1140-D957-4678-8C50-2B66066D227B%7D
[24] See https://www.ktimanet.gr/geoportal/catalog/search/resource/details.page?uuid=%7B456CB655-B899-450A-87BF-8322B8FB8370%7D
[25] See https://www.ktimanet.gr/CitizenWebApp/Orthophotographs_Page.aspx and https://www.ktimanet.gr/geoportal/catalog/search/resource/details.page?uuid=%7B485EC696-D9F3-492B-BA82-B77E071BB356%7D
[26] See https://www.ktimanet.gr/geoportal/catalog/search/resource/details.page?uuid=%7B3DE46469-97B1-46D4-A8DB-03D9BA80F523%7D
[27] See https://digitalstrategy.gov.gr/project/ethnika_synola_anaforas
[28] See https://ypen.gov.gr/wp-content/uploads/legacy/Files/Dimosia%20Diavouleysi/20201026_strathgiki_EYGEP.pdf

private sector and to citizens. The EYGEP strategy proposes to establish a framework of cooperation at institutional, administrative and technological levels between the public services that produce geospatial data. It is based on the principles of e-government, open data, uniform standards and specifications, participatory processes and experience from international practices. It is based on the implementation of the regulations and decisions of the INSPIRE Directive as well as on Law 3882/2010.

The "Digital Transformation Bible 2020-2025[29]", setting out the strategy for "Digital Greece", contains several location-related initiatives. It describes more than 400 specific projects, classified into short-term and medium-term, horizontal and sectoral. Some examples of location related projects are:

- the implementation of the "Single Digital Map", a complete information system which will collect, systematise and incorporate digital geospatial information held by different bodies of public administration regarding the status of ownership, construction, exploitation and protection of real estate. The aim is to make all the information interoperable and available through a single online platform;
- the creation of a national reference geospatial dataset according to the law 3882/2010;
- the implementation of the "Digital Land Use Bank";
- the digitisation of public property;
- the implementation of the National Spatial Data Infrastructure (NSDI);
- the creation of a register/database containing real estate data and values.

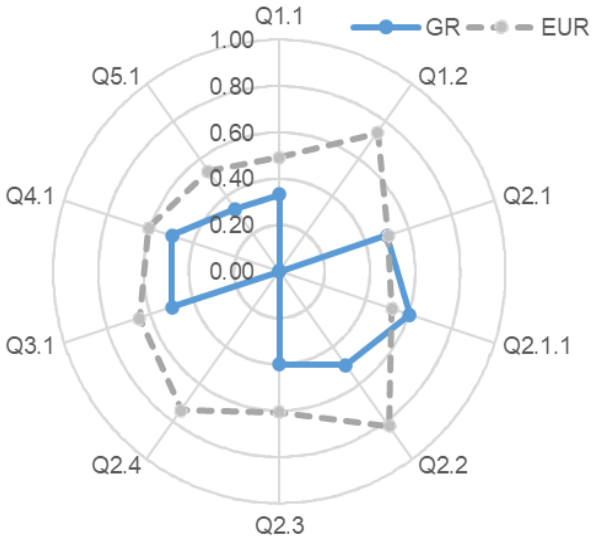

Figure 6 - Policy and Strategy Alignment - scores by indicator

Only some organisations are fully compliant with GDPR, including awareness of potential location data privacy issues and processes to comply with the rights of data subjects (Recommendation 3). Among them, the Greek Cadastre implements several measures for the privacy and security of personal data. The processing of personal data is carried out in compliance with the basic principles of personal data protection imposed by Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016[30].

