LIFO: Location Interoperability Framework Observatory

2020 Country Factsheet

Poland

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The monitoring information for Poland has been provided by the *Head Office of Geodesy and Cartography.*

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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).

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.

European Union Location Framework Blueprint
EULF Blueprint

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.
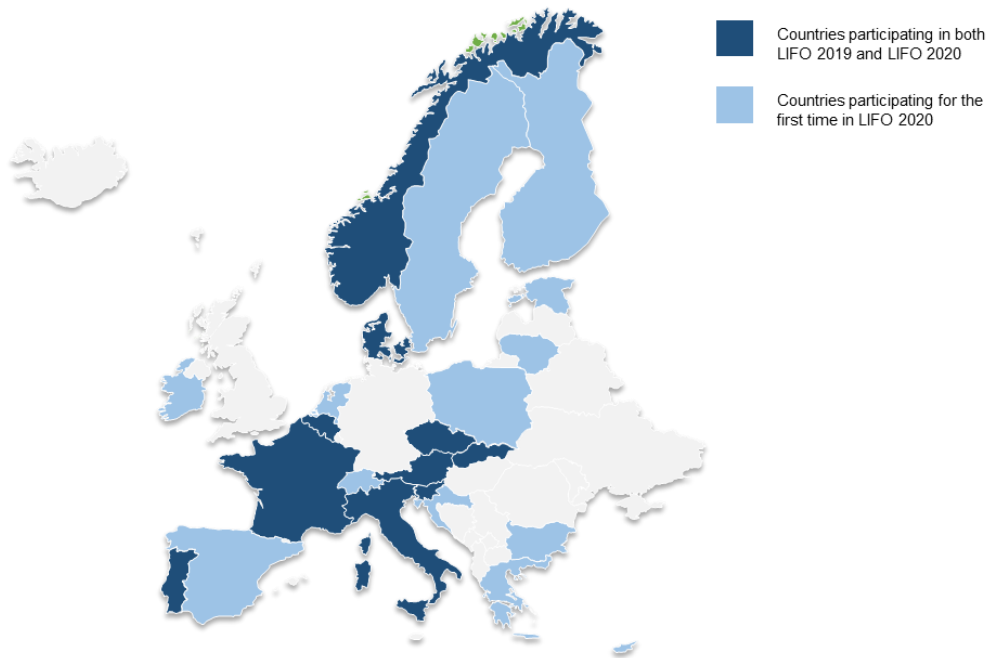

Figure 3 - LIFO participating countries in 2019 and 2020

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 Poland 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 Poland comprising the questionnaire response and the scores and charts based on the response.

The 2020 LIFO monitoring information for Poland has been provided by the *Head Office of Geodesy and Cartography.*

3. Location Interoperability State of Play

3.1. Overview

The information gathered through the LIFO 2020 data collection indicates that Poland's scores are consistently above the European averages in the "Governance, Partnership and Capabilities" and "Return on Investment" focus areas. The country is aligned with the European averages in the "Policy and Strategy Alignment", "Digital Government Integration" and "Standardisation and Reuse" focus areas (see Figure 4).

"Governance, Partnership and Capabilities" is the focus area where the country recorded the highest score. This solid positioning is due to the strong joint leadership and coordination on actions and policies related to the role of the SDI in Digital Government, although not all relevant stakeholders are involved in its governance. A large number of partnership agreements are in place to finance, build and operate location data services. The country also organises quite an extensive series of initiatives to raise awareness and develop geospatial skills.

In the "Return on Investment" focus area, the country performed above the European average thanks to the regular, thorough and convincing communication on the availability and benefits of location data and the existence of a strategic approach to funding location reference data. A negative note is the limited resort to impact-based improvement in location enabled processes and services.

In the "Digital Government Integration" focus area, the good positioning is linked to the delivery of many digital cross-government public services using the SDI, even though the use of location data in digital public services is still made at a basic or sub-optimal level in several sectors. The country has also adopted an open and collaborative methodology to design and improve location-enabled digital public services at local, sub-national and national levels, but external parties are only involved in limited ways in the development and delivery of such services.

In the "Standardisation and Reuse" focus area, the country has adopted a well-organised approach to monitoring, testing and upscaling of new technological developments. Moreover, INSPIRE and other standardised approaches are used for combining spatial and non-spatial metadata. The architectural approach is, in general, an area of weakness, as a policy for a common location architecture in the SDI exists but it is not yet widely adopted. On the positive side, a series of APIs have been developed, documented and are accessible for high-value location data sets and a variety of steps are taken to stimulate their take-up. Finally, little reuse is made of generic ICT solutions in the SDI, and location data quality practices are not yet sufficiently mature.

In the "Policy and Strategy Alignment" focus area, strengths 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 made to the applicable parts of the INSPIRE Directive and/or national/international standards in public procurements of location data and services. On the negative side, only partial alignment is reported between location and digital government strategies, and location datasets are not available under a common data licensing framework.

The value of the overall LIFO index combining the scores for all focus areas is 0.65, which confirms the good performance of Poland in terms of location interoperability. This compares with a European average of 0.55.

