



# LIFO: Location Interoperability Framework Observatory

## 2020 EUROPEAN STATE OF PLAY REPORT



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<sup>2</sup> Programme.

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# 1. Introduction



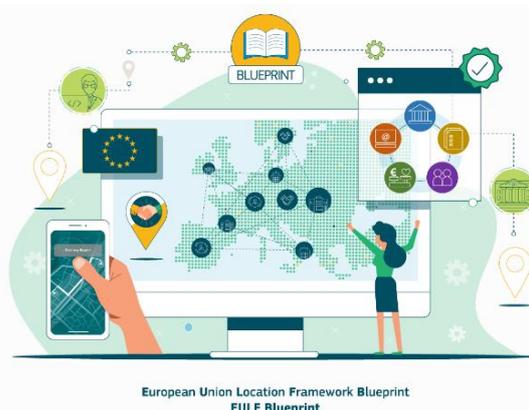
The *Location Interoperability Framework Observatory* (LIFO<sup>1</sup>) monitors the implementation of location interoperability good practices in European public administrations.

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<sup>2</sup> (see [Figure 1](#)).

The EULF Blueprint provides guidance for implementing European Interoperability Framework (EIF)<sup>3</sup> in the geospatial domain.

Consequently, the LIFO complements the EIF monitoring mechanism operated by the National Interoperability Framework Observatory (NIFO)<sup>4</sup>.

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



## Policy and strategy alignment

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



## Digital government integration

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



## Standardisation and reuse

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



## Return on investment

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



## Governance, partnerships and capabilities

effective decision making, collaboration, knowledge and skills related to the provision and use of location information in the context of digital government

Figure 1 - EULF Blueprint focus areas

<sup>1</sup> <https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/lifo-location-interoperability-framework-observatory/about>

<sup>2</sup> <http://data.europa.eu/w21/8e942bc2-657a-4289-b057-f2a285ee7375>

<sup>3</sup> [https://ec.europa.eu/isa2/eif\\_en](https://ec.europa.eu/isa2/eif_en)

<sup>4</sup> [https://ec.europa.eu/isa2/solutions/nifo\\_en](https://ec.europa.eu/isa2/solutions/nifo_en)

<sup>5</sup> <https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/about>

<sup>6</sup> [https://ec.europa.eu/isa2/home\\_en](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<sup>7</sup>. This model is composed of primary indicators, calculated upon information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive<sup>8</sup>. 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, as for example, required datasets and means of access under both the INSPIRE Directive and the Open Data Directive<sup>9</sup>, obligations under the General Data Protection Regulation (GDPR)<sup>10</sup>, approaches under the Public Procurement Directive<sup>11</sup>, and factors relevant to the EIF<sup>12</sup>.

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 alternative legislations, or apply the provisions only for specific aspects, must be read taking this into account.

The first LIFO data collection was performed in 2019 and the second in 2020. The LIFO 2020 model improves the monitoring capabilities of the model used in 2019 while keeping it aligned.

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



Figure 2 - LIFO online resources

<sup>7</sup> See [Annex 1](#) for the scoring methodology used in the model and [Annex 2](#) for a list of indicators

<sup>8</sup> 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.”

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

<sup>10</sup> <https://eur-lex.europa.eu/eli/reg/2016/679/oj>

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

<sup>12</sup>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>

<sup>13</sup> <https://joinup.ec.europa.eu/node/704194>

<sup>14</sup> <https://joinup.ec.europa.eu/node/704361>

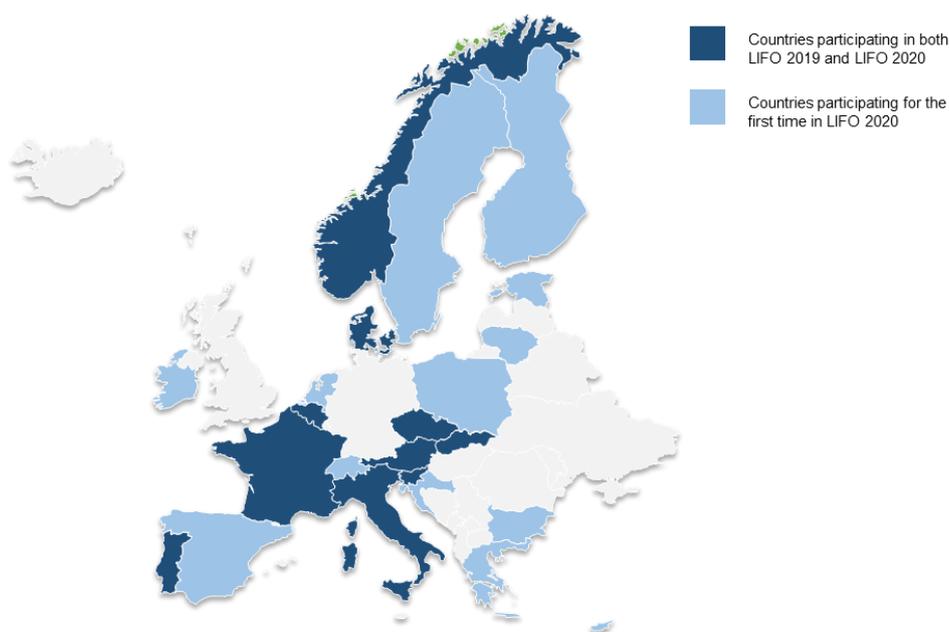
<sup>15</sup> <https://joinup.ec.europa.eu/node/704247>

<sup>16</sup> <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](#))<sup>17</sup>.

<sup>17</sup> 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

The LIFO 2020 State of Play Report provides an overview of the information collected on location interoperability from the 23 participating countries. Its main section is the [Location Interoperability State of Play](#), where information is provided at two levels:

- **Overview of results**, organised as follows:
  - [2020 Results](#): describes the location interoperability state of play for the 23 participating countries across all five focus areas, together with summary charts by focus area and by country and a table with the main strengths and weaknesses in European practices.
  - [2019/2020 Comparison](#): compares the results between 2019 and 2020 by focus area and by country. The focus area comparison shows the European averages for all 2019 countries, all 2020 countries and those 2020 countries that also participated in 2019. The country comparison only includes countries participating in both years and shows their results alongside the overall European averages for 2019, 2020 and the subset of 2020 countries that also participated in 2019.
- **Detailed results by focus area**, organised in five sections, each with the following content:
  - **2020 results**: the vision and recommendations for the focus area are followed by an analysis of the state of play in 2020 across the 23 monitored countries. Two focus area charts are included, one displaying the focus area index scores for each country compared with European averages, the other the European average scores for each recommendation. The title of the latter chart is linked to the table of recommendations in the focus area. Good practices in one or more focus areas/recommendations are presented in callouts embedded in the text and provide selected 'evidence' demonstrating the adoption of the EULF Blueprint guidance.
  - **2019/2020 comparison**: compares the focus area results between 2019 and 2020 by country and by recommendation. The country comparison comprises the 10 countries participating in both years and shows their results alongside the overall European averages for 2019, 2020 and the subset of 2020 countries that also participated in 2019. The comparison of recommendations in the focus area shows the European averages for all 2019 countries, all 2020 countries and those 2020 countries that also participated in 2019.

Lists of [abbreviations and definitions](#), [figures](#) and [tables](#) are provided later in this document to aid cross-referencing.

Annexes to the document include:

- The method of scoring and normalisation applied to the indicators ([Annex 1](#));
- A list of indicators used for each of the recommendations, together with a summary of 2020 indicator changes ([Annex 2](#)); and
- Additional information comprising the full scores and charts from the questionnaire responses and a 2019/2020 comparison table ([Annex 3](#)).

## 3. Location Interoperability State of Play

### 3.1. Overview

LIFO follows the structure of the EULF Blueprint through its five focus areas. The overall 2020 results and a comparison with the previous year are provided below. The following sub-sections give more details in the different focus areas, again providing the 2020 results and comparisons with the previous year.

#### 3.1.1 2020 Results

The key messages from LIFO 2020 data collection are:

- the combined LIFO index for the 23 countries is **0.55**, which confirms an **average good level of maturity for the participants**;
- the **Policy and Strategy Alignment** focus area has the highest score of 0.62, followed by *Return on Investment* (0.58), *Digital Government Integration* (0.57) and *Standardisation and Reuse* (0.55); the *Governance, Partnerships and Capabilities* focus area stands apart with the lowest score (0.45);
- a group of **four outliers** (Czech Republic, Belgium, Norway and Denmark) have reported **excellent scores in all focus areas**; five more countries (Poland, Switzerland, The Netherlands, Spain, Sweden and France) are positioned above the average; the remaining countries (more than half of the total) have more or less significant room for improvement;
- even with the diverse levels of maturity across all focus areas, and in each of them separately, **all countries have offered some examples of best practices in one or more focus areas**.

[Figure 4](#) displays the indexes for each of the five focus areas computed as the average of the focus area indexes for all 23 countries in 2020. These indexes represent the maturity level of location interoperability implementation in the respective focus areas, measured against the target state expressed in the EULF Blueprint.



Figure 4 – Overall European EULF Blueprint implementation

[Figure 5](#) presents the values of the LIFO index, representing an overall measure of location interoperability maturity by country. The LIFO index for a given country is the average of its focus area indexes.

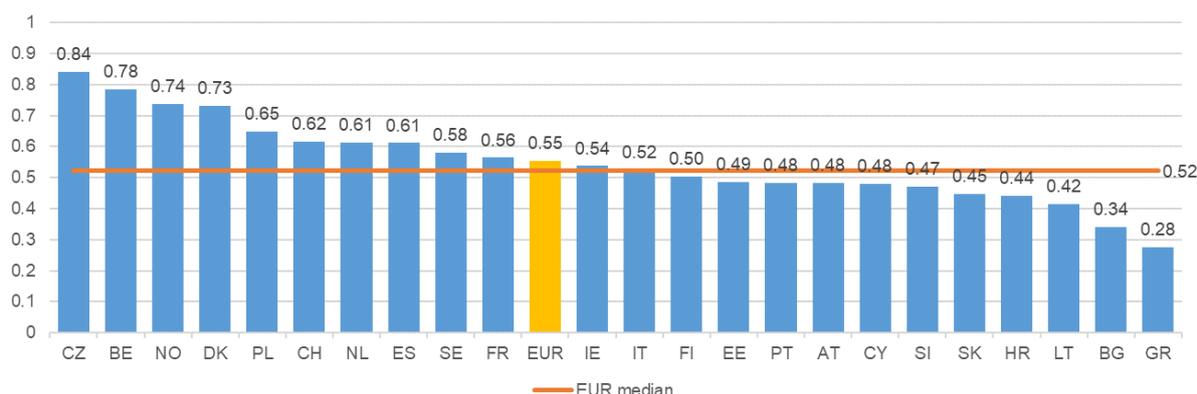


Figure 5 - LIFO index by country

An initial interpretation of these results could indicate that the participating countries focus first and foremost on the policy and strategy aspects of location interoperability and carefully consider whether benefits can be obtained from implementing strategic (or even ad-hoc) geospatial initiatives. Furthermore, location information seems to support service delivery across government to a notable extent and is often, if not always, reused across different services, leveraging a good degree of standardisation. Practices seem to be weaker in organisational interoperability (governance and partnerships) and interoperability skills and awareness (capabilities), although cross-government partnerships are increasingly adopted.

The participating countries have focused on the strategic development of location interoperability (*Policy and Strategy Alignment*) by implementing location information strategies that are, to a certain extent, aligned with their digital strategies and, more broadly, with the relevant EU policy context. Most location data is available free of charge under an open licence (without restrictions or with minimum restrictions). In most countries, the use in digital government of authoritative location datasets and services is mandated by legislation or binding agreements. Most organisations are aware of and fully prepared for location privacy requirements. Location underpins policy making in a good number of policy areas. Public procurements of location information and services refer more or less specifically to some form of relevant standard to identify the procured components correctly and indicate where they fit in an overall architecture of the Spatial Data Infrastructure (SDI).

SDIs underpin cross-government digital services to a good extent (*Digital Government Integration* focus area). Datasets and services conformant to the INSPIRE Directive are used for cross-border digital services, but not for domestic cross-government digital services, where data and services from the national SDIs (or even sector-specific SDIs) are more used. The public sector SDI is also sometimes exploited by non-governmental actors to develop and deliver their products and services. In general, location information is used to develop and deliver digital public services, but often in a basic rather than an innovative way.

Results in the *Standardisation and Reuse* focus area confirm that all participating countries consistently use standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate integration in digital public services. Reuse of generic solutions and of authentic data is promoted. Still, only a few authentic data registers have been implemented in several countries. Data quality standards and, to a minor extent, architectural frameworks, are less mature than the other practices in this focus area.

Under the *Return on Investment* focus area, the good results obtained confirm the attention paid to the sustainability of investments in the SDI. The advantages of exploiting location information are stressed, and the use of public sector location information is facilitated in several ways. However, assessing the efficiency and effectiveness of location-enabled digital services should be more fully considered to guide the necessary investments.