Regarding public sector procurements of location information and / or services (Recommendation 5), only general reference is made to INSPIRE or other standards, while no specific details are given in the procurement documents. Some examples of public tenders containing references to INSPIRE provisions are:

- "Digital Services of Single Aid Application in the Renewed Parcel Recognition System"[31];
- "Completion and expansion of digital geospatial data and their integration in the GIS system within the boundaries of the Municipality of Heraklion"[32];

[29] See https://digitalstrategy.gov.gr/
[30] See https://www.ktimatologio.gr/privacy-policy
[31] See https://www.opekepe.gr/images/olddata/doc/June2010/draft_teyxh_dhmoprathsh_lpis_part_a_v4_as_diavouleush.pdf
[32] See https://www.heraklion.gr/files/items/2/28063/geodata_diakirixi_meleti.pdf

- Digitalisation services and development of application in the context of the project: “Network creation and promotion of castles”[33];
- “Approval of specifications for the drafting of the Regions Spatial Planning and Sustainable Frameworks Development”[34].

In Greece, the European Single Procurement Document (ESPD) is in use for the procurement of location information and services, ensuring, where applied, the standardisation of procurement information.

[33] See https://pin.gov.gr/wp-content/uploads/2015/12/%CE%94%CE%B9%CE%B1%CE%BA%CE%AE%CF%81%CF%85%CE%BE%CE%B7_NETCASTLE-%CE%B7%CE%BB%CE%B5%CE%BA%CF%84%CF%81%CE%BF%CE%BD%CE%B9%CE%BA%CE%BF%CF%82_final-3-12-15.pdf

[34] See https://www.pde.gov.gr/ppxsaa/content/files/nomothesia/FEK_45_%CE%91%CE%91%CE%A0%CE%98_2011.pdf

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

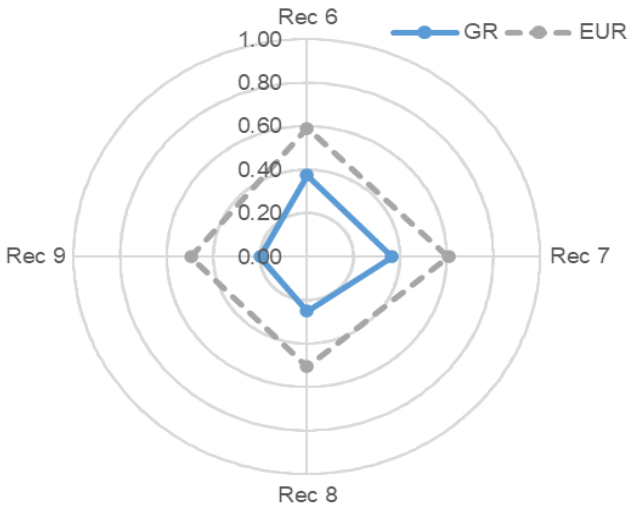

Figure 7 - Digital Government Integration - scores by recommerndation

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 with the European averages.

The "Digital Government Integration" focus area index for Greece is 0.30 compared with the European average of 0.57.

Under Recommendation 6, location information is occasionally used to optimise key digital public services. Certain steps are taken to improve the use of location information in digital public services, in sectors such as disaster management and civil protection, energy, environment, property and land administration. There are a number of interesting examples for using location information in a comprehensive way such as:

- disaster management and civil protection: an example is provided by the Institute of Geodynamics (National observatory of Athens), which offers real time Seismicity maps[35];
- energy: an example is provided by the BEYOND Centre of Earth Observation Research and Satellite Remote Sensing, which offers a variety of applications that covers thematic areas such as agriculture, climate, disasters, energy, epidemics[36];
- environment: an example is provided by the Regulatory Authority for Energy (RAE), which offers a geoportal monitoring the renewable energy production sites[37];

[35] See http://www.gein.noa.gr/en/
[36] See http://beyond-eocenter.eu/index.php
[37] See https://geo.rae.gr/

- property and land administration: an example is provided by the Ministry of Environment and Energy, which offers a geoportal with information such as land cover, regional development, altitude maps, soil maps, environmental information maps (noise, Seveso Directive provisions, protected sites, etc.)[38]

However, in the regional and urban development sector, key digital public services show clear margins for improving or increasing the use of location data.

