



# LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET

ESTONIA



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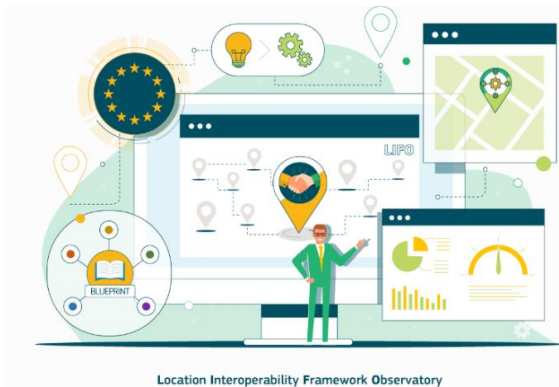
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# 1. Introduction



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 the 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.



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 using information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive<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 including, 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 alternatives, or apply the provisions only for specific aspects, must be read taking this into account.

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

LIFO results are published on Joinup (see [Figure 2](#)) in the form of *Country factsheets*<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.

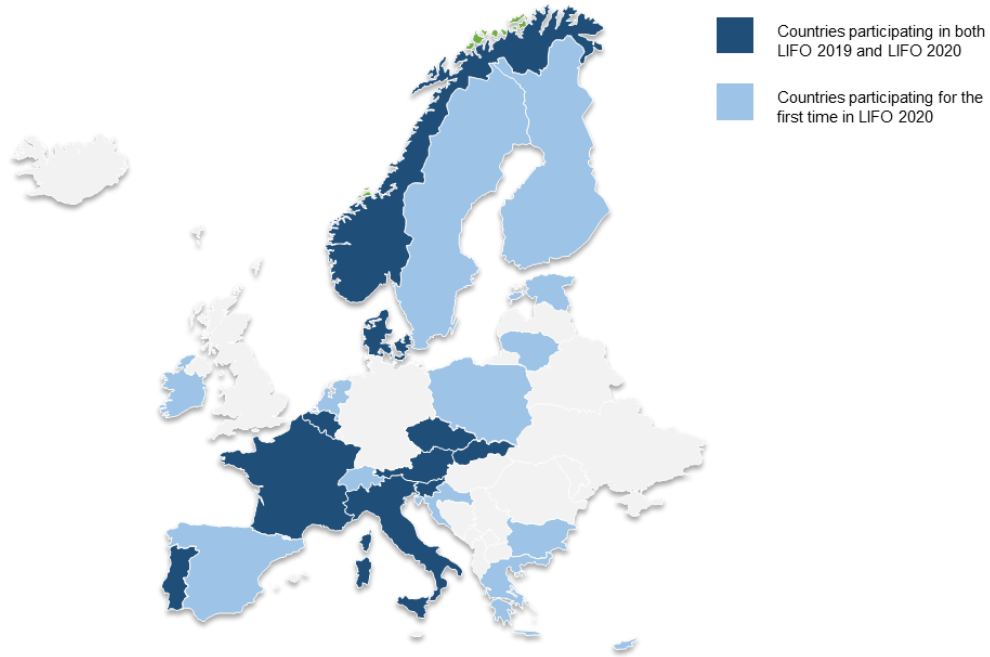


Figure 3 - LIFO participating countries in 2019 and 2020

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

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

- [Location Interoperability State of Play](#) where information is provided at two levels:
  - **Overview of results:** describes the location interoperability state of play in the country across all five focus areas, together with a summary chart and a table with the main strengths and weaknesses;
  - **Detailed results by focus area:** organised in five sections; while the overview section gives a bird's eye view of the status across all focus areas, the focus area sections give a more detailed picture, with the vision and recommendations for the focus area, followed by an analysis of the state of play in the country for each of the recommendations. Two focus area charts are included, one displaying the average scores for each recommendation and the other the individual scores for the underlying indicators. In both charts, scores are compared with the average of the monitored countries. The titles of the charts are linked respectively to the table of recommendations in the focus area and to the relevant indicators in [Annex 2](#).
- [Best Practices:](#) This section highlights initiatives and applications provided as survey 'evidence' which demonstrate the adoption of EULF Blueprint good practices in one or more focus areas / recommendations.

Lists of [abbreviations and definitions](#), [figures](#) and [tables](#): These aid cross-referencing in the document.

Annexes to the document are:

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

The 2020 LIFO monitoring information for Estonia has been provided by the *Estonian Land Board*.