Finally, the *Governance, Partnerships and Capabilities* focus area is the weakest of the five. Capacity building and awareness-raising are still based on a limited catalogue of rather traditional options. Partnerships with cross-border organisations and with the private sector are rare, although they are more frequently adopted between public organisations in the participating countries. Organisations respectively coordinating the SDI and digital government in each country collaborate to a reasonable extent in the decision making on the role of the SDI in digital government, but other relevant stakeholders, both inside and outside public administration, are involved only to a limited extent.

The average LIFO index, at 0.55, is higher than the median that stands at 0.52. This indicates the prevalence of outliers in the upper end of the scale, as mentioned above and displayed in [Figure 5](#). Leaving aside the cluster of four outliers with the highest LIFO scores (Czech Republic, Belgium, Norway and Denmark), the remaining countries form a more homogeneous cluster, spread on an almost continuous scale of scores.

The following table summarises the main strengths and weaknesses of European practices across the five focus areas. These are drawn from the strengths and weaknesses appearing most frequently in the participating countries.

Focus Area	Strengths	Weaknesses
 <p><i>Policy and Strategy Alignment</i></p>	<ul style="list-style-type: none"> <li>• Generally, there is a good level of alignment between location and digital government strategies (both where a location strategy exists and where it is integrated within the digital strategy)</li> <li>• The practice of opening core location datasets making them available for free is frequent</li> <li>• Very good level of preparedness of all organisations on potential location data privacy issues concerning the GDPR</li> </ul>	<ul style="list-style-type: none"> <li>• Public procurements of location data and services make only generic reference to relevant standards (including specific provisions of the INSPIRE Directive, where applicable)</li> </ul>
 <p><i>Digital Government Integration</i></p>	<ul style="list-style-type: none"> <li>• The national SDI is used to a good extent in delivering digital public services across government (in different sectors and levels of government), often in combination with sector-specific SDIs</li> <li>• Some countries adopt a rigorous approach to service improvement and take-up opportunities for</li> </ul>	<ul style="list-style-type: none"> <li>• Location information is not yet extensively and regularly used in an innovative way for the development and delivery of digital public services</li> <li>• The integration between location and non-location information in statistics is generally not</li> </ul>

Focus Area	Strengths	Weaknesses
	new business or delivery models.	yet approached in a comprehensive way
 <b>Standardisation and Reuse</b>	<ul style="list-style-type: none"> <li>• Significant efforts are made towards the standardisation of spatial data modelling, sharing and exchange</li> <li>• APIs are available for many high-value location datasets</li> <li>• Most of the participating countries promote the reuse of existing authentic data, data services and relevant technical solutions</li> </ul>	<ul style="list-style-type: none"> <li>• Location data quality assurance often relies upon a limited, non-structured set of actions</li> </ul>
 <b>Return on Investment</b>	<ul style="list-style-type: none"> <li>• Most countries have adopted policies supporting the reuse of public sector location information by the private sector</li> <li>• A variety of measures have been adopted to make searching, finding and accessing location data and services as easy as possible for the needs of different users</li> <li>• Communication on the availability and benefits of location information and location-enabled digital public services is frequent and thorough</li> </ul>	<ul style="list-style-type: none"> <li>• Performance monitoring of location-enabled activities is generally based on a limited set of criteria</li> <li>• Assessment of benefits from location information does not rely consistently on measurable indicators</li> <li>• Inadequate implementation of impact-based improvements</li> </ul>
 <b>Governance, Partnerships and Capabilities</b>	<ul style="list-style-type: none"> <li>• Decision making on the role of the SDI in digital government relies on collaboration between the organisations, respectively coordinating the SDI and digital government</li> <li>• Training and awareness-raising on geospatial skills are undertaken by some organisations as part of a recognised geospatial/ public sector ICT or data competency framework</li> </ul>	<ul style="list-style-type: none"> <li>• Only a few relevant stakeholders are involved in decision making on the SDI</li> <li>• Partnerships with cross-border organisations and with the private sector for the development and delivery of location-enabled services are still limited</li> <li>• Capacity building and awareness raising still exploit a limited array of approaches and tools</li> </ul>

Table 1 – Strengths and weaknesses by Focus Area

### 3.1.2 2019/2020 Comparison

As the number of participants has increased significantly from 10 countries in 2019 to 23 countries in 2020, comparisons between 2020 and 2019 considers only the countries participating in both years. This approach is taken both for the overall comparison in this section and the comparisons by focus area in the following sections.

[Figure 6](#) shows two different 2020 European averages for comparison: firstly, the average for all countries participating in 2020 (yellow line); secondly, the average for the subset of countries that participated in both years (green line). The same figure also shows the 2019 averages (red line). The EULF Blueprint (and therefore LIFO) structure in focus areas and recommendations has remained the same over the years, allowing valid comparisons at these levels. However, changes were introduced in 2020 to some indicators to reflect learning from 2019 and the latest developments impacting location interoperability in Europe. Further details on this are provided in [Annex 2](#).

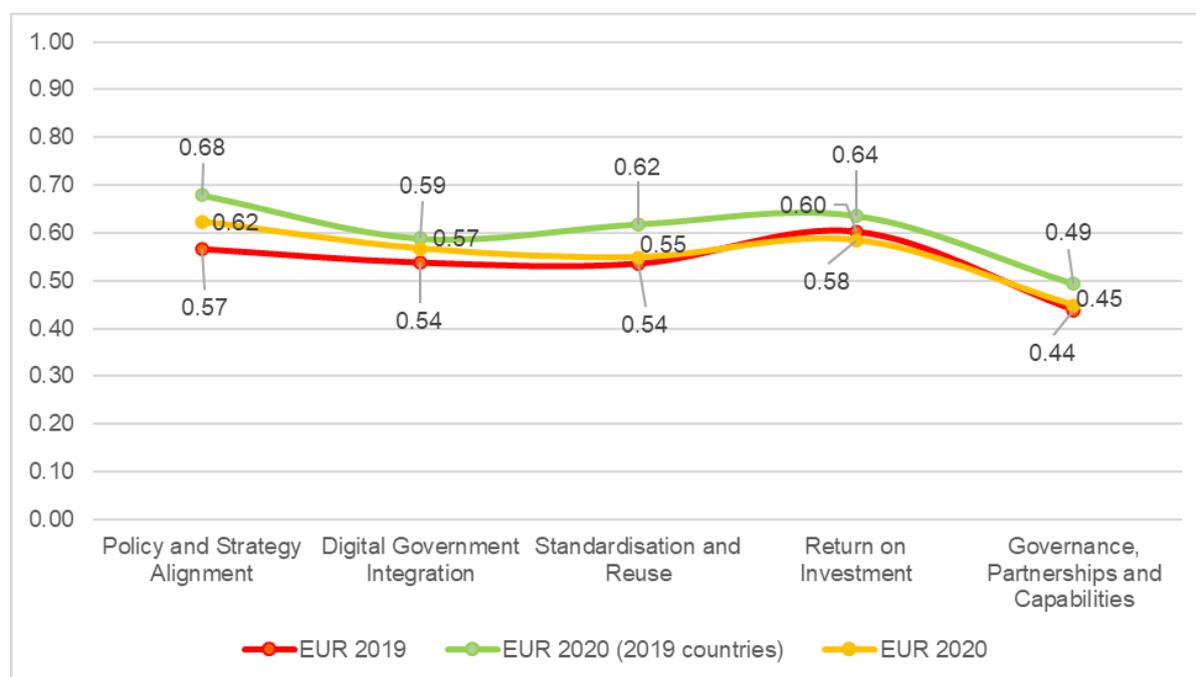


Figure 6 – Focus area indexes – 2020 vs 2019

The green line always placed above the red line indicates that the countries participating in both years have improved their positioning in all five focus areas. The improvements range from quite considerable in the *Policy and Strategy Alignment* focus area to only marginal in the *Digital Government Integration* focus area, but the overall difference is significant, also considering the other three focus areas.

Looking at all 2020 participants, the upward trend has been less sharp: there have still been improvements in the *Policy and Strategy Alignment* and, to a lesser extent, in the *Digital Government Integration* focus areas, but the other three areas have remained at almost the same scores as 2019. As a consequence, the progress registered in the 10 countries participating in both years has been offset by the lower average scores of the new participating countries.

For the countries participating in both years, the average LIFO index has increased to 0.60 (see [Figure 7](#)). The average LIFO index was 0.54 in 2019. This confirms the impact of the new participants offsetting the progress of the ten original participants, as mentioned above. Eight out of the thirteen new countries have obtained LIFO index scores lower than the average.

The *Policy and Strategy Alignment* focus area results are significantly improved, with the index increasing by 0.11 (from 0.57 in 2019 to 0.68 in 2020). This step forward is linked to the improvements made under [Recommendation 3](#) and [Recommendation 5](#).

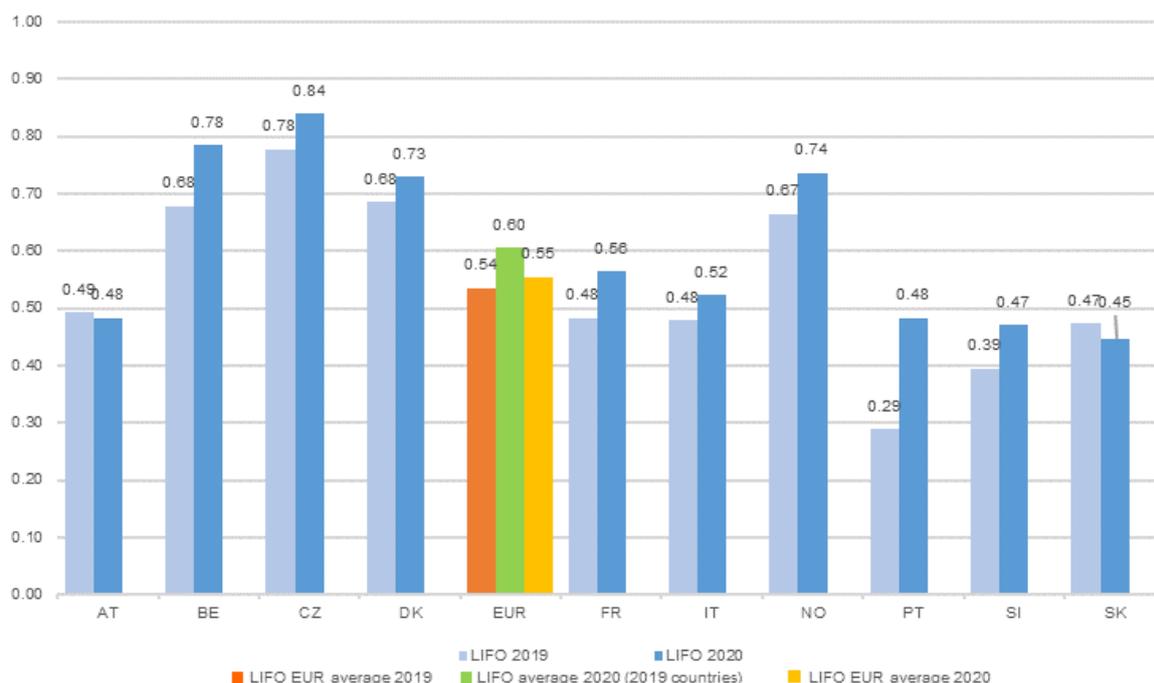


Figure 7 - LIFO index by country – 2020 vs 2019

*Standardisation and reuse* sees the second-highest increase, by 0.08 (from 0.54 to 0.62), due to significant progress in the conformity of datasets and network services to the relevant INSPIRE implementing regulations and to the high values of the new indicators on the use of metadata to facilitate the joint discovery of spatial and non-spatial data ([Recommendation 12](#)).

The index for the *Governance, Partnerships and Capabilities* focus area has progressed by 0.05 (from 0.44 to 0.49) due to more frequent use of public-private partnerships and the adoption of a more structured approach to training and awareness-raising.

The *Digital Government Integration* focus area has also increased by 0.05 (from 0.54 to 0.59). Greater use of the SDI to deliver cross-government digital services and more cases of optimised use of location information in digital public services have been reported.

The *Return on Investment* focus area has had the smallest increase (0.04, from 0.60 to 0.64), mostly due to the higher maturity of performance monitoring ([Recommendation 14](#)).

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 benefits. 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.
<a href="#">Recommendation 1</a>	Connect location information and digital government strategies in all legal and policy instruments
<a href="#">Recommendation 2</a>	Make location information policy integral to, and aligned with, wider data policy at all levels of government
<a href="#">Recommendation 3</a>	Ensure all measures are in place, consistent with legal requirements, to protect personal privacy when processing location data
<a href="#">Recommendation 4</a>	Make effective use of location-based analysis for evidence-based policy making
<a href="#">Recommendation 5</a>	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

### 3.2.1 2020 Results

As mentioned above, this is the focus area with the highest overall score across all the participating countries, acknowledging the attention paid to the strategic dimension of location interoperability. The results are distributed evenly, and there are no distinct outlying clusters either in the upper or lower part of the scale (see [Figure 8](#)).