Neither SDIs nor INSPIRE datasets are used in delivering digital public services across different public administrations in Greece (Recommendation 7). However, in the cross-border context, Greece uses both SDI and INSPIRE datasets for the delivery of some cross-border digital public services. An example of a cross-border initiative reusing harmonised location data is by the Ministry of Environment and Energy, responsible for the Greek INSPIRE Geoportal which contributes to the implementation of the European INSPIRE geoportal[39]. Currently, in Greece, there is no information available on the use of the public sector SDI by the private sector and other organisations (e.g. NGOs) for the delivery of innovative applications, products and services. This is due to the fact that Greece has no fully operational NSDI, as such, the country is not yet provided with the mechanisms needed to monitor the reuse of the geospatial information provided by the existing public sector SDI.

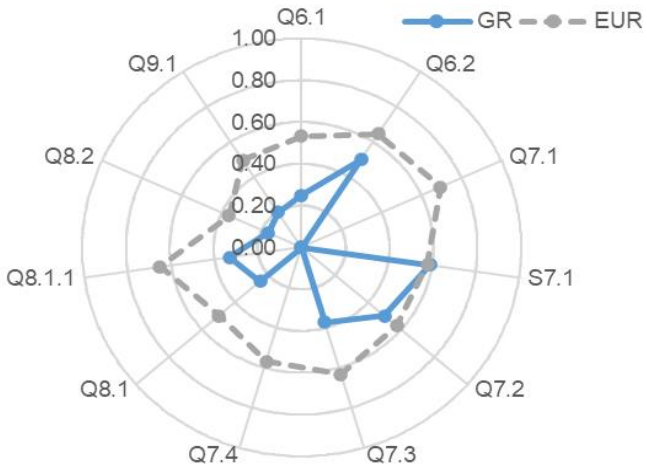

Figure 8 - Digital Government Integration - scores by indicator

Under Recommendation 8, Greece applies, infrequently, at a national level, an open and collaborative methodology to the design and improvement of location-enabled digital public services in specific initiatives.

Collaboration with the private sector takes the form of contracting location-based services under public sector accountability. The Hellenic Cadastre, for example, assigns the production of spatial data to private sector contractors. After the delivery of the project, the Hellenic Cadastre has the responsibility of maintaining and updating the pertinent spatial data bases.

Finally, under Recommendation 9, there are significant margins for improvement in the integration of location and statistical information in the production of location-based statistics, where only the following actions are taken:

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

[38] See http://mapsportal.ypen.gr/ - Best practice GR1
[39] See http://geoportal.ypen.gr/geonetwork/srv/eng/catalog.search#/home

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

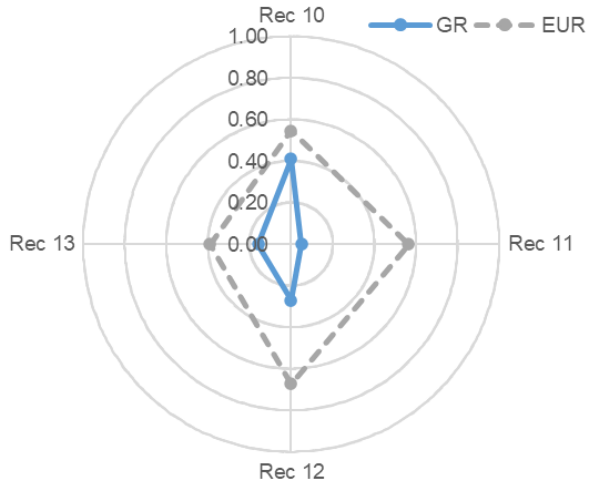

Figure 9 - Standardisation and Reuse - scores by recommendation

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 with the European averages.