Figure 4 - Overall EULF Blueprint implementation

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

Focus Area	Strengths	Weaknesses
Policy and Strategy Alignment	• A wide range of core location reference datasets are available for general use • Pan-government guidelines on the publication of public sector data cover specifically location aspects • Most organisations are fully prepared for GDPR and aware of potential location data privacy issues • Specific references are made to the applicable parts of the INSPIRE Directive and/or national/international standards in public procurements of location data and services	• Location and digital government strategies are only partially aligned • A common data licensing framework is in place but location datasets are not available under that framework
Digital Government Integration	• Key location-based digital public services and processes are optimised through service improvement actions, or through new business or delivery models.	• Use of location data in digital public services is still made at a basic or sub-optimal level in different sectors • External parties are involved to a limited extent

Focus Area	Strengths	Weaknesses
	• Many cross-government digital public services use the SDI • An open and collaborative methodology is adopted to design and improve location-enabled digital public services at local, sub-national and national levels	in service co-delivery of location-based digital public services
Standardisation and Reuse	• Well-organised approach to monitoring, testing and upscaling of new technological developments • INSPIRE and other standardised approaches are used for combining spatial and non-spatial metadata	• A policy for a common location architecture in the SDI exists but it is not yet widely adopted • Little reuse is made of generic ICT solutions in the SDI • Few actions are implemented to assure quality of location data
Return on Investment	• Regular thorough and convincing communication on the availability and benefits of location data and location-enabled digital public services • Existence of policies supporting the reuse of public sector information • Existence of a strategic approach to funding location reference data	• Few actions are implemented for impact-based improvement in location enabled processes and services
Governance, Partnerships and Capabilities	• There is strong leadership and coordination on actions and policies related to the role of the SDI in Digital Government • A large number of partnership agreements exist to finance, build and operate location data services • Training on geospatial skills is undertaken by organisations as part of a recognised geospatial competency framework	• A governance structure is in place enabling some joint decision making on SDI in Digital Transformation but not all stakeholders are involved

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
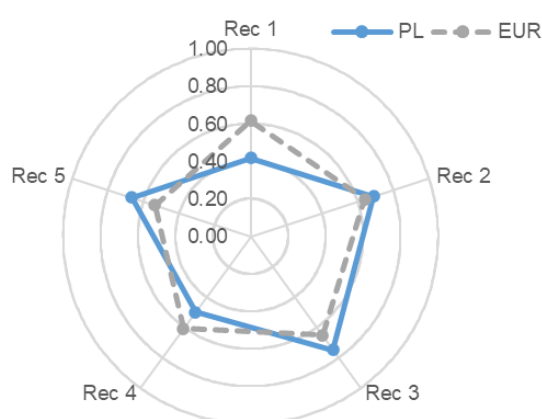

Figure 5 - Policy and Strategy Alignment - scores by recommendation

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 Poland is 0.60 slightly below the European average of 0.62. The country has performed above the European average under Recommendation 2, Recommendation 3 and Recommendation 5, while it has a below-average standing under Recommendation 1 and Recommendation 4.

Poland has confirmed only some degree of alignment in the digital strategy on location elements (Recommendation 1). The digital information strategy is set by the "Efficient State 2020[18]" Strategy, which foresees among its objectives support to the development and use of the SDI and digital technologies (part. 3.2.2) and specifies activities to meet these goals. The new "Efficient and Modern State 2030[19]" Strategy, still in the initial implementation phase, which is part of the activities aimed at implementing objective III of the "Strategy for Responsible Development"[20] – i.e. "effective state and economic institutions contributing to growth as well as social and economic inclusion", aims at the expansion of general public administration e-services and use of location data. This new strategy acknowledges that the

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[18] See http://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WMP20130000136
[19] https://www.gov.pl/web/ia/strategia-sprawne-i-nowoczesne-panstwo-2030-ssnip2
[20] See https://www.gov.pl/web/fundusze-regiony/informacje-o-strategii-na-rzecz-odpowiedzialnego-rozwoju and best practice PL1

geoinformation sector, so far, has not been the subject of any homogeneous strategic action programme of the Polish government, and outlines some lines of development to improve the quality of geoinformation and the wider use of geoinformatic tools in order to obtain a positive impact on the effectiveness of the tasks of public administration, and ultimately on economic development.

The use in digital government of authoritative location datasets and services is mandated by the "Geodetic and cartographic law"[21].

Most location data is available free of charge under an open licence without restrictions (Recommendation 2). This include datasets such as addresses, administrative units, air quality, elevation, geographical names, health statistics, land cover, land use, population distribution and demography, protected sites, statistical units and transport networks. Other datasets (buildings, cadastral parcels and hydrography) are available upon payment of charges for commercial use or depending on volumes and types of access[22]. The common data licensing framework is provided under the Geodetic and cartographic law but location data tends to be available through different licensing arrangements from different data providers.

The same policy mandates for a wide range of core location reference datasets being available for general use[23]. Here are some examples:

- administrative units;
- special borders;
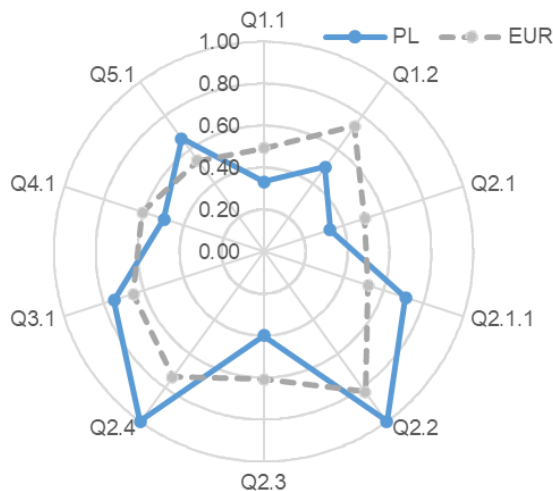- address points and streets.