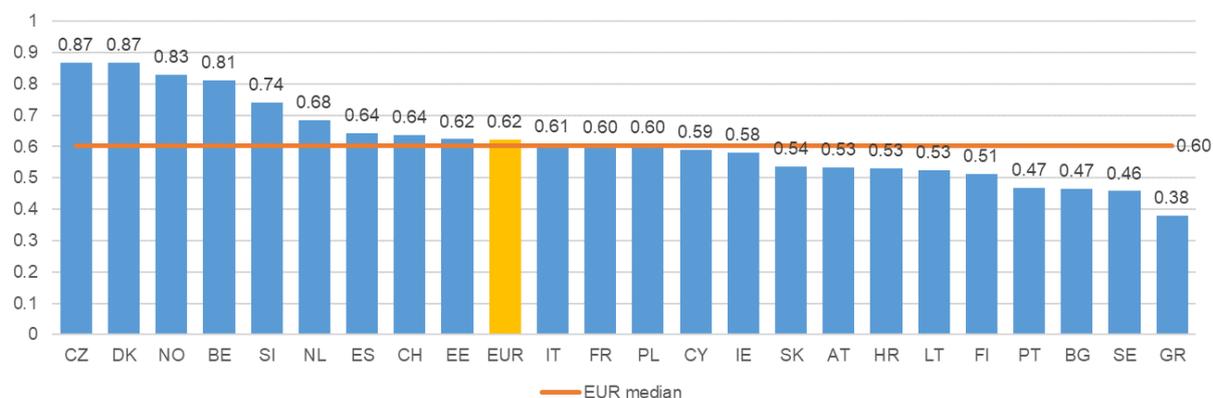


Figure 8 - Policy and Strategy Alignment focus area index by country

The results in this focus area indicate that:

- the level of alignment between location and digital government strategies (both where a location strategy exists and where it is integrated within the digital strategy) is generally good; several countries, however do not have a specific location strategy;
- the practice of opening core location datasets making them available for free is frequent but not universal; in general, attribution of data sources is required;
- all organisations are well prepared on potential location data privacy issues with regard to the GDPR;

- location-based evidence and analysis is quite often used to help in developing relevant policies and monitoring their outcomes;
- general references are made to relevant standards in public procurement of location data and related services, but only very rarely to a standards-based architecture.

In half of the participating countries, specific location information strategies are aligned to a great extent with digital government strategies in legal and policy instruments with, sometimes, the location strategy embedded in the digital strategy. In the remaining countries, either there is no location

#### Licence Ouverte

Licence Ouverte ("Open Licence") is the French licensing framework under which all public open data are made available. It facilitates and encourages the re-use of public data made available free of charge. The Licence has the following features:

- great freedom to reuse information
- a strong requirement for transparency of the data and quality of the sources
- an opportunity for pooling together public data from a variety of sources by setting up a reusable standard for use by local authorities willing to open their data

<https://www.etalab.gouv.fr/licence-ouverte-open-licence>

strategy, or this is aligned with the digital government strategy only in some specific elements ([Recommendation 1](#)).

In most countries (13 out of 23), the use in digital government of authoritative location datasets and services is mandated by cross-sectoral legislation and/or cross-sector binding agreements.

Only Finland and Greece reported no legislation or binding agreements on this matter.

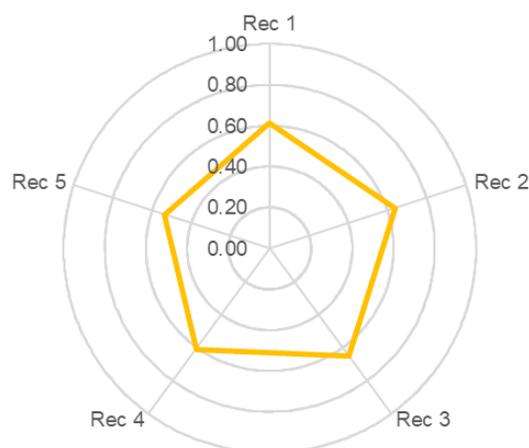
The majority of countries have reported a consistent level of integration between location information and wider data policy. In particular, some location core reference datasets are available as part of a broader core reference data policy. In addition, national guidelines on the publication of Public Sector Information (PSI) specifically refer to some geospatial topics in 14 countries.

In more than half of the countries, most location datasets are available free of charge under an open licence ([Recommendation 2](#)). Some of these datasets are subject to minimum restrictions (mostly the requirement to acknowledge data origin), while others are available without restrictions. In almost all participating countries, broad core reference data policies stipulate the availability of a wide range of location core reference datasets together with non-location datasets. In some cases, a common licensing framework is adopted, facilitating the consolidation of location data from different sources.

#### Interplay between geospatial and digital strategies

The strong alignment between Sweden's digital strategy and geospatial strategy is made evident through cross-references showing how the goals of digital competence, digital security, digital innovation, digital management and digital infrastructure are deployed in sub-goals, which in their turn are each given a geospatial dimension in the relevant part of the digital strategy.

<https://bit.ly/3msehqa>



[Figure 9 - Policy and Strategy Alignment scores by recommendation](#)

Eleven countries report that most of their controllers and processors of public sector location data are fully aware of potential location data privacy<sup>18</sup> issues and compliant with the GDPR under a location perspective ([Recommendation 3](#)). In Belgium and Denmark, all controllers and processors of location data are fully aware and compliant. Specific processes have been established to comply with the rights of data subjects. This practice has become a point of strength for the whole sample of participating countries due to the overall advanced implementation status of the GDPR since its entry into force in 2018.

#### KAMP

KAMP is a screening tool implemented in Denmark that, based on selected national data, calculations and projections, shows the areas with possible climate impacts that may need to be looked at more closely. A new feature allows users to directly see how many buildings and how many kilometres of road can potentially be affected by flooding and the estimated building value that is endangered.

<https://kamp.miljoportal.dk/>

The use of location information for policymaking is a key asset and used in most or all domains and cases in 10 countries out of 23 ([Recommendation 4](#)). However, as mentioned before, such use is not yet systematic. Some cases of a strong push towards using location data for better and more informed policymaking are linked to the outbreak of the COVID-19 pandemic and monitoring climate change impacts.

Only a minority of countries reported that the documents used for public sector procurements of location data and services make specific references to the applicable parts of the INSPIRE Directive, applicable national

standards, or a standards-based architecture ([Recommendation 5](#)).

Furthermore, several countries do not use INSPIRE or other relevant (geospatial) standards in tender specifications.

#### Corona dashboard

An interactive dashboard which provides up-to-date information on location-based developments on coronavirus in the Netherlands. This information helps the government to pick up early warning signs that the rate of infection is increasing, allowing them to act in time to stop the virus from spreading further.

<https://coronadashboard.rijksoverheid.nl/>

### 3.2.2 2019/2020 Comparison

Considering the results by country (see [Figure 10](#)), the highest increases have been reported for Slovenia (due to the full uptake of location elements in the digital strategy), Denmark (due to substantial improvements in almost all practices – strategy, data privacy, evidence-based policymaking and procurement) and Norway (due to the adoption of a core reference data policy aligned with wider data policies and of a data licensing framework incorporating location data).

Together with the consistently high scores of Belgium and the Czech Republic, these increases have contributed to bringing the average of the countries participating in both years above the average of all 23 countries.

<sup>18</sup> For a definition of “location data privacy” see Pignatelli F. et al, “[Guidelines for public administrations on location privacy](#)”, Version 2, JRC, 2020

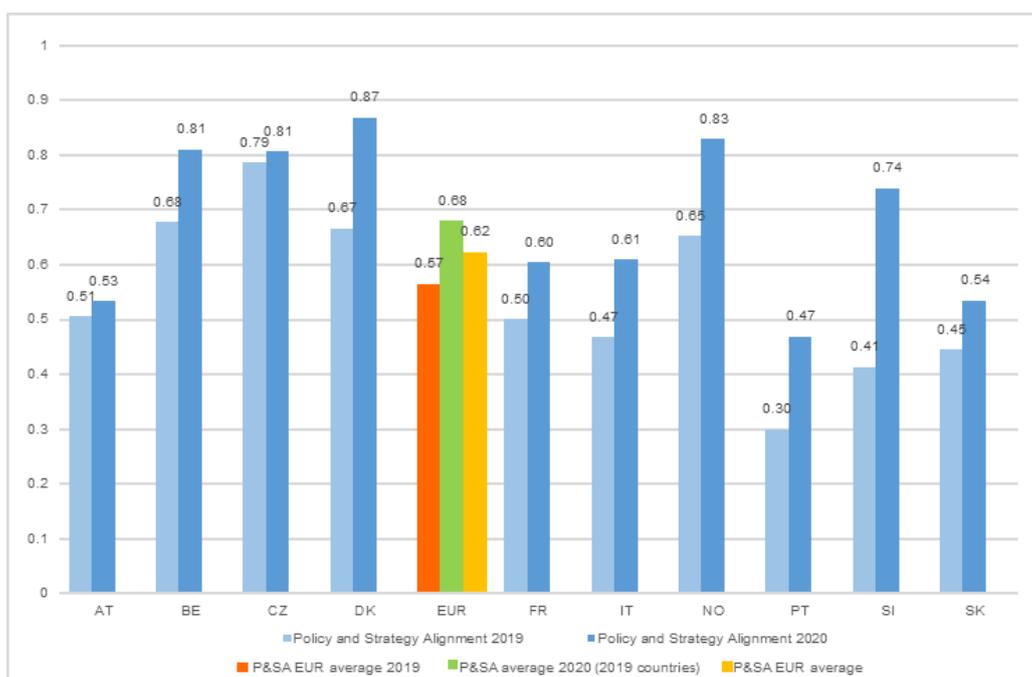


Figure 10 - Policy and Strategy Alignment focus area scores by country 2020 vs 2019

The overall increase in the score of this focus area between 2019 and 2020 is strongly related to the positive performance under [Recommendation 3](#), concerning the compliance with data protection principles when dealing with location data, and under [Recommendation 5](#), on the standardisation of procurement processes (see [Figure 11](#)).

Belgium, France and Portugal have reported the strongest progress on data protection. Belgium, for example, reported in 2019 having some organisations fully prepared and compliant with the rights of data subjects; in 2020, the country reported that all organisations are now fully prepared and compliant with GDPR.

The additional 2020 participating countries are also aligned with the high average level of preparedness of the 2019 participating countries, with the only exception being Switzerland, whose organisations are subject to the GDPR in specific cases, based on the provisions on the territorial scope of art. 3 of the Regulation.

The progress under [Recommendation 5](#) has also been strong among the 10 countries, with the highest improvements registered for Belgium, the Czech Republic, Denmark, France and Portugal. These countries now reference specific provisions of the INSPIRE Directive or relevant standards (or, in the case of Belgium and the Czech Republic, to a standards-based architecture document describing where and how the requested components fit).

The additional 2020 participating countries, on the other hand, have shown a less consistent approach to the use of standards in procurement of location data and services, thus keeping the average of all 23 countries to the level it was in 2019.

[Recommendation 1](#) has also seen a positive variation compared with 2019. This is mostly due to an increased alignment and connection in all legal and policy instruments between location and digital government strategies, particularly reported by Slovenia, Denmark, Norway and Portugal.

The additional 2020 participating countries (particularly Bulgaria, Finland, Greece and Poland) have offset that progress and contributed to keeping the average of all 23 countries at the 2019 level.

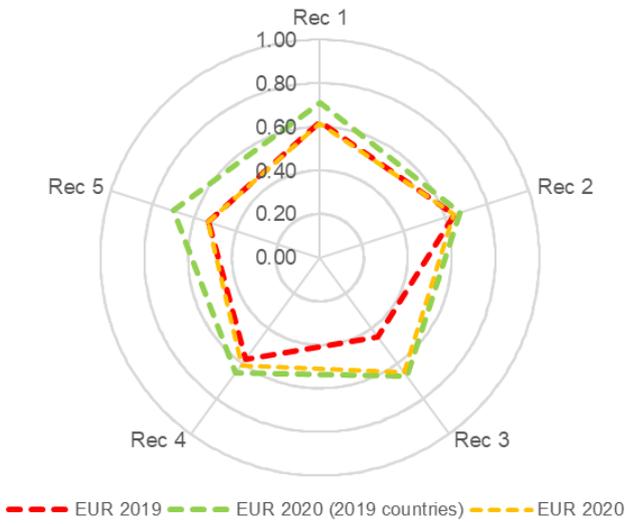


Figure 11 - Policy and Strategy Alignment scores by recommendation – 2020 vs 2019

[Recommendation 2](#) is aligned with the 2019 results, with the small deviation linked to a limited recalibration of some indicators. This applies as well to the whole group of 23 countries.

Finally, concerning [Recommendation 4](#), the progress is linked with the extended use of location data to shape and guide policymaking, although not yet in all relevant policy topics. The additional 2020 participating countries have almost equally contributed to raising the average score.