The "Standardisation and Reuse" focus area index for Greece is 0.22, compared with a European average of 0.55. This is the focus area where the gap with the European average is the highest, as well as being the second lowest result for the country across the five focus areas.

A significant part of this gap is linked to the practices of reuse of technical solutions and authentic data registers (Recommendation 11). Greece has limited reuse of generic ICT solutions (national or international catalogues) in the SDI. Of the main registers of location information, only the cadastral parcels registry[40] has been implemented. Although Law 3882/10 calls for creation of national spatial reference data sets and their use by the public administration, this has not yet been realised and only recently have steps been taken in that direction.

There is a policy for a common architecture applicable in the design, re-engineering, interconnectivity and reuse of ICT and data in digital public services, even if it is not yet widely adopted (Recommendation 10). Reference to the common location architecture is made in the "Strategy for the creation of the Greek NSDI"[41] (which will be followed by further references regarding the National Framework of Interoperability of Geoinformation and Services), as well

[40] See https://www.ktimanet.gr/geoportal/catalog/main/home.page
[41] See https://ypen.gov.gr/wp-content/uploads/legacy/Files/Dimosia%20Diavouleysi/20201026_strathgiki_EYGEP.pdf?

as in the Law 3882/2010[42]. This recommendation presents the highest alignment with the European average, due to the good number of location data APIs that have been developed, documented and are accessible. In particular, the following high value location datasets can be accessed using APIs:

- air quality;
- cadastral parcels;
- elevation;
- hydrography;
- land cover;
- land use;
- protected sites;
- water quality;
- weather observation.

In this context, the steps taken to stimulate take-up and usefulness of APIs are the following:

- APIs are based on recognised standards (e.g. OGC API - Features, OGC Sensor of Things API);
- APIs have simple standard licences that specify their use.

Compared with the European average, a more ad-hoc approach is in place to discover, explore and incorporate new technological features or emerging technologies.

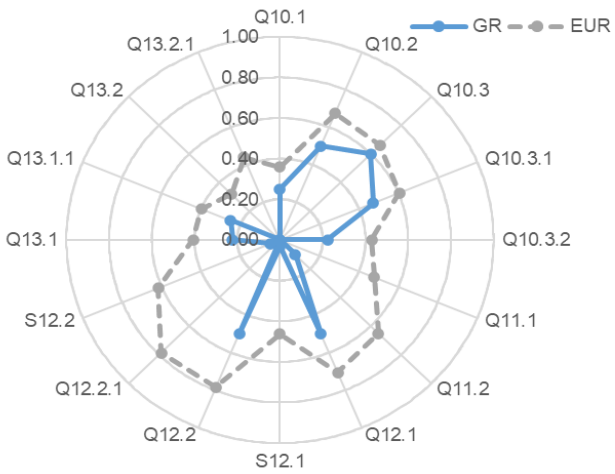

Figure 10 - Standardisation and Reuse – scores by indicator

Significant gaps can also be found under Recommendation 12. This is due to the small number of spatial data sets being in conformity with Regulation (EU) No. 1089-2010 and almost no network services in conformity with Regulation (EC) No. 976-2009.

Geospatial standards used are:

- adaptations of international standards (e.g. INSPIRE);
- stand-alone domestic standards.

The standards used in Greece for the management and provision of geospatial data under the INSPIRE scope are those proposed / used in the INSPIRE Implementing Rules and Technical Guidance documents. Other Greek public bodies may use different standards in the context of their commitments to other international initiatives (e.g. meteorology, geology, etc.), however, given the fact that the NSDI organisational mechanisms do not yet apply in Greece, currently, they are not mapped properly.

In Greece only limited actions are taken to ensure location data quality (Recommendation 13), namely:

- in the design phase, the inclusion of the different dimensions of data quality in the standard, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards / legislation;
- in the measurement phase, ex-post evaluations of existing data quality issues.