Figure 6 - Policy and Strategy Alignment - scores by indicator

Moreover, government guidelines on the publication of public sector data cover location aspects.

The degree of preparedness for GDPR concerning location data is high (Recommendation 3): most organisations are fully prepared and no complaints are reported so far with regard to GDPR under location data privacy aspects.

Location-based evidence and analysis is used to help in developing policies and monitoring outcomes in some relevant policy topics (Recommendation 4). Statistics gathered through the geoportal.gov.pl demonstrate a growth in the number of visits and use of data for spatial analysis, with almost 1,000,000 visits per month at the time of reporting.

Specific references to the applicable parts of the INSPIRE Directive and/or national/international standards are made in public sector procurements of location information and/or services (Recommendation 5).

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[21] https://isap.sejm.gov.pl/isap.nsf/download.xsp/WDU19890300163/U/D19890163Lj.pdf

[22] See http://www.gugik.gov.pl/pzgik/dane-udostepniane-odplatnie

[23] See http://www.gugik.gov.pl/pzgik/dane-bez-oplat/dane-z-panstwowego-rejestru-granic-i-powierzchni-jednostek-podzialow-terytorialnych-kraju-prg;
https://mapy.geoportal.gov.pl/imap/Imgp_2.html?locale=pl&gui=new&sessionID=5160004; https://mapy.geoportal.gov.pl/imap/Imgp_2.html?locale=pl&gui=new&sessionID=5159785

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

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.

Figure 7 - Digital Government Integration - scores by recommendation

The "Digital Government Integration" focus area index for Poland is 0.55, almost aligned with the European average of 0.57. The country has scored above the European averages under Recommendation 8 and Recommendation 9, and below the averages for Recommendation 6 and Recommendation 7.

The use of location information in digital public services and processes is usually optimised through service improvement actions, as well as by applying in some cases a service innovation approach through new business or delivery models (Recommendation 6).

However, only in the property and land administration sector is the use of location data in digital public services currently made in a comprehensive way. In this regard, some interesting examples are:

- KIEG[24] (National Land Registry Integration), a service with the ability to generate a map of the land and building registry for any area of the country;
- ULDK[25] (Service of Location of Cadastral parcels), a service for location of cadastral parcels that enables spatial location of a given parcel on the basis of its identifier, district name and plot number, or on the basis of X,Y coordinates of any point inside it.

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[24] See https://integracja.gugik.gov.pl/cgi-bin/KrajowaIntegracjaEwidencjiGruntow?lang=en
[25] See http://uldk.gugik.gov.pl/

In other sectors (e.g. agriculture, business, disaster management and civil protection, environment and marine), the use of location data is still at a basic or even sub-optimal level. Some examples are:
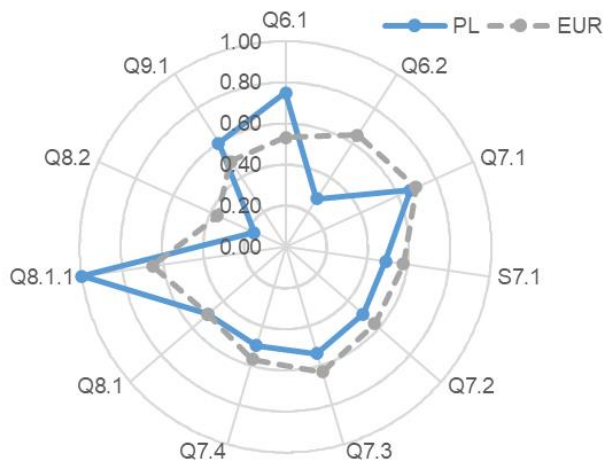

Figure 8 - Digital Government Integration - scores by indicator

- business: adresowo.pl[26] and buylando[27] (real estate sale applications, which provide access services to geoportal data), aquagis[28] (a GIS for water and sewage companies) and Polska e-mapa[29], a service publishing current registration data from geodetic and cartographic documentation centres;
- environment: Korona Gór Polski 3D[30], an application made by students to develop 3D models of Polish mountain peaks, which can be viewed on the project website, displayed in augmented reality mode on smartphones and added free of charge on every website.

Delivery of digital public services is supported by the use of the national SDI or of sector-specific SDIs (Recommendation 7), in various domains such as agriculture, disaster management and civil protection, environment, marine, property and land administration, and transport[31].

INSPIRE conformant datasets and services are used only in certain digital public services, for instance in the Open Public Data portal[32]. The SDI is used in many cases to deliver digital public services across government, but only to a limited extent for cross-border services. Even in this case, INSPIRE conformant datasets and services are used only in some cross-border digital public services. The public sector SDI is used only occasionally by the private sector and non-governmental organisations for the delivery of new and innovative applications, products and services. An example in this respect is FME, a data integration platform that enables users to combine and integrate data from multiple sources, applications and systems, including the public SDI[33].

Poland applies an open and collaborative methodology to design and improve location enabled digital public services in several cases at local, sub-national and national levels (Recommendation 8). At national level, an example is represented by the National Geoportal[34], while examples at local level are:

- SDI Module[35], a set of IT tools that support controllers of spatial data in collecting and managing spatial data, creating metadata as well as publishing the services for searching, browsing and collecting and transferring information within the national spatial data infrastructure;

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[26] See https://adresowo.pl/
[27] See https://buylando.io/
[28] See https://aquagis.pl/
[29] See https://polska.e-mapa.net/
[30] See https://kgp3d.amu.edu.pl/index.html#OProjekcie
[31] See https://widok.gov.pl/statistics/
[32] See https://dane.gov.pl/en/application?page=1&per_page=50&q=&sort=-date
[33] See https://fme.globema.pl/jak-dziala-fme/
[34] See https://www.geoportal.gov.pl/
[35] See https://modul-sdi.geoportal.gov.pl/

- EMUiA[36], an application integrating and giving access to addresses data for regional and local public administrations.