### 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.
<a href="#">Recommendation 6</a>	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
<a href="#">Recommendation 7</a>	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
<a href="#">Recommendation 8</a>	Adopt an open and collaborative methodology to design and improve location-enabled digital public services
<a href="#">Recommendation 9</a>	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

#### 3.3.1 2020 Results

This focus area score is in the middle of the scores of the five focus areas. There are three outliers at either end of the range of country scores that balance each other out, with a significant gap between these two groups of outliers (see [Figure 12](#)). The three countries at the bottom of the scale and a few others immediately above them show considerable margins for improvement, particularly under some recommendations.

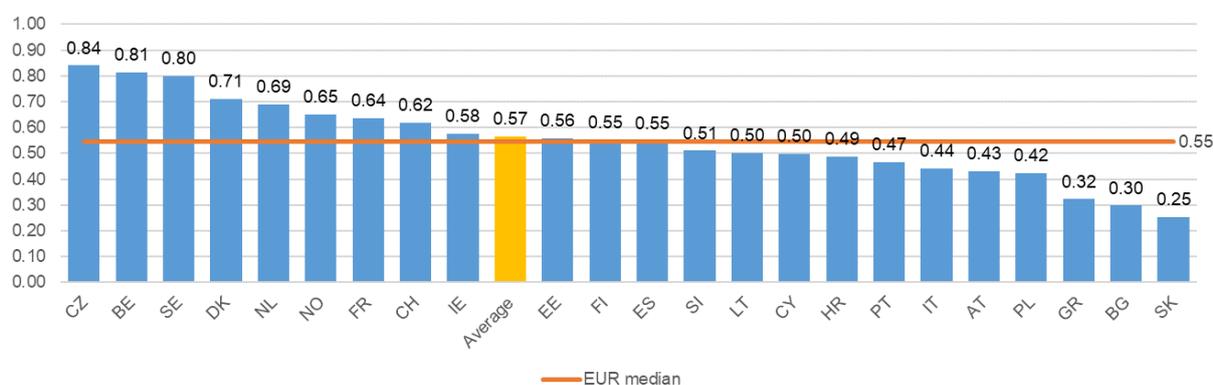
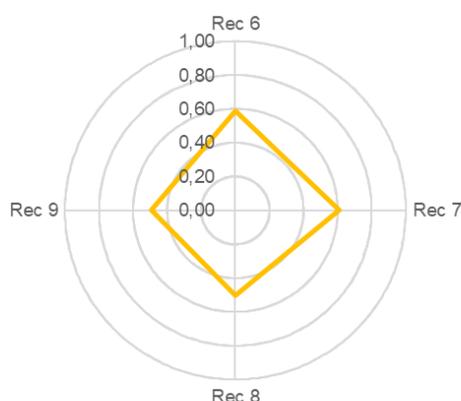


Figure 12 – Digital Government Integration focus area scores by country

The current state for this focus area shows that:

- Most participating countries report extensive reuse of location data and solutions in digital public services but do not yet fully exploit its potential for the modernisation and simplification of such services;
- The national SDI is used to a good extent in delivering digital public services across government (in different sectors and levels of government). Such use is often combined

with sector-specific SDIs; an INSPIRE-based SDI is typically used for cross-border services but rarely for cross-sector public services within each country<sup>19</sup>;



*Figure 13 - Digital Government Integration scores by recommendation*

- The integration of location and statistical information in producing location-based statistics is not yet mature and does not rely on a holistic set of actions and methodologies.

Opportunities for modernisation and simplification through location-enabled services are exploited, though often not to the full extent possible in contributing to the innovation and quality of the services ([Recommendation 6](#)).

#### PELL Public lighting platform

The PELL project in Italy has implemented a digital platform to evaluate the performance of public lightning infrastructures through the structured and harmonised collection of the georeferenced identity data in each municipality.

PELL supports the reorganisation and modernisation of public lightning management processes and the entire decision support system for public lighting. The platform also enables optimal exploitation of public lighting infrastructures, identifying the opportunities for reusing them to install additional services (e.g., Wi-Fi hot spots, cameras).

<https://www.pell.enea.it/la-piattaforma>

the participating countries, Belgium, Czech Republic, Denmark and Sweden reach a very high degree of alignment with the target state, as they report having adopted a rigorous approach to both service improvement and take-up of opportunities for new business or delivery models.

There are a number of cases where location information is used innovatively, for example, to integrate processes or create innovative location-based analytics (e.g. using AI algorithms). Relevant examples of public services using location information to a comprehensive degree have also been found. However, most countries make

rather basic or, in some cases, even sub-optimal use of location information for developing and delivering digital public services.

- The private sector and other non-governmental organisations use the public sector SDI to deliver innovative applications and services, but the practice is applied to a significant extent only in a minority of countries;
- Open and collaborative methodologies are not used extensively to design and improve location-enabled digital public services; however, a more collaborative approach is adopted for the delivery of services, with quite an active involvement of the private sector;

#### Hinderpremie

It is a geospatial-based Belgian solution that supports the process for granting compensations to small businesses that are seriously hampered by ongoing roadworks.

The compensation is allocated through an automated procedure taking into account all roadworks that have to be registered in the Platform for General Information of Public Domain (GIPOD), and associated addresses, validated through the central registry of businesses.

<https://www.vlaio.be/nl/subsidies-financiering/hinderpremie/wat-is-de-hinderpremie>

<sup>19</sup> For the definition of SDI see [Definitions](#). For a definition of an INSPIRE-based SDI, see <https://inspire.ec.europa.eu/about-inspire/563>

Public sector SDIs are used in cross-government and cross-border contexts and by the private sector and non-governmental organisations to deliver applications, products, and services in almost all participating countries ([Recommendation 7](#)). The Czech Republic, Denmark and

#### Fellestjenester BYGG

Fellestjenester BYGG (Joint Services BUILD) is a toolkit for ICT providers in Norway who want to develop commercial solutions to manage building permit applications for both professional and public users. By using Fellestjenester BYGG, all digital building permit applications come to the municipalities in a common format regardless of which application system is selected.

Fellestjenester BYGG offers automatic control of a building application before submission to the municipality. It also enables digital dissemination of applications and further dialogue between the applicant and the municipality in processing the application.

<https://dibk.no/verktoy-og-veivisere/andre-fagomrader/fellestjenester-bygg/>

#### Common Ground

Common Ground is a concept and an environment developed under the umbrella of the Association of Dutch Municipalities to provide local administrations with a joint information facility for the exchange of data. Location data and services are important components of this environment.

Solutions developed collaboratively by different municipalities exploiting the layers of Common Ground are then made available to all municipalities as open source through the same environment.

<https://commonground.nl/>

Norway, in particular, indicate extensive use of the SDIs in new and innovative private sector products and services. National and/or sectoral SDIs are more used to deliver intra-national services, while INSPIRE is rather used to deliver cross-border digital public services, but only rarely for intra-national ones. Several countries, in particular, have engaged in various regional/cross-border initiatives exploiting INSPIRE.

The results under [Recommendation 8](#), concerning the adoption of a collaborative approach for service development and delivery, are below the average of this focus area. Only some countries (Belgium, Czech Republic, Denmark, France, the Netherlands, Sweden and Switzerland) report adopting an open and collaborative methodology to design and improve location-enabled digital public services in every case, at all levels of government and with all relevant entities.

External parties are also sometimes involved in the delivery of digital public services, mostly through the following models:

- services are contracted to the private sector or NGOs under public sector accountability;
- public authorities collect location data through a particular process or service and make the data openly available for external parties to develop their own products and services;
- public authorities use location data from external parties (e.g. businesses, citizens, NGOs) in their digital public services.

The participating countries register the lowest degree of progress towards the target state in implementing [Recommendation 9](#). Only a minority of the participating

#### IDE-OTALEX

IDE-OTALEX is a project financed by the European INTERREG III programme, aimed at building a cross-border spatial data infrastructure between Portugal (Alentejo and Centro regions) and Spain (Extremadura region).

IDE-OTALEX enables sharing of official geographic information with all users, for the purpose of contributing to territorial cohesion. The spatial information available in the infrastructure is the result of extensive action in data harmonisation based on the INSPIRE Directive and integration of basic cartography and socio-economic and environmental indicators.

<http://www.ideotalex.eu/Otalex>

**Interactive Tool for the Presentation of Geospatial Data (STAGE)**

STAGE is an interactive tool for presenting and disseminating geospatial data in Slovenia. It provides users with interactive viewing of statistical content in the form of thematic maps at 10 spatial scales. Based on spatial queries, spatial units can be combined and statistics can be customised. All data is freely available in geospatial format or in a thematic map and can be used in further spatial statistical analyses.

<http://gis.stat.si/>

countries implement a significant array of actions to facilitate and ensure the integration of location and statistical information in the production of location-based statistics. The most active countries are Belgium, the Czech Republic, Denmark, Finland and the Netherlands, while others also showcase interesting good practices, such as Slovenia.

These actions often consist of using a common geospatial reference framework for statistics, the collection of location-referenced census data, and contributions to European projects aiming at establishing a data and production infrastructure for location-based statistics.

### 3.3.2 2019/2020 Comparison

As mentioned in the Overview, there has only been a marginal improvement in the Digital Government Integration focus area index between 2019 and 2020.

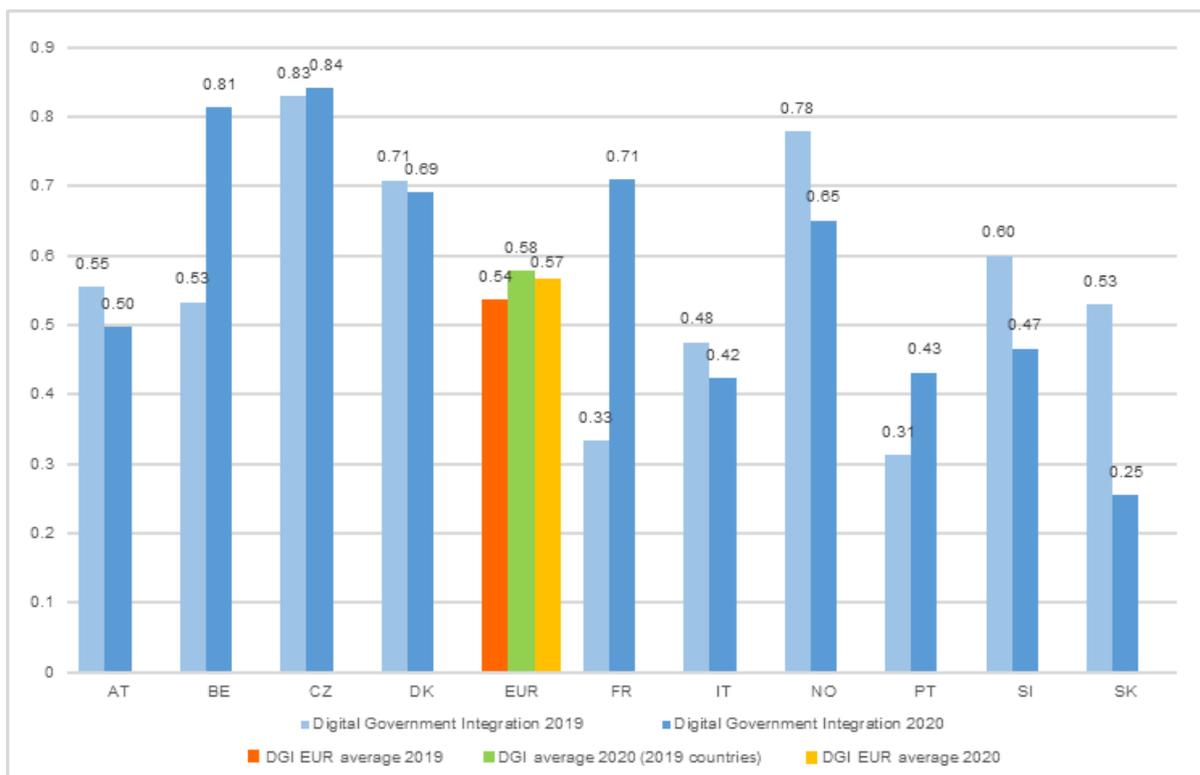


Figure 14 – Digital government integration focus area scores by country – 2020 vs 2019

Figure 14 shows that, while the average of the 10 countries that have participated in 2019 and 2020 has seen only a slight increase, there have been significant positive deviations in Belgium, France, and Portugal offset by negative deviations in Norway, Slovenia and Slovakia. The average 2020 score of all 23 countries is aligned with the average of the 10 original countries.

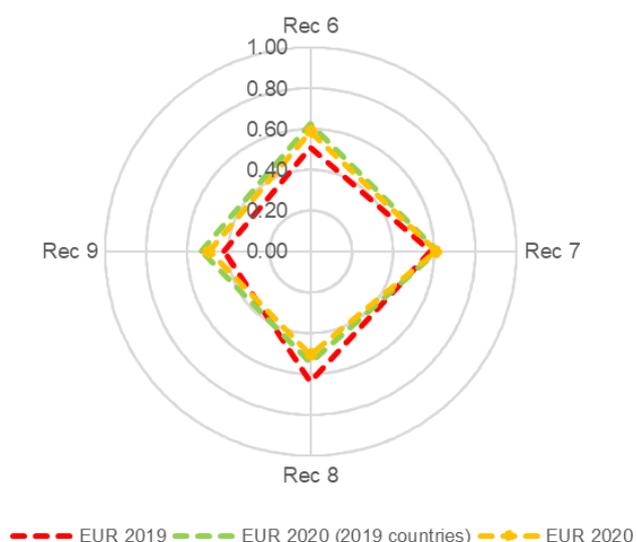


Figure 15 - Digital Government Integration scores by recommendation – 2020 vs 2019

Belgium and Portugal report having significantly extended the array of actions to ensure the integration of location with non-location data in statistics. This has positively impacted the index for [Recommendation 9](#), as shown in [Figure 15](#). France has extended the range and scope (local, sub-national and national) of options by which external parties are involved to develop or deliver location-based digital public services.