## 3. Location Interoperability State of Play

### 3.1. Overview

Estonia fares positively compared with the corresponding European averages in the “Policy and Strategy Alignment”, “Digital Government Integration” and “Return on Investment” focus areas but is positioned quite below the European averages in the “Standardisation and Reuse” and “Governance, Partnerships and Capabilities” focus areas. The gaps in the last two focus areas place the country somewhat below the European average in terms of overall location interoperability practices.

Among the points of strength, the country is particularly well positioned in the “Policy and Strategy Alignment” focus area, in line with the European average, especially thanks to the connection between the location information strategy and the digital government strategy ([Recommendation 1](#)).

The country is also well positioned under the “Return on Investment” focus area, where it even has an edge over the European average. This is due to the approach to performance monitoring of location-enabled digital public services ([Recommendation 14](#)) and to the approach to the communication of benefits of integrating and using location information in digital public services ([Recommendation 15](#)).

With respect to “Digital Government Integration”, the country is overall aligned with the European average. It has integrated efficiently the use of location data in digital government processes supporting G2G, G2B and G2C interactions. It has also adopted an integrated location-based approach in the collection and analysis of statistics on different topics ([Recommendation 9](#)).

Under the “Standardisation and Reuse” focus area, which presents the second lowest result for the country, gaps can be found under several recommendations, such as the limited use of APIs ([Recommendation 10](#)) and the use of ad-hoc metadata specifications ([Recommendation 12](#)).

The focus area where the country is placed the worst is “Governance, Partnerships and Capabilities”, where the gap with the European average is quite wide. There is very limited involvement of stakeholders in decision making on the role of location information in digital government ([Recommendation 17](#)). Another weakness is the lack of partnership agreements among public administrations to ensure the successful development and exploitation of spatial data infrastructures ([Recommendation 18](#)).

Specific gaps can also be found in other focus areas, such as the sub-optimal use of a standards based approach in public procurement of location information and services ([Recommendation 5](#)) or the lack of pan-government guidelines on the contribution of location data to the publication of public open data ([Recommendation 2](#)).

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*The LIFO index for Estonia combining the scores for all focus areas is 0.49. This is below the LIFO index European average, which is 0.55, due to gaps particularly in the “Standardisation and Reuse” and “Governance, Partnerships and Capabilities” focus areas.*

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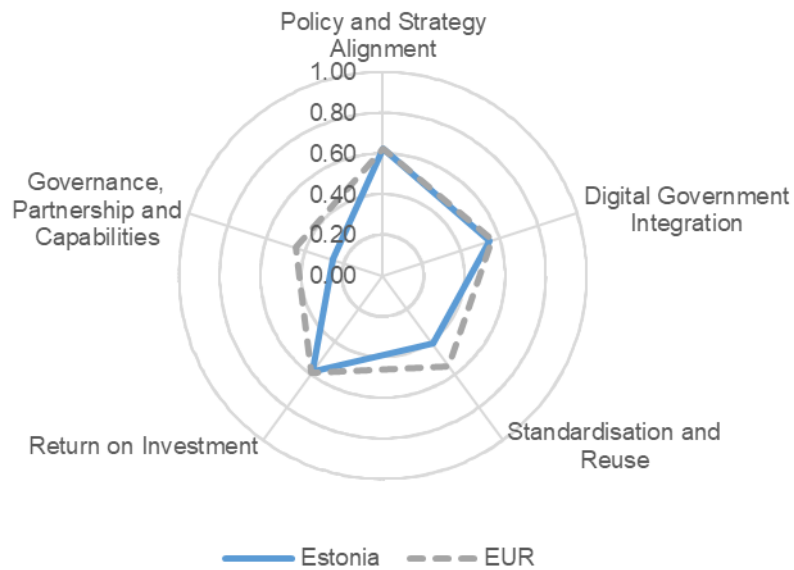