External parties contribute to location-based public services in various circumstances. Examples include:

- public tenders for data collection according to defined standards, including use of quality tools to ensure compliance[37];
- contact form in the National Geoportal[38]: the website represents a central node of the Spatial Information Infrastructure, acting as an intermediary in access to spatial data and related services. It provides a contact form with the possibility to report any bug or suggestions for the operation of the site;
- the government encourages 'civic hacking' to develop new ideas, technologies or methodologies that help solve civic problems and improve the lives of citizens; numerous competitions have been launched to inspire open data engagement, such as the competition for the best use of GUGiK's data and services in 2020[39].

Finally, the actions taken for the integration of location and statistical information in the production of location-based statistics (Recommendation 9)[40] include:

- an accurate and up-to-date knowledge base of where citizens and businesses are located;
- a common geospatial reference framework for statistics to enable timely, accurate and efficient production of location-based statistics;
- use of INSPIRE to support the location reference framework for statistics;
- collection of census data based on the location reference framework for statistics;
- the spatio-temporal dimension of statistics being captured in a format that enables it to be used readily in a tool for geostatistical analysis;
- contribution to European projects aiming at establishing a data and production infrastructure for location-based statistics.

An example of the above practices, in particular a contribution to European projects, is the "Open European Location Services (ELS) Project"[41], which provides a single point of access to a number of European open geospatial data test services. OpenELS aims to provide user-focused services using open geospatial data available from EuroGeographics members (Europe's National Mapping, Cadastral and Land Registration Authorities), so it can be considered as an action for the integration of location information and the adoption of location-based approaches in the collection of data from many sources.

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[36] See https://emuia.gugik.gov.pl/
[37] See http://www.gugik.gov.pl/bip/zamowienia-publiczne/2020-powyzej-kwoty-okreslonej-w-art.-4-pkt-8-pzp/opracowanie-cyfrowej-ortofotomapy2
[38] See https://www.geoportal.gov.pl/kontakt/zglos-blad
[39] See http://www.gugik.gov.pl/aktualnosci/2021/21.12.2020-rozstrzygamy-konkurs-na-najlepsze-wykorzystanie-danych-i-uslug-gugik-w-2020-r.
[40] See https://geo.stat.gov.pl/imap/
[41] See https://openels.eu/; https://geospatialworldforum.org/2019/openELS-launch.html

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

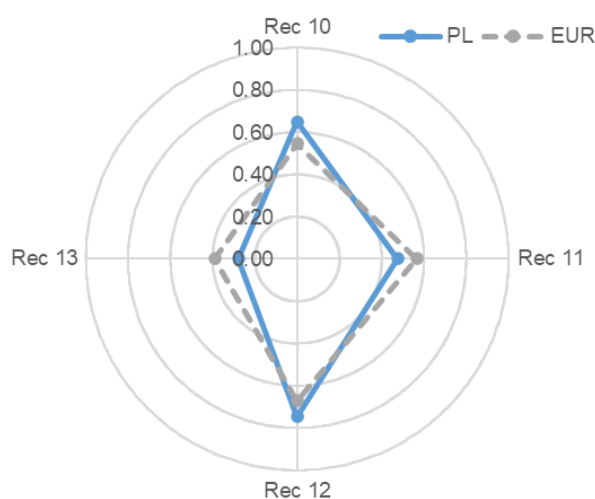*Table 4 - Focus Area "Standardisation and Reuse" - vision and recommendations*

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 Poland is 0.54, basically aligned with the European average of 0.55. The country has scored slightly above the European averages under Recommendation 10 and Recommendation 12, while slightly below the averages for Recommendation 11 and Recommendation 13.

The adoption of a common architecture to develop digital government solutions is slightly above the European average (Recommendation 10). As previously mentioned, there is a policy defining the architecture for location data and services in the SDI within the "Efficient and Modern State 2030[42]" Strategy, which however is not yet widely adopted. The strategy assumes that the starting point for the creation of an effective, digitally available and secure e-administration is the construction and maintenance of the State Information Architecture model, which is necessary for the government's digital transformation.

The approach to discover, explore and incorporate new features or emerging technologies is well organised. A series of APIs have been developed, documented and are accessible for high-value location data sets[43], such as: addresses, administrative units, air quality, buildings,

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[42] See https://www.gov.pl/web/ia/architektura-informacyjna-panstwa
[43] See https://api.stat.gov.pl/, https://inspire.gios.gov.pl/imap/?locale=en#gpmap=gpMonit and https://sipam.gov.pl/zasoby-gis/interfejsy-api/

cadastral parcels, elevation, geographical names, health statistics, hydrography, land cover, land use, population distribution and demography, protected sites, statistical units, transport networks, and weather observations. Some examples of APIs are available on the National Geoportal[44], the API GUS Portal[45] and SIPAM[46].

Several steps are taken to stimulate take-up of APIs and ensure that they are as useful as possible:

- APIs are based on recognised standards (e.g. OGC API - Features, OGC SensorThings API);
- APIs are documented in open specifications (e.g. through OpenAPI specifications);
- API designs best practices are used (e.g. REST APIs);
- APIs provide access to updates of both static (slow moving) and dynamic (fast moving data);
- APIs have simple standard licenses which specify their use.