Furthermore, all three countries have strengthened their positioning under [Recommendation 6](#): Belgium by strengthening the process for identifying opportunities and implementing improvements to key digital public services in their use of location information; France

and Portugal by identifying a higher number of key digital public services using location information in a comprehensive way and to a significant degree.

The decrease in the index for [Recommendation 8](#) is linked to the decrease of the corresponding indexes for Austria, Denmark and Slovakia. In Slovakia, which sees the strongest decrease of all countries, this is due to the combined effect of a less extensive range of actions reported on the involvement of external parties by public administrations when delivering location-based public services and a recalibration of one of the indicators.

The average scores by recommendation for the whole group of 23 countries are aligned with the average scores of the 10 countries participating in both years, with only small gaps between them.

### 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 <sup>2</sup> 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.
<a href="#">Recommendation 10</a>	Adopt a common architecture to develop digital government solutions, facilitating the integration of geospatial requirements
<a href="#">Recommendation 11</a>	Reuse existing authentic data, data services and relevant technical solutions where possible
<a href="#">Recommendation 12</a>	Apply relevant standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate integration in digital public services
<a href="#">Recommendation 13</a>	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

#### 3.4.1 2020 Results

Results in the *Standardisation and Reuse* focus area show that:

- The participating countries have made significant efforts towards standardising spatial data modelling, sharing and exchange, which is now identified as a point of strength of location interoperability practices in Europe;
- Most participating countries promote the reuse of existing authentic data, data services and relevant technical solutions.
- Location architectures are rarely based on EU-wide interoperable frameworks (e.g. based on the EIF/EIRA), but rather on national ICT architectural frameworks; in some cases, national policies on architectures exist but are not widely adopted;
- Conversely, with some exceptions, most countries adopt only a limited range of initiatives to manage and improve location data quality.

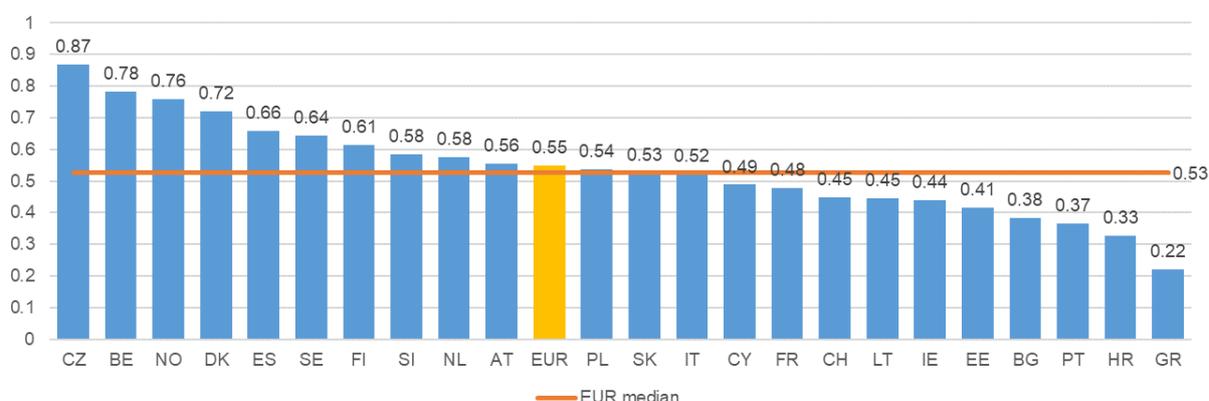


Figure 16 – Standardisation and Reuse focus area scores by country

There are significant variations in maturity under this focus area, with a cluster of top performers in the upper part of the scale, a large cluster concentrated in the central part of the scale, and a few countries with around half (in one case, much less than half) the score of the top performers, as displayed in [Figure 16](#).

As shown in [Figure 17](#), results for [Recommendation 10](#) indicate a good level of alignment with the target state. All countries monitor new technological developments applicable to the geospatial domain and incorporate them in their respective architectures, although more often with an ad-hoc rather than systematic approach. Architectures are based mostly on national policies (not always adopted in practice) and frameworks, with Belgium, the Czech Republic, Denmark and Norway adopting an EIF / EIRA-based framework.

Reusing authentic data, data services and relevant technical solutions ([Recommendation 11](#)) is also quite advanced. Belgium, Czech Republic, Norway and Finland register the

highest scores under this recommendation, with Italy and Spain

positioned immediately after this cluster. Good practices have also been identified in other countries, such as Estonia, where public administrations' systems and databases must be published in a national catalogue.

Alignment with [Recommendation 12](#) is reported as significant by 14 out of the 23 participating countries. The percentage of spatial data sets conformant with Regulation (EU) No 1089-2010 on interoperability of spatial data sets and services<sup>20</sup> is above 50% for the majority of the participating countries. Even better results have been reached on the conformity of network services with

#### Estonian catalogue of public sector information systems (RIHA)

RIHA is the Estonian catalogue of public sector information systems. It serves as the national registry of systems, components, services, data models, semantic assets, etc.

RIHA supports database interoperability, information systems life-cycle management and data reuse by providing complete and up-to-date metadata of Estonian public sector information systems. Registration of public databases and information systems on RIHA is mandatory and enforced by law.

<https://www.riha.ee/Avaleht>

#### Oskari

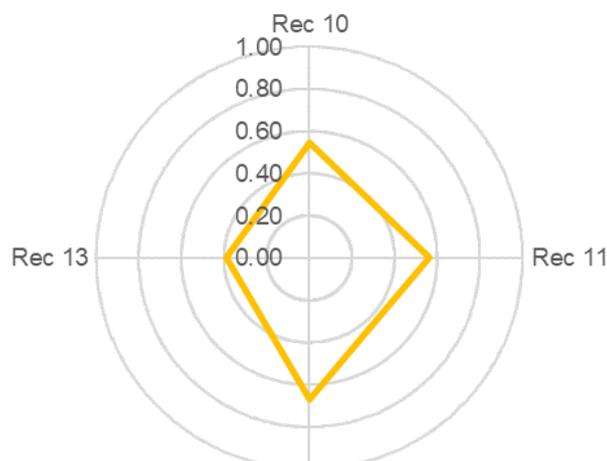
Oskari is a Finnish open source framework for easily building multipurpose web mapping applications based on distributed SDIs such as INSPIRE.

One of the main features of Oskari is the easy-to-use wizard for creating embedded maps. The maps can be used, for example, in the context of eGovernment services, where information from different registers needs to be displayed on a map along with map layers from an SDI.

Oskari is ready to connect to INSPIRE data services or other data sources with standard OGC APIs providing different kinds of data. Users can also easily add their own data or a dataset to the service. The source code is dual licensed (MIT and EUPL) and is available in GitHub.

Oskari is used extensively in Finland as well as by public administrations outside of Finland (e.g. Iceland, Moldova).

<https://oskari.org/>



[Figure 17 - Standardisation and Reuse - scores by recommendation](#)

<sup>20</sup> This Regulation implements the INSPIRE Directive setting out the requirements for technical arrangements for the interoperability and, where practicable, harmonisation of spatial data sets and spatial data services corresponding to the themes listed in Annexes I, II and III to the Directive.

### Slovenian metadata profile

The Slovenian metadata profile fully complies with the requirements of the INSPIRE Directive and its implementing rules and is upgraded with additional metadata elements and rules that are in line with the needs for spatial metadata management in the country. The profile is mandatory for all spatial data controllers who publish metadata in the Slovenian metadata system (regardless of whether the databases fall under the requirements of the INSPIRE Directive or not), so they must prepare their metadata in accordance with the requirements of the Slovenian metadata profile.

[http://www.geoportal.gov.si/prenos/5827\\_SMP.pdf](http://www.geoportal.gov.si/prenos/5827_SMP.pdf)

Regulation (EC) No 976-2009<sup>21</sup>, with 12 countries reporting more than 70% of conformant services. A standardised metadata approach is frequently adopted to enhance the joint discoverability of spatial and non-spatial data in data portals combining both types of data.

APIs for location data have been developed, documented and made accessible in 17 out of 23 countries. In some cases, they are available for all high-value location datasets (or even for the wider range of all high-value public sector datasets) as part of a national strategy. The latter is the case, for example, in Cyprus, Denmark, Sweden and Switzerland.

### Swedish API strategy

For the common national digital infrastructure, API management is a priority focus area. Organisations sharing their APIs via Sweden's data portal can activate the API search function for such APIs.

The API management strategy established the principles for making information available, upon condition that it is documented and described so that it is easy to discover, understand and use by both people and machines, and is searchable on [dataportal.se](http://dataportal.se).

At least 150 APIs for spatial datasets are made available by the Mapping, Cadastral and Land Registration Authority, municipalities and other government agencies.

<https://bit.ly/32fh9QBt>

Conversely, the maturity in managing location data quality ([Recommendation 13](#)) is subject to significant margins for improvement. Out of the wide range of possible measures available for this purpose, most countries adopt only a few of them: sometimes linking data quality standards with data standards; sometimes considering different dimensions of data quality, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications/standards/legislation; and in some cases focusing on ex-post evaluation of data quality issues, but not building up a proper data quality approach joining together all applicable measures. Only Belgium, the Czech Republic, Norway and Spain implement a consistent array of actions to assure quality of location data and effective location data quality governance. ISO 19157 is frequently, but not universally, adopted as a reference (and in any case, not all its quality measures and evaluation methods are implemented even in the countries that officially refer to it). In conclusion, this is the recommendation with the lowest index value in the whole LIFO 2020.

### 3.4.2 2019/2020 Comparison

This is the focus area with the second-highest increase of the index between 2019 and 2020 for the 10 countries participating in both years, after *Policy and Strategy Alignment* and together with *Return on Investment* (see [Figure 18](#)). The country scores show that Denmark, Norway and Czech Republic have had the highest increases. Denmark has improved in three of four recommendations, particularly under [Recommendation 12](#), due to the good scores for the two new indicators on joint discoverability of spatial and non-spatial data and the significantly higher percentage of INSPIRE-conformant spatial datasets and network services.

<sup>21</sup> This Regulation sets out the requirements for the establishment and maintenance of the network services provided for in the INSPIRE Directive, and the obligations related to the availability of those services to the public authorities of the Member States and third parties pursuant to the Directive.

Norway's score has also improved due to the significant progress of the indicator on INSPIRE-conformity of spatial datasets (which the country has adopted voluntarily), as well as to the newly reported use of generic ICT solutions in the SDI and the additional implemented register of location information ([Recommendation 11](#)). The Czech Republic has shown progress in using a standardised approach to enhance the joint discoverability of spatial and non-spatial data and the substantially higher percentage of INSPIRE-conformant spatial datasets and network services. On the latter result, it should be noted that the values reported for 2019 did not correctly represent the actual state due to issues linked to the update of the INSPIRE Validator in late 2019.