[42] See https://inspire.ec.europa.eu/reports/stateofplay2011/rcr11GRv101.pdf

The reference data quality standard applied in Greece is ISO 19157 - Geographic information — Data quality.

Finally, no actions have been implemented so far concerning location data quality governance.

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

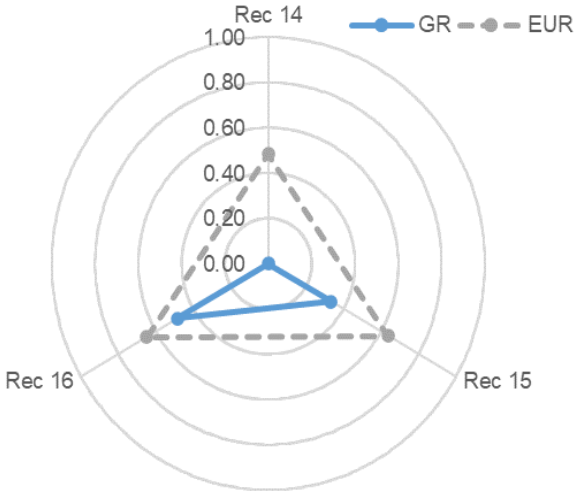

Figure 11 - Return on Investment - scores by recommendation

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 with the European averages.

The "Return on Investment" focus area index for Greece is 0.27, compared with a European average of 0.58.

This gap is linked mainly with Recommendation 14, as the country does not assess the efficiency and effectiveness of location-based services or implement impact-based improvements in location-enabled processes and services based on these assessments.

Recommendation 16, presents the lowest deviation from the European average due to the considerable range of measures 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. These measures include:

- national open data portal[43] merging location data and non-location data;
- national discovery geoportal integrating INSPIRE and non-INSPIRE data, which is also harvested by the European Data Portal[44];
- thematic portals complementing general search facilities with "specialist" search[45];

[43] See https://www.data.gov.gr/
[44] See http://geoportal.ypen.gr/geonetwork/srv/eng/catalog.search#/home
[45] See http://www.latomet.gr/

- websites with exposition of data[46];

However, only a limited set of actions is implemented in Greece to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data. Such actions include:

- the open data policy;
- promoting access to open data through hackathons;
- “innovation labs” or “innovation hubs”.

Relevant initiatives in this context are:

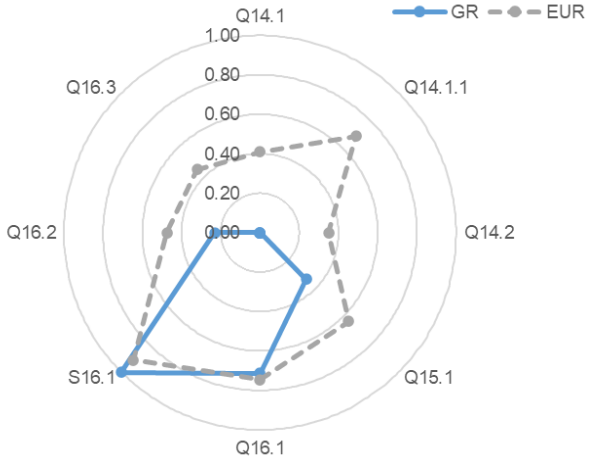

Figure 12 - Return on Investment - scores by indicator

- “Go 4 Green Crowdhackathon[47]”: an event organised by the Ministry of Environment and Energy in 2019-2020, in order to encourage the use of Ministry’s data for the development of environmental applications;
- “Hacking Health Athens Hackathon[48]”: an event organised by the “eHealth Forum” and “Biomimicry Greece Research & Innovation” with the aim of looking for innovative solutions to promote medical data and mobility;

Under Recommendation 15, the communication of availability and benefits of location data and location-enabled digital public services is at a basic level. such communication has recently started through public consultation on the NSDI strategy, which is ready to be adopted. Otherwise, sporadic efforts to inform the public administration on the use and benefits of geospatial data have been made in recent years by public bodies responsible for that data, have been carried out, with some articles and scientific studies being published on the subject.