The reuse of generic ICT solutions in the SDI is still in the planning or the analysis phase (Recommendation 11). The reuse of data, on the other hand, relies on various registers of location information[47], namely:
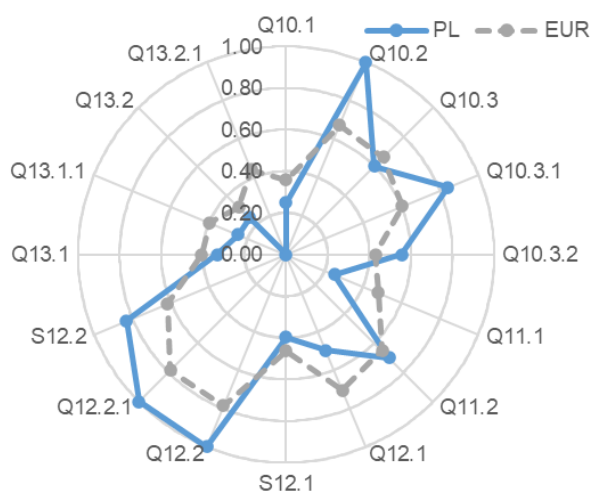

Figure 10 - Standardisation and Reuse - scores by indicator

- addresses;
- geographical names;
- administrative units;
- cadastral parcels;
- buildings;
- hydrography;
- transport networks.

The following geospatial domain standards are used (Recommendation 12):

- international standards (like ISO/TC211, OGC, IHO, GDF);
- adaptations of international standards (e.g. INSPIRE).

The country adopts a standardised approach for combining spatial and non-spatial metadata, by adapting and extending international or European specifications and tools. For example, the Act on Spatial Data Infrastructure is a direct transposition of the INSPIRE directive, and together with the Geodetic and Cartographic Law they apply the ISO 19128 and ISO 19142 standards and the technical specifications for country-level WMS related to land and building registers.

The management of location data quality (Recommendation 13) is where Poland displays the largest gaps compared to the European average in this focus area. The quality of location data is assured at the design level through the:

- development and application of a framework for analysis of data quality[48];
- linking of data quality standards to data standards;

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[44] See https://www.geoportal.gov.pl/uslugi
[45] See https://api.stat.gov.pl/
[46] See https://sipam.gov.pl/zasoby-gis/interfejsy-api/
[47] Such data registers are freely available through https://www.geoportal.gov.pl/dane/dane-bezplatne
[48] See http://www.gugik.gov.pl/aktualnosci/2021/28.07.2020-nowe-rozporzadzenie-fotogrametryczne and http://www.gugik.gov.pl/bip/zamowienia-publiczne/2020-powyzej-kwoty-okreslonej-w-art.-4-pkt-8-pzp/pozyskanie-danych-wysokosciowych2

- inclusion of the different dimensions of data quality, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards / legislation.

However, the country fails to adopt a more complete range of quality assurance principles and actions. The only reference standard adopted is ISO 19157 - Geographic information — Data quality.

The approach to data quality governance is also subject to improvements. It relies currently on well-defined data quality responsibilities and collection of feedback from users to report problems and help improve data quality but does not consider aspects such as a well-established review process, the use of technological solutions to automatise data quality reviews and the definition of a data quality roadmap.

The approaches to collect feedback from users include:

- licences for location datasets typically requesting feedback on problems and changes made to improve quality[49];
- a community/discussion forum to collect feedback from users and stakeholders[50];
- a feedback mechanism embedded in the SDI data portals or catalogues of services[51];
- use of traffic and usage statistics to improve the SDI[52].

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[49] See https://www.geoportal.gov.pl/kontakt/zglos-blad
[50] See https://www.facebook.com/gugikgovpl/posts/4215040765257180?__tn__=-R
[51] See https://www.geoportal.gov.pl/kontakt/zglos-blad
[52] See https://integracja.gugik.gov.pl/, https://widok.gov.pl/statistics/ and https://integracja.gugik.gov.pl/cgi-bin/KrajowaIntegracjaEwidencjiGruntow#

3.5. Return on Investment

<table>
<tr><td colspan="2">Vision</td></tr>
<tr><td></td><td>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.</td></tr>
<tr><td>Recommendation 14</td><td>Apply a consistent and systematic approach to monitoring the performance of location-based services</td></tr>
<tr><td>Recommendation 15</td><td>Communicate the benefits of integrating and using location information in digital public services</td></tr>
<tr><td>Recommendation 16</td><td>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</td></tr>
</table>

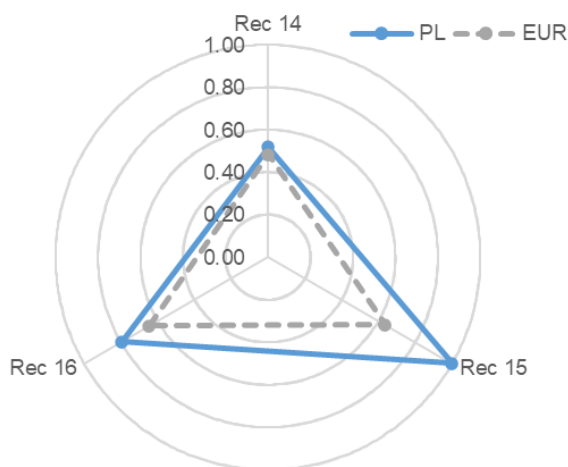*Table 5 - Focus Area "Return on Investment" - vision and recommendations*

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 Poland is 0.77, well above the European average of 0.58. The country registers good practices under all recommendations, especially for Recommendation 15 and Recommendation 16, while scoring slightly above the European average for Recommendation 14.