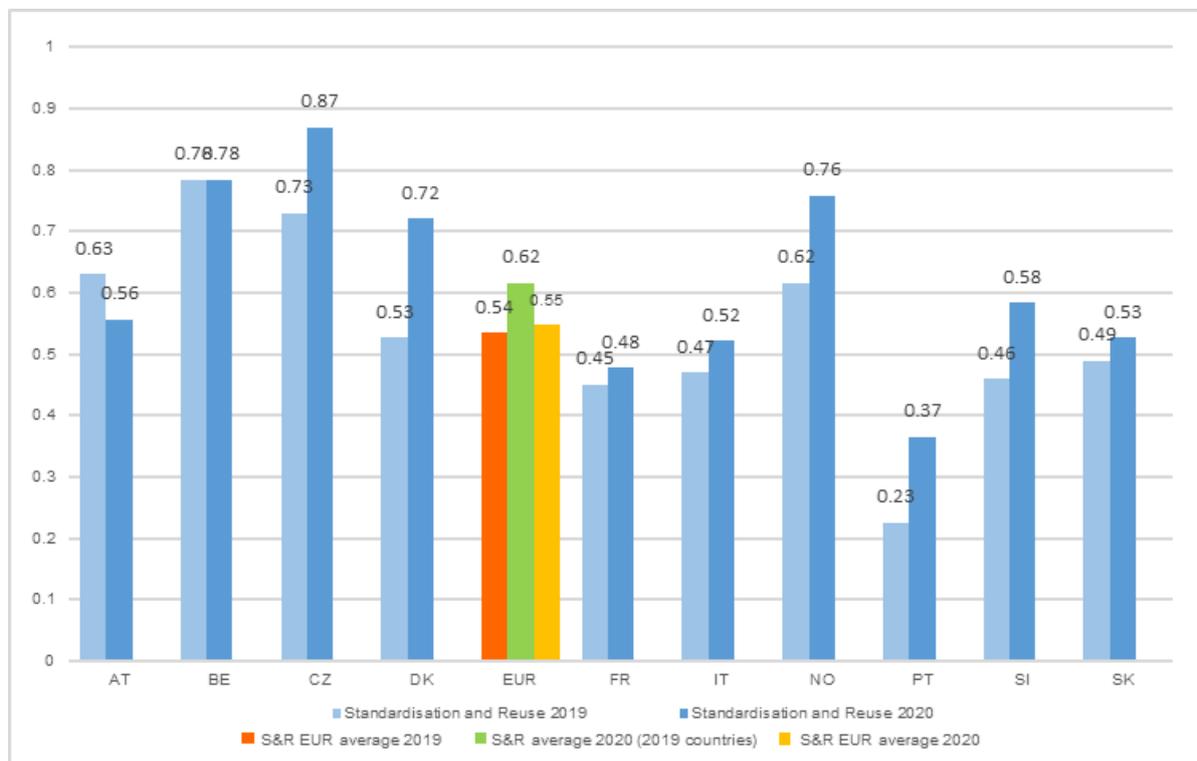


Figure 18 - Standardisation and Reuse focus area scores by country – 2020 vs 2019

In terms of recommendations, the progress in this focus area is mainly linked with [Recommendation 12](#), as shown in [Figure 19](#). The increase in Recommendation 12 is the consequence of two factors:

- The considerable progress made in the degree of conformity of spatial datasets and network services under the respective INSPIRE implementing regulations; and
- Two new indicators<sup>22</sup> have brought out the existence in some countries of some form of standardised metadata approach to enhance the joint discoverability of spatial and non-spatial data in data portals combining both types of data.

The additional 13 countries participating in 2020 are almost aligned with the average level of maturity under this recommendation of the 10 countries participating in both years.

As for the other recommendations, the improvement under [Recommendation 10](#) is linked to the higher average maturity in adopting a standard-based architecture and to a generally good level of maturity under the new indicators on the adoption of location APIs. The average of the additional 13 countries participating for the first time in 2020 has offset the progress of the 10 countries participating in both years due to the relatively low maturity of several new participants (particularly Croatia, Estonia and Lithuania).

<sup>22</sup> Q12.2 and Q12.2.1. See [Annex 2: LIFO 2020 Indicators](#)

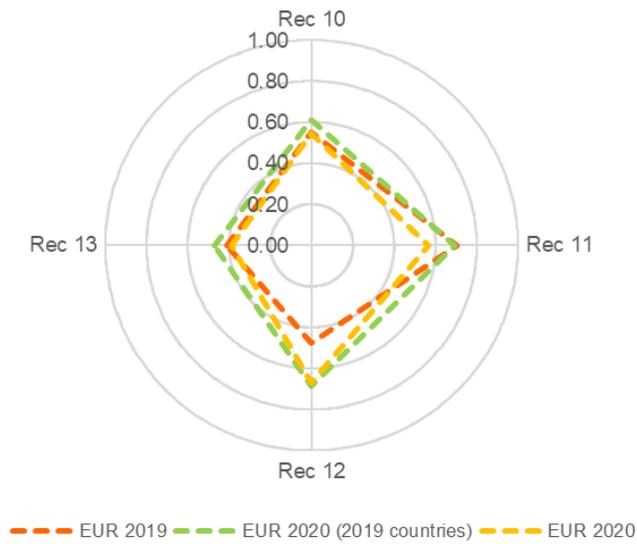


Figure 19 - Standardisation and Reuse scores by recommendation – 2020 vs 2019

The slight reduction in the index for the 10 countries under [Recommendation 11](#) is connected with the recalibration of one indicator; however this does not impair the comparability between the two years. The 13 additional countries have performed less well on average (particularly Croatia, Greece, Ireland and Switzerland), bringing down the average for all 23 participants.

Finally, the limited progress under [Recommendation 13](#) has not significantly improved the weak state of play mentioned above – all countries have reported only minor adjustments to their location data quality practices. The 13 additional countries have offset the progress made by the countries participating in both years.

### 3.5. Return on Investment

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

#### 3.5.1 2020 Results

*Return on Investment* is the focus area with the second-highest score. The results of this focus area indicate that:

- Almost all countries have adopted a good number of measures to make the process of searching, finding, and accessing location data and services as easy as possible for non-governmental parties (one of the enablers to help build the data economy);
- More than half of the countries are developing, or have implemented, a systematic approach to communicate the availability and benefits of location data and location-enabled digital public services, to raise awareness and understanding;
- More than half of the countries apply a strategic approach to funding public sector location reference data to make access cost-effective;
- Many countries have implemented or planned an array of actions to actively support private, non-profit and academic players in developing new products and e-services;
- Across participating countries, there is no consistent and systematic approach to monitoring the performance and benefits of location information activities and driving impact-based improvements.

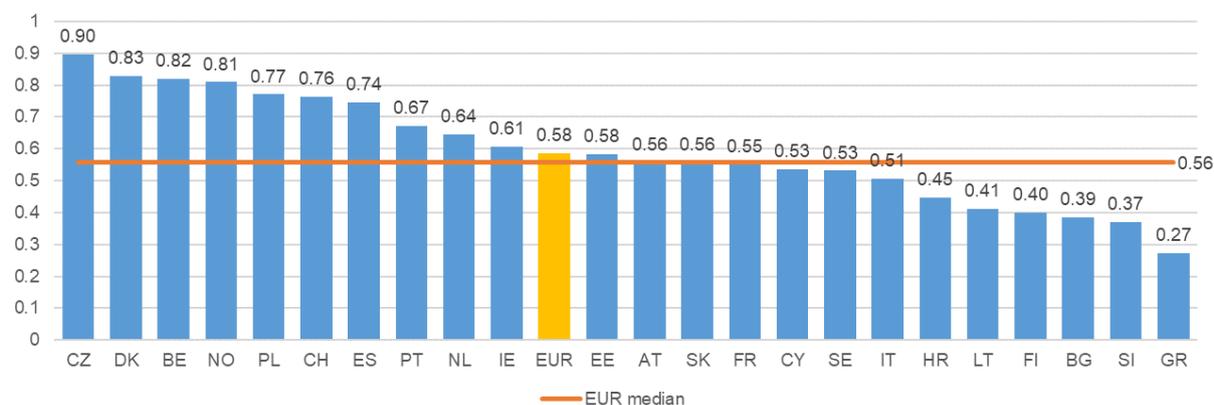
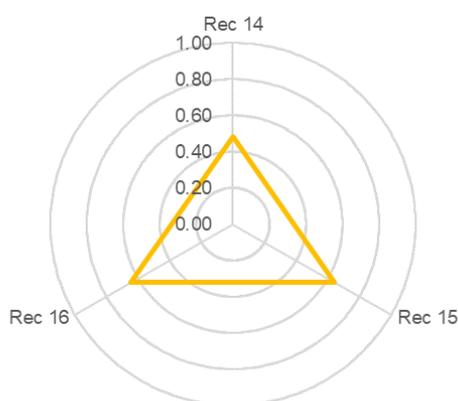


Figure 20 - Return on Investment focus area scores by country



*Figure 21 - Return on investment - scores by recommendation*

#### Study on the identification of valuable datasets

A 2020 study in Sweden identified the valuable datasets and which actors are affected by these in accordance with the revised PSI Directive (Open Data Directive). The study also analysed the societal benefits and budgetary consequences of making that data available free of charge.

The study analysed 140 case studies and included a meta-analysis with around 12 impact assessments from neighbouring Nordic countries.

The study concluded that opening data (among which location data is one of the most relevant categories) could bring added value of between 10 and 21 billion Swedish Krona.

<https://www.lantmateriet.se/sv/Om-Lantmateriet/Samverkan-med-andra/psi---regeringsuppdrag-till-lantmateriet/>

The set of parameters considered for the assessments in various countries is not extensive, even if it includes at least some intermediate measures (particularly reusability and availability) and outcome measures (such as user satisfaction, reduction in administrative burden and simplification of administrative processes).

The monitoring information is not generally used to guide funding and investment of initiatives, nor to assess maturity and benchmark performance of initiatives with other countries. However, some countries have launched comprehensive studies to evaluate the impact and benefits of location information.

Regarding [Recommendation 15](#), several countries have implemented or are planning to implement a systematic approach to communicating the availability and benefits of location data and location-enabled digital public services to raise awareness and understanding. Belgium, the Czech Republic, Denmark, Portugal, and Switzerland have adopted the corresponding practices extensively.

The cluster of high performers in this focus area (see [Figure 20](#)) is quite wide and composed of seven countries, above a larger cluster of middle performers and a smaller cluster of low performers.

Practices concerning performance monitoring of location information activities and implementation of impact-based improvements ([Recommendation 14](#)) show the lowest maturity in this focus area (see [Figure 21](#)).

#### Measurement of the use and value creation of Denmark's Address Web API (DAWA)

The Danish Addresses Web API (DAWA) offers access to data and functionality relating to Denmark's Authoritative Addresses. The value of DAWA's address data was considered from two primary 'effect levels' (efficiency gains and innovation) and from the level of derived social benefits.

Efficiency gains were calculated using existing literature cases, knowledge about the actual use of DAWA and assessment of savings in a sample of organisations, including the value of DAWA as a key driver in the use of other data. The analysis was accompanied by a sensitivity assessment to evaluate its degree of trustworthiness.

[https://sdfc.dk/media/292002/0/dawa\\_rapport-004-002.pdf](https://sdfc.dk/media/292002/0/dawa_rapport-004-002.pdf)

#### Danish Portal on Use Cases of Geographical Information

Brugstedet.dk is a common communication platform for the Danish geo-data domain, focusing on the use of geographical information. It was established in 2012 and serves as a communication and marketing platform, providing access to ideas, solutions and examples.

<http://brugstedet.dk/>

**IGNfab**

IGNfab, the geoservices project accelerator set up by France's IGN, aims to help SMEs and start-ups to develop innovative products and services using the description of the territory and geolocation.

Support through IGNfab lasts one year, during which IGN advises and helps the participants in the programme in the development of their project, providing technical expertise and access to its developers, as well as ad hoc training according to their needs, giving access to IGN data, development platforms and specific materials, in a dedicated space of 200m<sup>2</sup>.

Finally, participants benefit from access to IGN's institutional and commercial network.

<https://www.ign.fr/ignfab>

The overall good alignment with [Recommendation 16](#) is due to several factors. Firstly, most countries have adopted policies supporting the private sector's reuse of public sector location information. Secondly, they have implemented various measures to make searching, finding and accessing location data and services as easy as possible for the needs of different users. Thirdly, private, non-profit and academic actors are supported in the development of new solutions and services in various ways: besides the more frequent hackathons and training in skills necessary to better exploit the SDI, there are also, for example, in a few cases the establishment of innovation labs/hubs and some form of government sponsorship of 'innovation' pilot projects.

**3.5.2 2019/2020 Comparison**

The increase of the index in the *Return on Investment* focus area for the 10 countries participating in both years is driven by the increases registered first of all for Austria, Portugal and Slovenia (all having significantly improved their approach to communication and promotion of benefits from location information), and to a much lesser extent for Denmark and the Czech Republic (see [Figure 22](#)). Specific areas of improvements have been encountered also in other countries.