Figure 4 - Overall EULF Blueprint implementation

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

Focus Area	Strengths	Weaknesses
 <b>Policy and Strategy Alignment</b>	<ul style="list-style-type: none"> <li>Core location reference datasets are made available as part of a broader core reference data policy</li> <li>Location data is available under a common licensing framework</li> </ul>	<ul style="list-style-type: none"> <li>Pan-government guidelines on the publication of public sector data do not cover location aspects</li> <li>Sub-optimal approach to referencing of standards in the procurement of location data and related services in line with broader ICT standards based procurement</li> </ul>
 <b>Digital Government Integration</b>	<ul style="list-style-type: none"> <li>Efficient integration of the use of location data in digital government processes supporting G2G, G2B and G2C interactions</li> <li>Integrated location-based approach in the collection and analysis of statistics;</li> <li>Next census planned to be registry-based</li> </ul>	<ul style="list-style-type: none"> <li>Use of the SDI currently limited to environment and property / land administration sectors</li> </ul>
 <b>Standardisation and Reuse</b>	<ul style="list-style-type: none"> <li>There is a national catalogue of information systems and databases serving the public sector, including location information, with</li> </ul>	<ul style="list-style-type: none"> <li>Limited use of APIs</li> <li>Use of ad-hoc metadata specifications</li> <li>Limited array of actions to ensure the quality of location data</li> </ul>



Focus Area	Strengths	Weaknesses
	<p>registration in the catalogue a legal requirement.</p> <ul style="list-style-type: none"> <li>• Conformity of spatial data sets with Regulation (EU) No 1089-2010 and conformity of INSPIRE network services with Regulation (EC) No 976/2009.</li> </ul>	
 <p><i>Return on Investment</i></p>	<ul style="list-style-type: none"> <li>• Thorough and convincing communication on the benefits of integrating and using location information in digital public services</li> <li>• Wide range of measures to facilitate access to and reuse of location data and services for non-governmental actors</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of a strategic approach to funding public sector location reference data in order to make access at point of use cost effective</li> </ul>
 <p><i>Governance, Partnerships and Capabilities</i></p>	<ul style="list-style-type: none"> <li>• Training and awareness on geospatial skills undertaken by some organisations as part of a recognised geospatial competency framework or within a public sector ICT or data competency framework</li> </ul>	<ul style="list-style-type: none"> <li>• Limited or no involvement of non-governmental entities in joint decision making on SDI</li> <li>• Lack of partnership agreements between public administrations to develop and exploit the SDI</li> </ul>

Table 1 - Strengths and weaknesses by Focus Area

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

## 3.2. Policy and Strategy Alignment


Vision	
	There is an aligned and coordinated policy and strategic approach across Europe for the use of location information that enables more efficient and effective integration of cross-sector and cross-border location-based applications., reducing costs and increasing social and economic benefit. Public sector location policies promote accessibility and interoperability. There are simple and consistent approaches to licensing, progressive open data policies that balance the needs of data users and suppliers, and authentic registers in which 'location' has a prominent role.
<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

The scores for each recommendation in the "Policy and Strategy Alignment" focus area are shown in [Figure 5](#) and the underlying indicator scores for each recommendation are shown in [Figure 6](#). In both cases, the country scores are compared with the European averages.

The "Policy and Strategy Alignment" focus area index for Estonia is 0.62, aligned with the European average of 0.62.

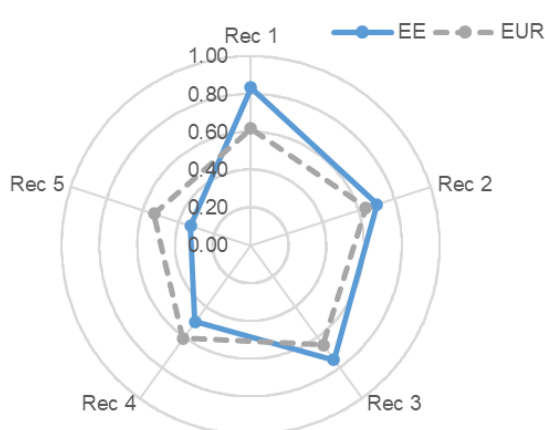


Figure 5 - Policy and Strategy Alignment - scores by recommendation

This is the result of:

- distinctive practices particularly under the strategic perspective of [Recommendation 1](#), and, to a lesser extent, under the location privacy aspect as defined under [Recommendation 3](#);
- weaknesses especially in the use of standards in location information and services procurement ([Recommendation 5](#)) and in the use of location information for policy making ([Recommendation 4](#)).