The assessment of efficiency and effectiveness of location-based services (Recommendation 14) is done under the following dimensions:

- return on investment;
- reusability;
- reduction in administrative burden;
- simplification of administrative processes;
- enhanced business opportunities.

The measurement is conducted in a comprehensive way, covering a combination of project, organisation and national levels.

In order to improve digital processes and services (including those that are location-enabled), the country has started a pilot project to set up a monitoring portal[53] gathering different types of data from 619 electronic services. Typologies of data collected include:

- cost per transaction, counted as total yearly maintenance costs divided by number of transactions per year;
- digital take-up, as the percentage of operations that are already performed digitally only;
- completion rate, the percentage of operations that have been successful;
- user satisfaction, measured on the basis of surveys or evaluations expressed in help desk systems;
- traffic stats, the information about users activity on websites including tools statistics;
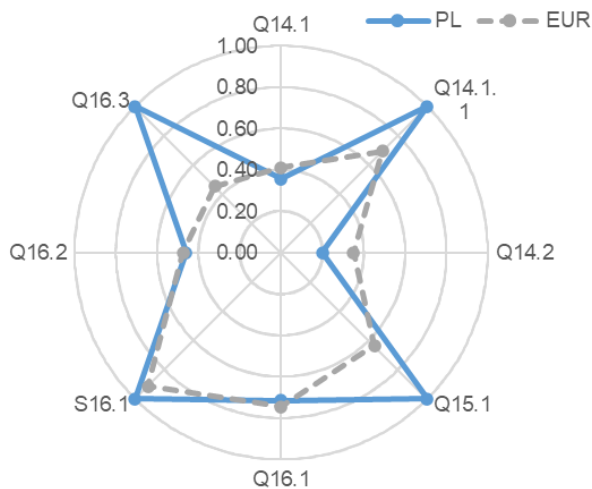- keywords that brought users to websites via search engines.

Figure 12 - Return on Investment - scores by indicator

The National Open Data Portal[54] and the monitoring portal[55] provide regular, thorough and convincing communication of the availability and benefits of location data and location-enabled digital public services to raise awareness and understanding of such benefits (Recommendation 15). Moreover, both the National Geoportal[56] and GUGIK[57] websites have a news section to provide information on these topics.

Poland has implemented a considerable number of portals and other measures 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 (Recommendation 16).

These measures include:

- a national Open Data Portal[58] and the monitoring portal[59].
- a national discovery geoportal integrating INSPIRE and non-INSPIRE data[60];
- the geoportal being harvested by the European Data Portal;
- thematic portals complementing general search facilities with "specialist" search[61];
- websites with exposition of data;
- availability of spatial data sets on web search engines.

The actions implemented to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data include:

- an open data policy;
- government sponsorship of innovative pilot projects[62];

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[53] See best practice PL2
[54] See https://dane.gov.pl/pl/dataset
[55] See https://widok.gov.pl/services/
[56] See https://www.geoportal.gov.pl/o-geoportalu/aktualnosci
[57] See http://www.gugik.gov.pl/aktualnosci
[58] https://dane.gov.pl/pl/dataset
[59] https://widok.gov.pl/services/
[60] https://geoportal.gov.pl/
[61] For example: https://wody.isok.gov.pl/, https://www.gov.pl/web/gdos and https://inspire.gios.gov.pl/portal/en/network-services/
[62] See http://www.gugik.gov.pl/projekty and best practice PL3

- establishing digital platforms through which a community of data providers, consumers and partners is actively engaged in the sharing, enhancing and using of location data and value is created for all partners in the ecosystem;
- collecting requirements of businesses, research institutions and other (potential) users for consideration in further development of INSPIRE/SDI;
- collecting best practice examples of how private companies, citizens, academic institutions and other users make use of INSPIRE/SDI data and services;
- training in skills necessary to exploit the SDI[63];

Regarding the open data policy, the "Data Opening Programme for 2021-2027"[64] specifies the data sharing standards (available in Annex 1 of the Programme) adopted by resolution of the Council of Ministers on 20 September 2016. The implementation of the Programme is coordinated by the Digital Affairs Chancellery of the Prime Minister[65], which among other things regularly checks whether selected institutions comply with the standard developed. It also cooperates with key contact points in charge of the implementation of openness principles and organises training and workshops on opening public data.

The country has adopted a strategic approach to funding public sector location reference data together with funding other important public sector authentic datasets[66].

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[63] See http://www.gugik.gov.pl/projekty/power
[64] See https://monitorpolski.gov.pl/MP/2021/290
[65] See https://www.gov.pl/web/digitalization
[66] See https://www.geoportal.gov.pl/o-geoportalu/materialy-do-pobrania

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
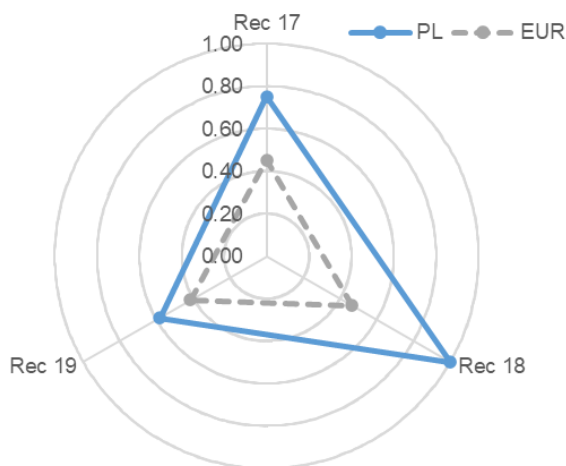

Figure 13 - Governance, Partnerships and Capabilities - scores by recommendation

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

The "Governance, Partnerships and Capabilities" focus area index for Poland is 0.78, well above the European average of 0.45. This is the highest positioning reached by Poland in all focus areas, thanks to the high score registered for Recommendation 18, followed by above average scores compared with the European averages for Recommendation 17 and Recommendation 19.