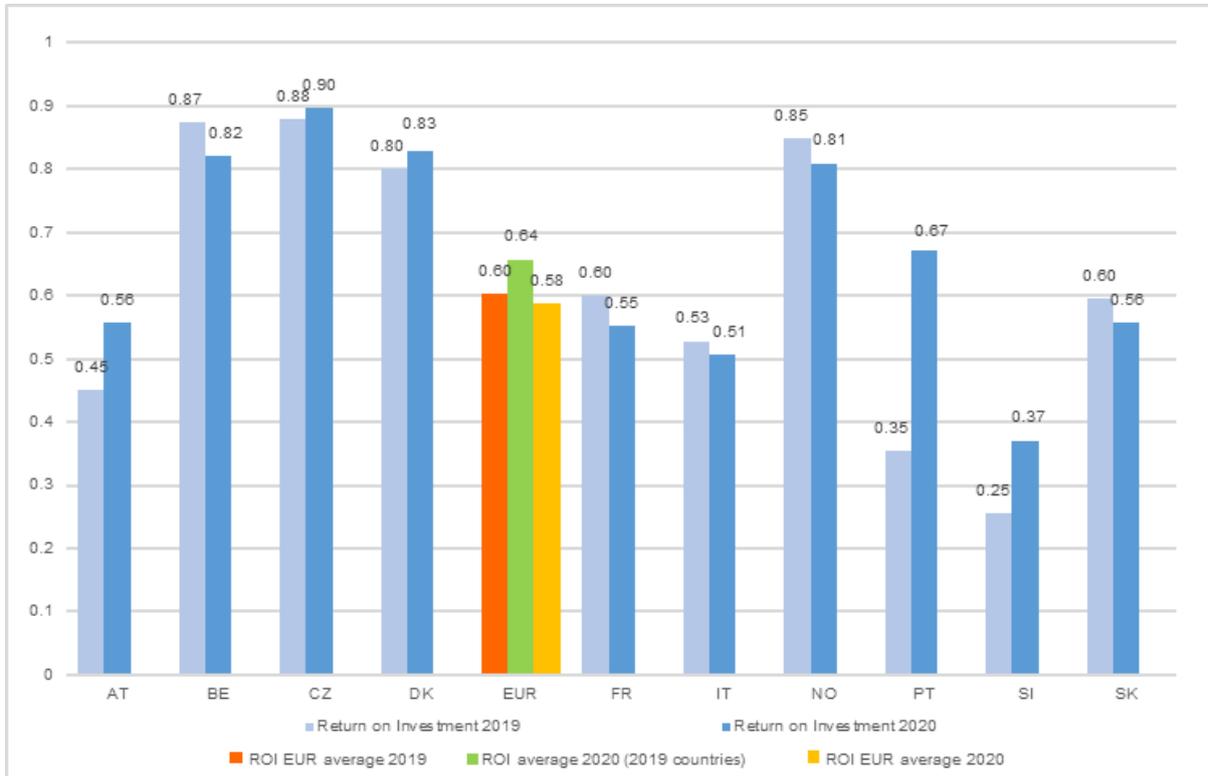


Figure 22 - Return on Investment focus area scores by country – 2020 vs 2019

The average of the additional 13 countries has offset the progress of the 10 countries participating in both years (7 out of 10 countries with the lowest scores are new participants), resulting in the average for the whole group of 23 participating countries going slightly down, from 0.60 to 0.58.

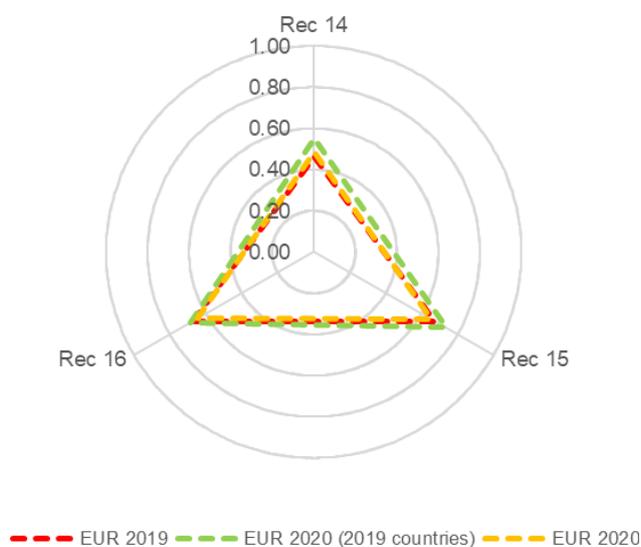


Figure 23 - Return on Investment scores by recommendation – 2020 vs 2019

In terms of recommendations (see [Figure 23](#)), the increase of the focus area index for the 10 countries participating in both years is mostly linked to the higher score under [Recommendation 14](#).

All practices under [Recommendation 14](#) (methods and scope of performance monitoring, impact-based improvement) have seen some improvement. However, this has not raised the recommendation index significantly, and it remains the lowest in this focus area. The additional participating countries have partially offset the positive impact on the overall average of the 23 countries.

The slight increase for [Recommendation 15](#) is mainly due, as mentioned before, to the progress made by Austria, Portugal and Slovenia. The majority of the additional participating countries are positioned at or below the level of the 2019 average, resulting in the average recommendation score for 2020 decreasing against the year before.

[Recommendation 16](#) has also seen a slight increase of the index, mostly linked to the progress made by France and Belgium. The average score of the whole group of 23 countries has, on the contrary, seen a slight decrease compared with 2019, and is also offset by the additional participating countries.

### 3.6. Governance, Partnerships and Capabilities

Vision	
	<p>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.</p>
<a href="#">Recommendation 17</a>	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
<a href="#">Recommendation 18</a>	Partner effectively to ensure the successful development and exploitation of Spatial Data Infrastructures
<a href="#">Recommendation 19</a>	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

#### 3.6.1 2020 Results

As mentioned in the [Overview](#), this is the focus area with the lowest alignment with the target state described in the EULF Blueprint. All countries obtain, in general, lower scores than those they obtain in the other focus areas (see [Figure 24](#)). The gap between top and low performers is also the widest of all five focus areas.

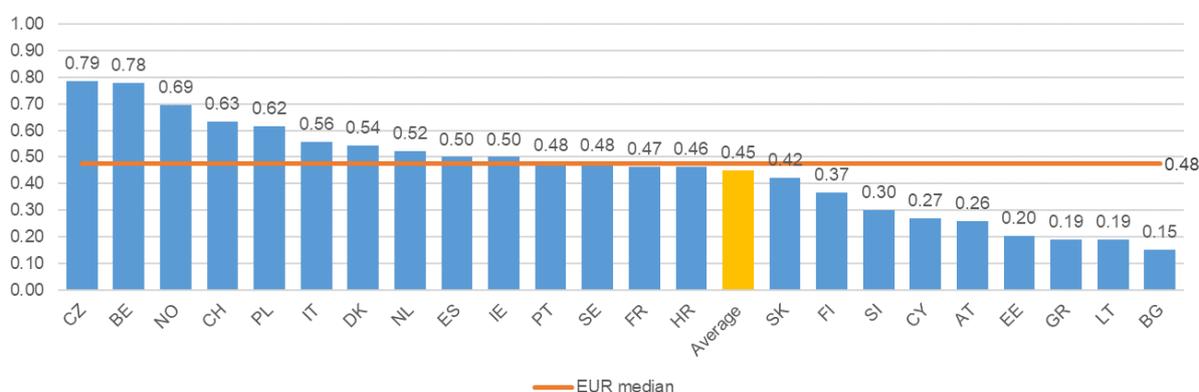


Figure 24 - Governance, Partnerships and Capabilities focus area scores by country

The current state for this focus area shows that:

- There are examples of well-organised governance of location information in the context of digital government; however, in general, such governance does not effectively involve all relevant stakeholders within and outside of the public administration;
- Cross-government agreements between public authorities for financing, building, and operating location data services or digital public services using location data within each country are quite frequent; such agreements are much less frequent in cross-border contexts; public-private partnerships are also scarce;

- While the range of initiatives taken to build awareness on geospatial matters in several countries is relatively extensive, a few countries are positioned significantly below the average. An important factor is that there is no strategic approach to building the skills necessary to drive through improvements in the use of location information in digital public services and to support growth opportunities in most countries.

Although the average score is not particularly high for [Recommendation 17](#), there are some good examples of integrated governance of location information processes, at the national and subnational level, between the bodies leading and coordinating the digital government and the implementation of the SDI.

The best examples of joint governance involving all relevant stakeholders and communities can be found in Belgium, the Czech Republic, the Netherlands and Switzerland as the top cluster, immediately followed by Denmark, France, Norway and Spain.

In most participating countries, there is still room for more effective involvement of different communities, administrative levels and sectors in decision-making on the role of location information in digital government through a well-established governance framework.

Findings on [Recommendation 18](#) indicate that most participating countries have not implemented formal partnership agreements to manage and exploit SDIs. However, some countries have established formal agreements between public authorities for financing,

#### Norway digital

Norway digital is a collaboration framework between organisations that are responsible for providing location information and / or major users of such information. The partnering bodies are municipalities, counties and national agencies that are suppliers and users of geographical data and online services. Norway digital is regulated by common technical and administrative obligations based on the Geodata Act and common agreed requirements.

<https://www.geonorge.no/Geodataarbeid/Norge-digital/>

building and operating a good number of location data services or digital public services using location data, namely Belgium, Czech Republic, Denmark, the Netherlands, Norway, Sweden, and Switzerland. A few countries have also established cross-border agreements for

#### Czech NSDI governance

Coordination of the role of the NSDI in the Czech digital strategy is ensured by the Working Group for Geospatial Information (PVPI) within the Government Council for Information Society (RVIS), an inter-ministerial body coordinating the strategy on information society development.

The PVPI manages and coordinates the implementation of the Action Plan for Digital Economy under location aspects, as well as the development of the NSDI. The PVPI shares most of its members with KOVIN, the national coordination body for INSPIRE, an advisory body of the Ministry of Environment, which comprises more than 25 member bodies at central and local level (central authorities, the Union of towns and municipalities, the Association of Regions, the Czech Association for Geoinformation, etc.).

KOVIN includes technical working groups composed of experts appointed by its member bodies to support the process of putting INSPIRE into practice in the Czech Republic with their knowledge and experience. Working groups are open and all relevant entities, including those from the private sector, can apply for membership.

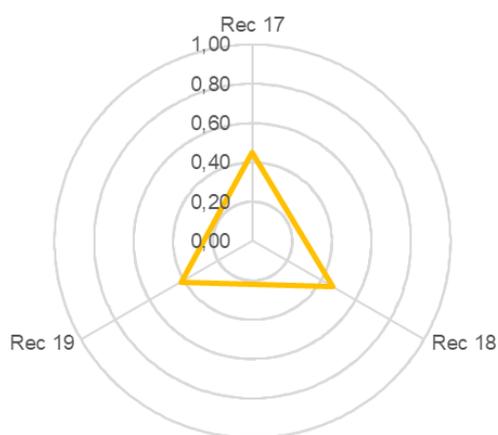
<https://bit.ly/32IQVMo>

<https://geoportal.gov.cz/web/guest/kovin>

#### Linking Alps

The LinkingAlps project, with partners from Austria, France, Germany, Italy, Slovenia and Switzerland, aims to foster the shift towards low carbon mobility options in public transport, including railways and alternative modes of transport like on-demand transport. The aim is to use innovative tools and transnationally aligned strategies to link travel information providers, offering seamless mobility chains for passengers. Travel information services across borders, operators and modes of transport will be shared among project partners to offer the best option for the end user. This includes pilot activities and tests for a decentralised, transnational journey planning system.

<https://www.alpine-space.org/projects/linkingalps/en/home>



*Figure 25 - Governance, Partnerships and Capabilities scores by recommendation*

#### Geographic Information professional profiles

This Italian technical standard defines the profiles of professionals operating in the geographic information sector, both in public and private organisations.

The technical standard (the first and only one in Europe so far) is built on top of the competencies defined within the European e-Competence Framework (deployed in Italy with the norm UNI EN 16234-1) and complementing for the geospatial domain the list of typical roles identified in that framework and performed by ICT professionals in any organisation.

<http://store.uni.com/catalogo/index.php/uni-11621-5-2018.html>

There are, however, a few selected best practices: Italy has established a geospatial competency framework as part of a broader ICT framework; and Slovakia has implemented a concept to develop soft skills on location interoperability (communication, culture, expertise), framing them with organisational, data, technology and standards components.

The average maturity of the approaches to geospatial training and awareness-raising is

relatively limited: while a few countries have set up quite an extensive array of initiatives to raise awareness on geospatial matters, most of them have adopted only a few initiatives, thus bringing down the average score on this indicator.

location data services or location-enabled digital public services. These are Cyprus, the Czech Republic, France, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland. On the other hand, public-private partnerships are not found to the same degree.

**Recommendation 19** gets the lowest score of all EULF Blueprint recommendations. This acknowledges the fact that geospatial training or awareness-raising is in most cases not part of a recognised or accredited competency framework but rather addresses ad-hoc needs.

#### ESPUS

The Slovak ESPUS (Effective management of spatial data and services) project focuses on "soft skills" support for INSPIRE implementation in synergy with eGovernment.

ESPUS provides an organisational and methodological framework for effective spatial data management and expert capacity support, including:

- methodologies for management and monitoring of spatial data and services;
- harmonisation of spatial data and services;
- realisation of use cases;
- awareness raising.

<http://inspire.gov.sk/projekty/espus>

### 3.6.2 2019/2020 Comparison

While the index for this focus area is still the lowest of all five, there has been some progress between 2019 and 2020, with improvements registered in most countries, particularly in Portugal, Norway and Belgium (see [Figure 26](#)). Portugal has started implementing agreements with other countries and public-private partnerships to exploit location-enabled services and has significantly improved the offer of training and awareness-raising activities. Norway has reinforced the coordinated leadership on actions and policies related to the role of the SDI in Digital Government and has also extended the offer of training activities. On training, Belgium has increased the degree of adoption of the geospatial competency framework and implemented some additional types of initiatives to raise awareness and develop geospatial skills. The focus area score for the whole group of 23 countries has, however, basically

remained the same as in 2019, showing that the 13 new participating countries have obtained average lower scores than the 2019 participants.