[46] See http://mapsportal.ypen.gr/maps/?limit=20&offset=0
[47] See https://www.crowdhackathon.com/go4green/
[48] See https://hacking-health.org/el/hackathon-athens-2019/

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

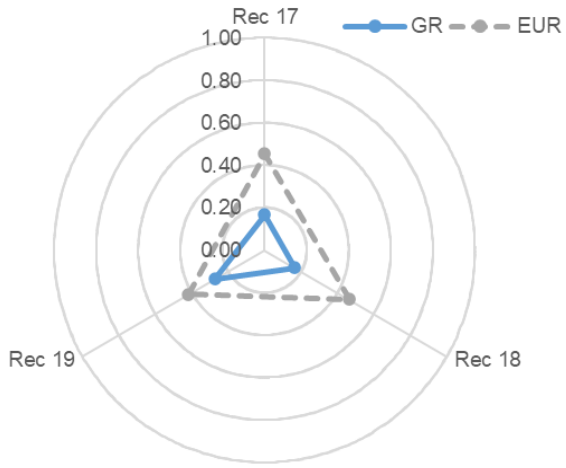

Figure 13 - Governance, Partnerships and Capabilities - scores by recommendation

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 Figure 14. In both cases, the country scores are compared with the European averages.

The "Governance, Partnerships and Capabilities" focus area index for Greece 0.20 compared with the European average of 0.45. This is the focus area where Greece obtains the lowest score.

In Greece some training or awareness raising on geospatial skills is undertaken by organisations to meet specific needs, however, the training is not part of a recognised or accredited competency framework (Recommendation 19). In this regard, the initiatives organised to raise awareness and develop geospatial skills are:

- spatial literacy awareness raising for non-specialists, e.g. policy makers, legal advisers, project managers;
- public or cross-government events specialising in location information / GI topics;
- INSPIRE training modules.

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 on SDI in Digital Transformation is quite limited. Since 2010, when the INSPIRE Directive was adopted as a national law, there have been attempts to involve other public and some academic communities in the decision making process related to the

role of geospatial information. However, the financial crisis had a negative influence on this process, leading to many changes in the public service administration's organisation and a focus on other priorities. In 2020, efforts resumed with the submission of a national strategy for the development of Greece NSDI.

There is joint leadership and coordination between organisations responsible for the actions and policies related to the role of the SDI in Digital Government. The responsibility for the construction and implementation of the NSDI is under the Ministry of Environment and Energy, while the Ministry of Digital Governance is responsible for Greece's digital programme. In this context, the two Ministries have collaborated on spatial data related topics when implementing the Digital Strategy Paper and the Strategy for developing Greece's NSDI.

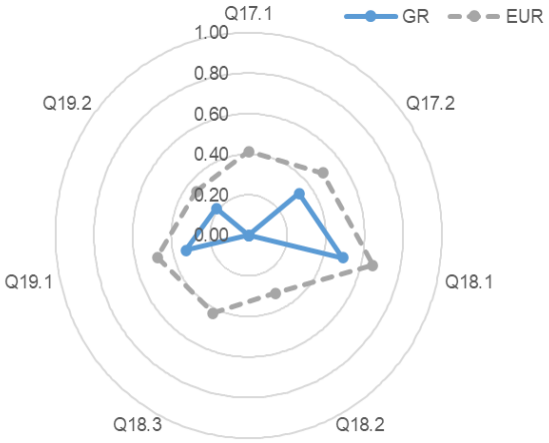

Figure 14 - Governance, Partnerships and Capabilities - scores by indicator

Regarding partnerships, there are no agreements with public authorities in other countries, and only limited formal agreements between public authorities within the country to finance, build and operate location data services or digital public services using location data. In addition, no public-private partnership are reported (Recommendation 18).