With regards to Recommendation 17, some stakeholders are involved in decision-making on the role of location information in digital government.

The two organisations respectively in charge of the SDI and digital government, i.e. the Head Office of Geodesy and Cartography[67] and the Ministry of Digitisation[68] jointly exercise strong leadership and coordination on actions and policies related to the role of the SDI in Digital Government.

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[67] See www.gugik.gov.pl
[68] See http://www.radaiip.gov.pl/

The Strategy for Responsible Development (SRD)[69] can be considered as a best practice in this focus area, as it defines the basic conditions, goals and directions of the country's development in the social, economic, regional and spatial dimensions with a perspective until 2030.

For example, specific objective III of the SRD – i.e. "effective state and economic institutions contributing to growth as well as social and economic inclusion" – is relevant for all aspects of governance, partnerships and skills development, as it underlines the necessity of public institutions to be inclusive, available and open to citizens and entrepreneurs. Moreover, it highlights the need for:

- efficient coordination of the most important economic and social processes;
- less bureaucracy in the public administration;
- spatial planning improvement;
- increased effectiveness of the administration of justice;
- changes to the public procurement system;
- strengthening of social and civil dialogue.

In a large number of cases, formal agreements are in place between public authorities to finance, build and operate many location data services or digital public services using location data (Recommendation 18). Examples included the before-mentioned Module SDI[70], EMUiA[71], KIEG[72], ULDK[73] and KIUT[74].

Training in geospatial skills is undertaken by organisations as part of a recognised geospatial competency framework[75] (Recommendation 19). The initiatives organised to raise awareness and develop geospatial skills include:
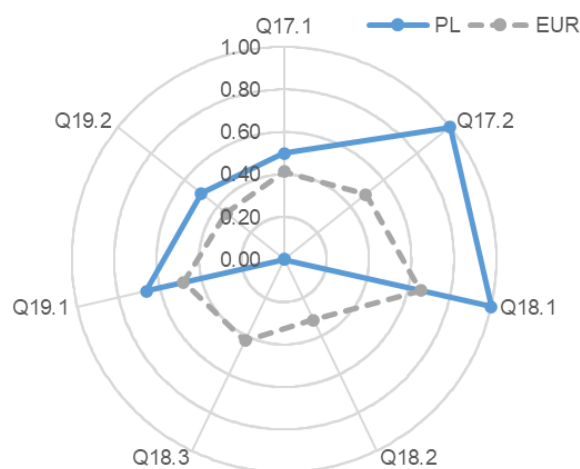
- a public sector location information / GI champion[76];
- training for specialists, e.g. developers, data analysts;
- special interest group for knowledge sharing within the geospatial community[77];
- public or cross-government events specialising in location information / GI topics;
- INSPIRE training modules;
- online self-learning tools[78];
- national guidelines on digital skills.

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

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[69] See best practice PL1
[70] See https://modul-sdi.geoportal.gov.pl/
[71] See https://emuia.gugik.gov.pl/
[72] See https://integracja.gugik.gov.pl/cgi-bin/KrajowaIntegracjaEwidencjiGruntow?lang=en
[73] See http://uldk.gugik.gov.pl/
[74] See http://integracja.gugik.gov.pl/cgi-bin/KrajowaIntegracjaEwidencjiGruntow
[75] See best practice PL4
[76] See https://pl-pl.facebook.com/gugikgovpl/ and https://twitter.com/gugikgovpl?lang=en
[77] See https://pl-pl.facebook.com/gugikgovpl/ and https://twitter.com/gugikgovpl?lang=en
[78] See https://capap.gugik.gov.pl/app/edu/?lang=en and https://power.gugik.gov.pl/kursy-e-learning/

4. Best practices

Best Practice PL1	Strategy for Responsible Development

Policy domain: Social, economic, regional and spatial development

Process owner: Ministry of Funds and Regional Policy

Short description: The Strategy for Responsible Development (SRD) defines the basic conditions, goals and directions of the country's development in the social, economic, regional and spatial dimensions for the period from 2020 and 2030. Its main objective is "creating conditions for the growth of incomes of Polish residents while increasing cohesion in the social, economic, environmental and territorial dimensions".

The adoption of the SRD was preceded by far-reaching public consultations with citizens, representatives of different communities, non-governmental and industrial organisations and government bodies. It is an applicable and key document in the field of medium and long-term economic policy, as it constitutes the basis for the development and operationalisation of the so called "Morawiecki Plan", which in response to the challenges faced by the Polish economy, defines a new vision and the country's development model.

The strategy sets the objective to build an integrated development planning system, where the spatial dimension is integrated with the social and economic dimensions. Activities essential for the efficiency of spatial planning are included to support various dimensions of the strategy, e.g. the adoption of the Urbanisation and Construction Code and the preservation and extension of the cultural and environmental heritage.