From a strategy perspective ([Recommendation 1](#)), Estonia reports a significant degree of alignment between

location and digital government elements<sup>18</sup>. The Spatial Data Act provides:

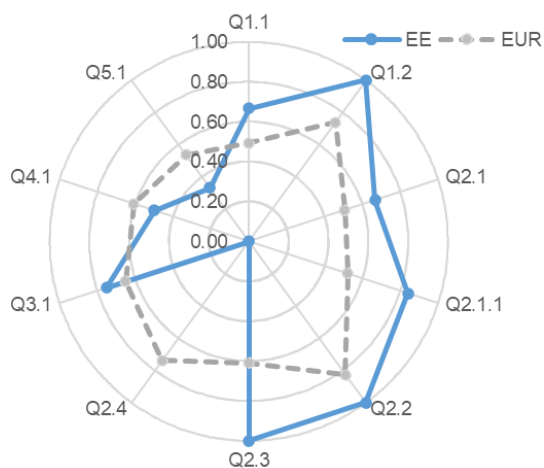
<sup>18</sup> The framework for digital government is provided by principles under which X-tee (<https://www.ria.ee/en/state-information-system/x-tee.html>), the data exchange layer for public information system, operates. The framework for the location strategy is provided by the Spatial Data Act (<https://www.riiqiteataja.ee/en/eli/ee/Riigikoju/act/526102020002/consolide>)

- the requirements for making available and sharing spatial data sets and services;
- the rules governing the geodetic system, the address data system as well as the acquisition and grant of use of topographic data;
- the framework coordinating the development of a spatial data infrastructure and organisation of reporting;
- the rules of administrative supervision over the establishment of location addresses and dealing with violations against the protection of geodetic marks.

Such requirements are aligned with the principles established for the exchange of data within the public sector.

The use of authoritative location datasets and services in digital government is mandated by legislation or binding agreements. The registration of databases and information systems in use in the public sector is mandatory and enforced by law. RIHA<sup>19</sup>, the Estonian catalogue of public sector information systems, is the register implemented for this purpose.

All public sector location datasets are available under a national licensing framework ([Recommendation 2](#)). The following location data are available through a non-restrictive open licence:



*Figure 6 - Policy and Strategy alignment – scores by indicator*

- addresses,
- administrative units,
- air quality,
- buildings,
- cadastral parcels,
- elevation,
- geographical names,
- hydrography,
- land cover,
- land use,
- statistical units,
- transport networks and timetables and
- weather observation.

A few other core location datasets can be used under minimum restrictions, such as health statistics, population distribution and demography, and protected sites. In these cases, restrictions are applied mostly to protect the privacy of people or for the protection of species under the nature protection legislation, while there are no restrictions for commercial use. The Spatial Data Act<sup>20</sup> provides the requirements to make spatial data sets and services available and therefore a regulatory framework clarifying the conditions for their sharing.

From a data protection perspective ([Recommendation 3](#)), controllers and processors of location data in the public sector are fully prepared for the GDPR and no location data related complaints have been raised so far.

Estonia uses location-based evidence and analysis in certain relevant policy topics ([Recommendation 4](#)). One example in the fiscal policy domain is the variable property tax approach, where the deductible amount on taxable land plots is higher in rural areas than in densely populated areas. In the environmental protection domain, Estonia uses satellite data and address references to subsidise farmers whose forests fall within the boundaries of natural

<sup>19</sup> <https://www.ria.ee/en/state-information-system/administration-system-riha.html>

<sup>20</sup> <https://www.riigiteataja.ee/en/eli/ee/Riigikogu/act/526102020002/consolide>

reserves. Geospatial information is also used for managing and coordinating Natura 2000<sup>21</sup>, a network of core breeding and resting sites for rare and threatened species and some rare natural habitat types which are protected in their own right. Natura 2000 forest areas are divided into zones with different levels of protection.

Lastly, public sector procurements of location information make only general references to INSPIRE or other standards but not to specific provisions ([Recommendation 5](#)). In general, the use of INSPIRE as a reference for public procurement is quite limited.