An example of a formal agreement between national public administrations is between the Ministry of Environment and Energy and the Technical Chamber of Greece, which are collaborating in developing various applications that use spatial data (such as the electronic issuance of building permits[49]). Another initiative concerns the creation of a digital map for Greece, which is now under procurement. This initiative will be financed by the Ministry of Transport and will be implemented by the Technical Chamber of Greece.

[49] See https://eadeies.ypen.gr/adeiapublic/faces/main?_adf.ctrl-state=11i2s6qycy_4

4. Best practices

Best Practice GR1	Geospatial Information Portal of the Ministry of Environment and Energy
Policy domain: Geospatial, Environment	
Process owner: Ministry of Environment and Energy	
Short description: The Geospatial Information Portal combines geospatial information from different public sources (e.g. the Hellenic Statistical Authority). The purpose of the Portal is the dissemination of geospatial information concerning phenomena of the natural and urban environment in the form of "maps". These phenomena are the subject of studies and interventions by the thematic services of the Ministry of Environment and Energy. In the portal, users are able to display, examine and combine thematic layers (patches) on available general backgrounds. Particular emphasis has been placed on the correct application of classification, synthesis and rendering of geospatial information prior to its publication. In this way, the understanding and interpretation of phenomena is optimally supported and the cartographic documentation provides a tool for policy planning and development. Development of the portal is carried out with the Ministry's own resources. For this purpose, Free/Open Source Software (FOSS) is used and the application is installed and running on the Government Cloud (G-Cloud) of the Information Society SA of the Ministry of Administrative Reform.	
Recommendation: Policy and Strategy Alignment (4); Return on Investment (16)	
Link: http://mapsportal.ypen.gr/	

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
API	Application Programming Interface
CSW	Catalogue Service – Web
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
DSM	Digital Surface Model
EFQM	European Foundation for Quality Management
EIF	European Interoperability Framework
EMDD	Hellenic Metadata Register
ELISE	European Location Interoperability Solutions for e-Government
EULF	European Union Location Framework
EYGEP	National Geospatial Information Infrastructure
GDPR	General Data Protection Regulation
GI	Geographic Information
GML	Geography Markup Language
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
JRC	Joint Research Centre
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
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
NSDI	National Spatial Data Infrastructure
OGC	Open Geospatial Consortium
PSI	Public Sector Information
RAE	Regulatory Authority for Energy
SDI	Spatial Data Infrastructure
SFSC	Short Food Supply Chains
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Services
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 European Single Procurement Document (ESPD) 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

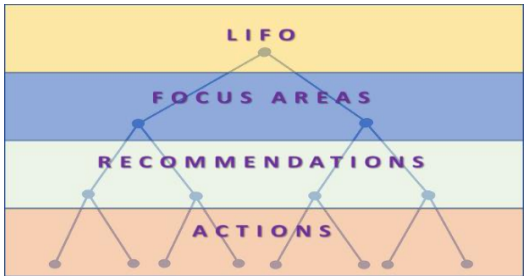

Figure 15 - Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*[50], 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[51] 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.

[50] https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf
[51] 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 - Accessibility of spatial data sets through view and download services - Conformity of the network services	Change of calculation method for the INSPIRE country fiche
Q7.2	Use of SDI in cross-border services	Is the country actively involved in delivering cross-border digital public	Change in scale

		services using their spatial data infrastructure (SDI)?	
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	Multiple choice in 2019, single choice in 2020

		decision making on the role of location information in Digital Government?	
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[52], with the aim to improve the capability of the LIFO analytical model to represent consistently the state of play of location interoperability at country and EU 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

[52] 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

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: Greece

Title	Attachment[53]
LIFO Survey questionnaire 2020 – Greece	LIFO Survey 2020 Greece
LIFO Survey questionnaire 2020 scores and charts – Greece	LIFO 2020 scores and charts Greece

[53] 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.