Recommendations: Digital Government Integration (8), Return on Investment (16), Governance, Partnerships and Capabilities (17)

Link: https://www.gov.pl/web/fundusze-regiony/informacje-o-strategii-na-rzecz-odpowiedzialnego-rozwoju

Best Practice PL2	Widok monitoring portal

Policy domain: e-Government

Process owner: Ministry of Digitisation, National Institute of Telecommunications

Short description: Widok is a monitoring portal implemented to collect and analyse data on the use and performance of digital public services. The data collected include digital take-up, completion rates, user satisfaction, traffic statistics, cost per transaction and keywords that bring users to websites via search engines.

The platform is being adapted to the needs and suggestions of Polish users, who can directly submit comments and requests for development of further services.

Widok aims to give digital service providers and policy makers indications on the most used and most effective digital services, as well as on emerging needs to address.

Recommendations: Digital Government Integration (8), Return on Investment (14), Governance, Partnerships and Capabilities (18)

Link: https://widok.gov.pl/

Best Practice PL3	Centrum Analiz Przestrzennych Administracji Publicznej (CAPAP - Centre for Spatial Analysis of Public Administration)

Policy domain: Geospatial competencies, e-Government

Process owner: Central Office of Geodesy and Cartography (GUGiK)

Short description: The CAPAP project is a continuation of activities carried out earlier by GUGiK, where tools were developed to enable the fulfilment of the provisions of the INSPIRE Directive. These provisions concerned, inter alia, creating and sharing service brokers, as well as tasks under which domain-specific data for INSPIRE topics was produced and IT systems for managing this data were created and expanded. CAPAP includes tasks related to the creation of a modern spatial data processing centre, which will become a competence and analytical environment common for public administration, enabling the provision of advanced services related to spatial information.

The CAPAP project ultimately aims at increasing the awareness and degree of use of spatial data by citizens, entrepreneurs and public administration. In this regard, CAPAP increases the availability of tools, services and data sets of the National Geodetic and Cartographic Resource (PZGiK) with particular emphasis on 3D data and digital maps adapted to conducting spatial analyses.

Recommendations: Return on Investment (16), Governance, Partnerships and Capabilities (19)

Link: https://popc.gugik.gov.pl/capap/

Best Practice PL4	Project POWER

Policy domain: Geospatial competencies, e-Government

Process owner: Central Office of Geodesy and Cartography (GUGiK)

Short description: GUGiK is implementing, as part of the Knowledge Education Development Operational Programme for 2014-2020 (POWER), a project entitled "Raising digital competences of e-administration - educational and training activities for users of spatial information infrastructure - stage II". The aim of the project is to strengthen the skills and knowledge of public administration in the field of geoinformation applications, processes, standards and technical understanding. Training (specialised and for leading authorities) is focused on the practical use of the infrastructure for spatial information, including geospatial data, for the purposes of tasks related to:

- investment and construction processes;
- keeping the state geodetic and cartographic resource;
- GUGiK services and their use;
- use of data and services in open source software;
- the role of local government units as a user and creator of spatial data within the spatial information infrastructure;
- technological solutions contributing to increasing the availability of spatial information infrastructure resources.

Recommendations: Return on Investment (16), Governance, Partnerships and Capabilities (19)

Link: https://power.gugik.gov.pl/; http://www.gugik.gov.pl/projekty/power

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List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
API	Application Programming Interface
CAPAP	Centrum Analiz Przestrzennych Administracji Publicznej (Centre for Spatial Analysis of Public Administration)
CSW	Catalogue Service – Web
DCAT-AP	Data Catalogue vocabulary – Application Profile
DQV	Data Quality Vocabulary
EIF	European Interoperability Framework
ELISE	European Location Interoperability Solutions for e-Government
EMUiA	Ewidencji Miejscowości Ulic i Adresów (List of Towns, Streets and Addresses)
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
GUGiK	Główny Urząd Geodezji i Kartografii (Central Office of Geodesy and Cartography)
ICT	Information and Communication Technology
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
KIEG	National Land Registry Integration
KIUT	National Integration of Terrain Utilities
LIFO	Location Interoperability Framework Observatory
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
NMA	National Mapping Agency
OGC	Open Geospatial Consortium
OpenELS	Open European Location Services
POWER	Programu Operacyjnego Wiedza Edukacja Rozwój (Operational Knowledge Education Development Program)
PSI	Public Sector Information
SDI	Spatial Data Infrastructure
SRD	Strategy for Responsible Development
ULDK	Service of Location of Cadastral parcels
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
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
European Single Procurement Document	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)

List of figures

List of tables
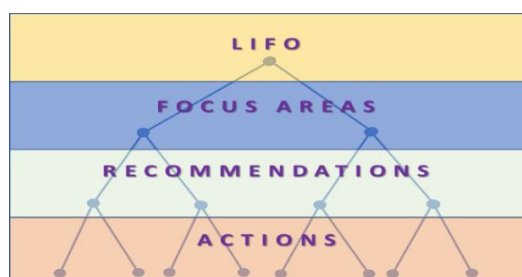
Annex 1: LIFO 2020 Scoring methodology

Figure 15 - Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*[79], 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[80] 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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[79] https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf

[80] 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 following 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 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 (from INSPIRE monitoring)	
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[81], with the aim to improve the capability of the LIFO analytical model to represent consistently the state

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[81] 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: Poland

Title	Attachment[82]
LIFO Survey questionnaire 2020 – Poland	LIFO Survey 2020 Poland
LIFO Survey questionnaire 2020 scores and charts – Poland	LIFO 2020 scores and charts Poland

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[82] 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.