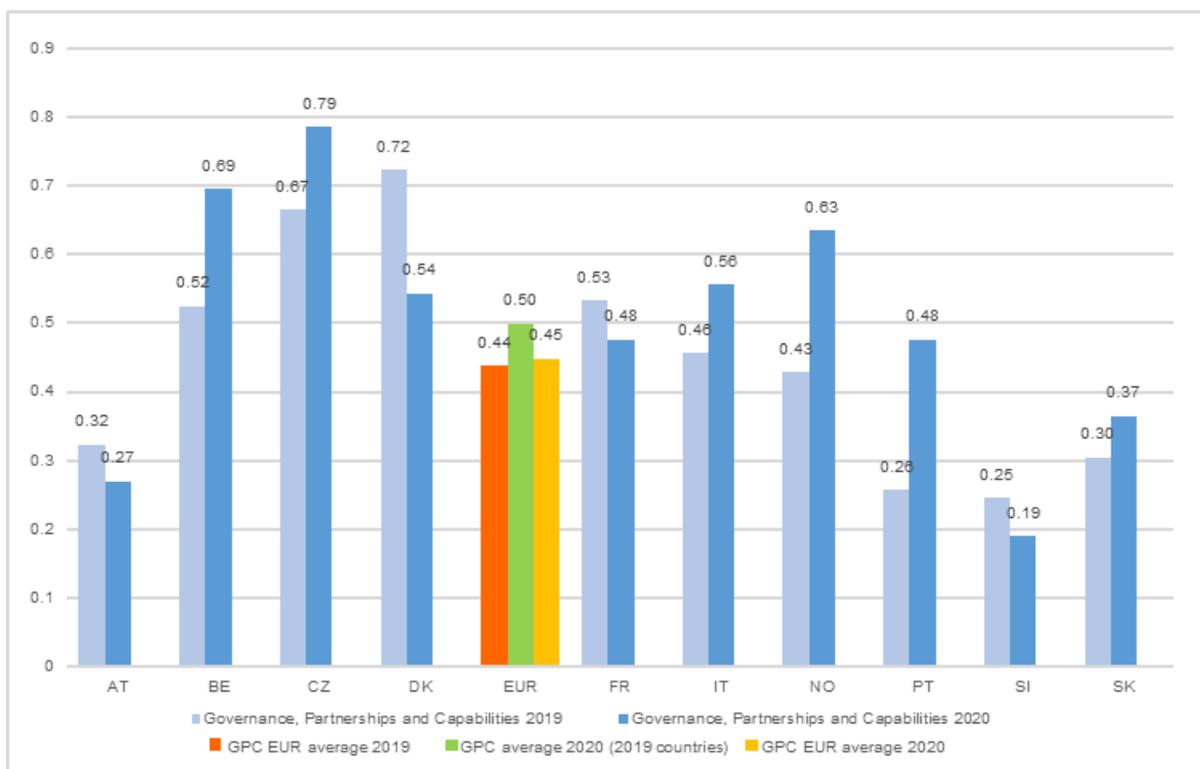


Figure 26 - Governance, Partnerships and Capabilities focus area scores by country - 2020 vs 2019

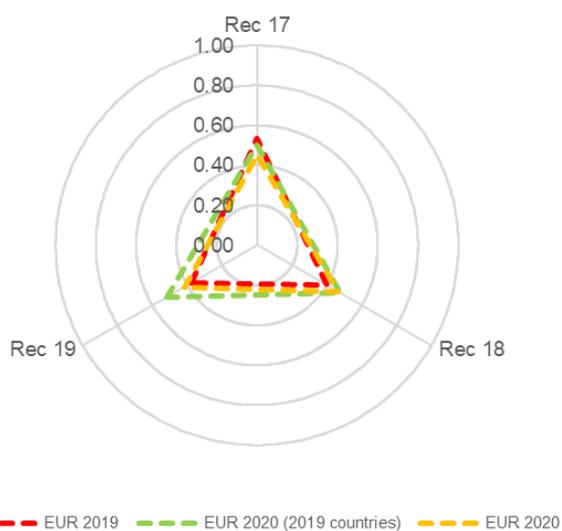


Figure 27 - Governance, Partnerships and Capabilities scores by recommendation – 2020 vs 2019

Results by recommendation are shown in [Figure 27](#). The index for [Recommendation 17](#) has been a negatively impacted by the recalibration of the indicator on the joint governance of the organisations respectively in charge of the SDI and of e-Government; this indicator now better reflects the actual state of play. The new participating countries are also positioned on average below the 2019 recommendation index.

The implementation of public-private partnerships, although still limited, has seen the largest progress of all practices under [Recommendation 18](#), positively impacting the recommendation index. Also, the new participating countries have reported more

mature practices on average than those reported in 2019 by the 10 original participating countries.

Finally, there has been an improvement under [Recommendation 19](#) for the 10 countries participating in both years, linked with the more frequent adoption of a strategic framework to implement geospatial training and awareness-raising activities. Although to a minor extent, the score has also benefited from a more extensive array of initiatives in this domain than in 2019. The 13 new participating countries have also contributed, making the 2020 average of the whole group of 23 countries higher than the 2019 average.

## List of abbreviations and definitions

### Abbreviations

Abbreviation	Meaning
AI	Artificial intelligence
API	Application Programming Interface
DAWA	Denmark's Addresses Web API
ECDIS	Electronic Chart Display and Information System
EIF	European Interoperability Framework
EIRA	European Interoperability Reference Architecture
ELISE	European Location Interoperability Solutions for e-Government
ESPD	European Single Procurement Document
ESPUS	Efficient Spatial Data and Services Management (Effecting správa priestorových údajov a služieb)
EU	European Union
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
ICT	Information and Communication Technology
IGN	French National Geographical Institute (Institut Géographique National)
INSPIRE	Infrastructure for Spatial Information in the European Community
ISA <sup>2</sup>	Interoperability Solutions for European Public Administrations, Businesses and Citizens Programme
ISO	International Standard Organisation
KOVIN	Coordination committee for INSPIRE (Koordinační výbor pro INSPIRE)
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
PVPI	Working Committee on Spatial Information (Pracovní výbor pro prostorové informace)
RVIS	Government Council for Information Society (Rada vlády pro informační společnost)
SDI	Spatial Data Infrastructure
SME	Small-medium enterprise
UNI	Italian National Unification Organisation (Ente nazionale italiano di unificazione)

## 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.	<a href="#">Application Programming Interface   Joinup (europa.eu)</a>
Authentic data	Data that provides an accurate representation of reality with quality parameters that are fit for the intended purposes.	<a href="#">Authentic data   Joinup (europa.eu)</a>
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.	<a href="#">Authoritative data   Joinup (europa.eu)</a>
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.	<a href="#">High Value Dataset   Joinup (europa.eu)</a>
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.	<a href="http://ggim.un.org/meetings/GGIM-committee/documents/GGI-M5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf">http://ggim.un.org/meetings/GGIM-committee/documents/GGI-M5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf</a>

Term	Meaning	Link
Digital government	Government designed and operated to take advantage of information in creating, optimising, and transforming, government services.	<a href="#">Digital government   Joinup (europa.eu)</a>
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	<a href="#">Commission Implementing Regulation (EU) 2016/7 of 5 January 2016</a>
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.	<a href="#">Evidence-based policy making   Joinup (europa.eu)</a>
GeoDCAT-AP specification	Data Catalogue vocabulary (DCAT) Application Profile extension for describing geospatial datasets, dataset series, and services.	<a href="#">GeoDCAT-AP   Joinup (europa.eu)</a>
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.	<a href="#">LIFO Guidelines and Recommendations</a>

Term	Meaning	Link
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.	<a href="https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/document/recommendation-6">https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/document/recommendation-6</a>
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	<a href="#">LIFO Guidelines and Recommendations Unlocking the Power of Location: The UK's geospatial strategy 2020 to 2025</a>
Location-enabled services	Services provided by public authorities which depend on effective management or use of location information.	<a href="https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117551/jrc117551_eulf_blueprint_v4.0.pdf">https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117551/jrc117551_eulf_blueprint_v4.0.pdf</a>
Location information	Any piece of information that has a direct or indirect reference to a specific location or geographical area, such as an address, a postcode, a building or a census area. Most information from diverse sources can be linked to a location. This term can be interchanged with spatial, geospatial, place or geographic information.	<a href="https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117551/jrc117551_eulf_blueprint_v4.0.pdf">https://publications.jrc.ec.europa.eu/repository/bitstream/JRC117551/jrc117551_eulf_blueprint_v4.0.pdf</a>
Location information strategy	A strategic approach for managing and maximising the value of location information.	<a href="#">Location information strategy   Joinup (europa.eu)</a>
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 non-contributors alike. Prominently used for the development of open source software.	<a href="https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1096442">https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1096442</a>
OpenAPI	Specification for machine-readable interface files for describing, producing, consuming, and visualising RESTful web services.	<a href="https://swagger.io/specification/">https://swagger.io/specification/</a>

Term	Meaning	Link
Open licence	An open licence is a way for the copyright holder (creator or other rightsholder) 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.	<a href="https://ec.europa.eu/programes/erasmus-plus/programme-guide/part-c/important-contractual-provisions/open-licence-intellectual-property-rights_en">https://ec.europa.eu/programes/erasmus-plus/programme-guide/part-c/important-contractual-provisions/open-licence-intellectual-property-rights_en</a>
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	<a href="https://docs.oracle.com/javase/6/tutorial/doc/gijqy.html">https://docs.oracle.com/javase/6/tutorial/doc/gijqy.html</a>
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).	<a href="https://inspire.ec.europa.eu/call-facilitators-%E2%80%93-thematic-clusters/50">https://inspire.ec.europa.eu/call-facilitators-%E2%80%93-thematic-clusters/50</a>
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'.	<a href="https://spatialdata.europa.eu/">Spatial Data Infrastructure   Joinup (europa.eu)</a>

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## Annex 1: LIFO 2020 Scoring methodology

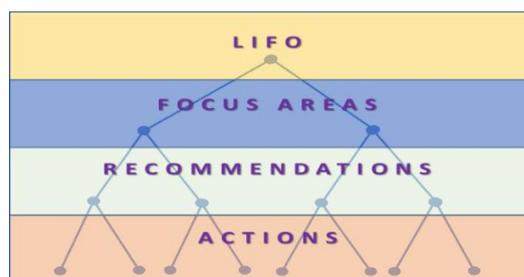


Figure 28 – Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*<sup>23</sup>, is based on a hierarchy of indicators and indexes, as represented in [Figure 28](#): from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

**(Action) Indicators:** A number of actions<sup>24</sup> 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.

<sup>23</sup> [https://joinup.ec.europa.eu/sites/default/files/inline-files/2020\\_LIFO\\_Guidelines\\_2.pdf](https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf)

<sup>24</sup> 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 through specific 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 policymaking	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 the 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: <ul style="list-style-type: none"> <li>- Availability of spatial data and services</li> <li>- Conformity of metadata</li> <li>- Conformity of spatial data sets</li> <li>- Accessibility of spatial data sets through view and download services</li> <li>- Conformity of the network services</li> </ul>	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 the delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by the private sector and other	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of	

	organisations (e.g. NGOs)	'new and innovative' applications, products and services?	
<b>Recommendation 8</b>			
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 the 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
<b>Recommendation 9</b>			
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?	

<b>Focus Area: Standardisation and Reuse</b>			<b>Changes vs 2019</b>
<b>No.</b>	<b>Indicator</b>	<b>Question</b>	
<b>Recommendation 10</b>			
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 the 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
<b>Recommendation 11</b>			
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?	
<b>Recommendation 12</b>			
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 the INSPIRE network services with Regulation (EU) No 108/2010 (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate the discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in 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)	
<b>Recommendation 13</b>			
Q13.1	Approach to location data quality	What actions are typically implemented to assure the 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?	

<b>Focus Area: Return on Investment</b>			<b>Changes vs 2019</b>
<b>No.</b>	<b>Indicator</b>	<b>Question</b>	
<b>Recommendation 14</b>			
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: <input type="checkbox"/> At a project or service level <input type="checkbox"/> At an organisational level <input type="checkbox"/> At an SDI / national level <input type="checkbox"/> 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 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	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?	

	location data services		
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?	
<b>Recommendation 19</b>			
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<sup>25</sup>, with the aim to improve the capability of the LIFO analytical model to consistently represent the state of play of location interoperability at the 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;

<sup>25</sup> 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>

- **“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 could 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 could be selected.

## Annex 3: LIFO 2020 Additional information: Europe

Title	Attachment <sup>26</sup>
LIFO survey questionnaire 2020 – scores and charts	 LIFO 2020 scores and charts EUR

FOCUS AREA	EUR 2020 v EUR 2019			EUR 2020 v EUR 2020 (only 2019 countries)		
	EUR 2019	EUR 2020	+/-	EU 2020	EUR 2020 (2019 countries)	+/-
Policy and strategy alignment	0.57	0.62	0.05	0.62	0.68	0.06
Digital government integration	0.54	0.57	0.03	0.57	0.59	0.02
Standardisation and reuse	0.54	0.55	0.01	0.55	0.62	0.07
Return on investment	0.60	0.58	-0.02	0.58	0.64	0.06
Governance, partnerships and capabilities	0.44	0.45	0.01	0.45	0.49	0.04
LIFO INDEX	0.54	0.55	0.01	0.55	0.60	0.05

<sup>26</sup> 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. Data can be also be explored interactively in the [LIFO Interactive Dashboards](#).