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<sup>21</sup> <https://elfond.ee/naturallyestlife/the-project/natura-2000>



### 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

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

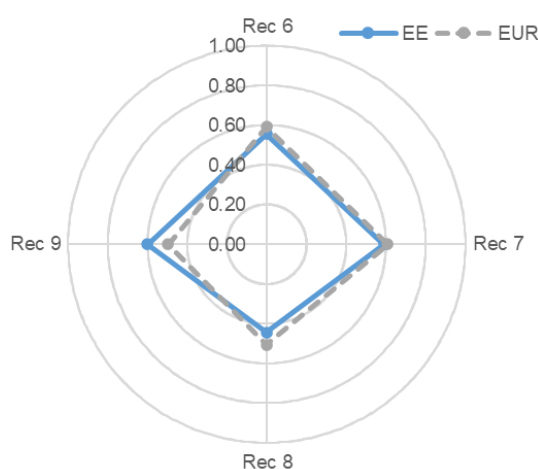


Figure 7 - Digital Government Integration - scores by recommendation

The "Digital Government Integration" focus area index for Estonia is 0.55, almost aligned with the European average 0.57. [Recommendation 6](#) and [Recommendation 7](#) are aligned with the European averages. [Recommendation 8](#) is slightly below, which is compensated by the above average score for [Recommendation 9](#).

A strong point for the country in this focus area is [Recommendation 9](#), where the scores are better than the European average due to the adoption of an integrated location-based approach in the collection and analysis of statistics on different topics<sup>22</sup>. Estonia has implemented many actions in this regard:

- an accurate and up-to-date knowledge base of where citizens and businesses are located;
- a common geospatial reference framework for statistics to enable timely, accurate and efficient production of location-based statistics;
- collection of census data based on the location reference framework for statistics;
- location-based statistics updated dynamically to give an up-to-date snapshot on which to make decisions;
- the spatio-temporal dimension of statistics is captured in a format that enables it to be used readily in a tool for geo-statistical analysis;
- relevant private sector data included in the statistical information infrastructure.

<sup>22</sup> See the possibility to search for statistical data over a country map at <https://estat.stat.ee/StatistikaKaart/VKR>

Statistics Estonia is permitted to use anonymised location data collected in the census. The next census in Estonia will be registry-based, so all the involved registries will have to use central address information system data for a successful census.

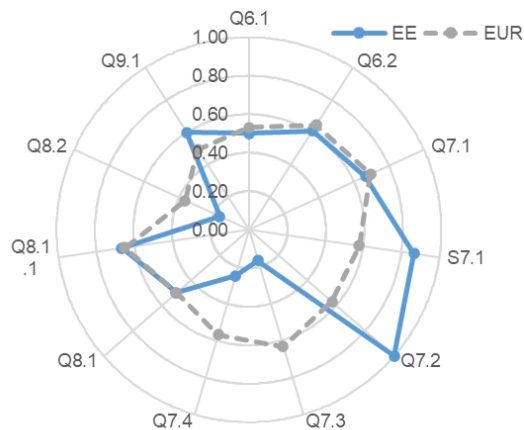


Figure 8 - Digital Government Integration – scores by indicator

There is an ongoing process of optimisation of key digital public services in their use of location information, either through service improvement or new business and delivery models ([Recommendation 6](#)). Transport<sup>23</sup> and property/land administration<sup>24</sup> are the two sectors where the use of location data in digital public services is reported as optimised. Disaster management<sup>25</sup>, civil protection and civil registry are other sectors with good examples of optimised use of location information.

The public sector currently prefers to use the national Spatial Data Infrastructure (SDI) over INSPIRE to deliver digital public services across

sectors and levels of government<sup>26</sup> ([Recommendation 7](#)). An example is the domain of property and land administration. Estonia uses a hybrid approach for delivering its digital public services, jointly exploiting application-specific spatial data, a sector SDI and the national SDI. The private sector only occasionally uses the public sector SDI to help deliver new and innovative applications, products and services.

Estonia is involved in delivering many cross-border digital public services using the SDI<sup>27</sup>, such as:

- X-Road<sup>28</sup>, a centrally managed distributed Data Exchange Layer (DXL) between information systems. Organisations can exchange information over the internet using X-Road to ensure confidentiality, integrity and interoperability between parties. It enables the nation's various public and private sector e-service information systems to link up and function in harmony. It has been developed into a tool that can also write to multiple information systems, transmit large data sets and perform searches across several information systems simultaneously. Today, it already enables information exchange and queries between the business and population registries of Estonia and Finland; it is also implemented in other countries such as Kyrgyzstan, Faroe Islands, Iceland and Japan.
- The smart city solution of Tallinn and Helsinki, involving Tallinn University of Technology (TalTech) in Estonia and Aalto University in Greater Helsinki, Finland. The two universities are undertaking research and developing cross-border innovation networks and capabilities in five domains – data, governance, mobility, energy, built environment – as well as advancing the joint smart city environment and services between the two cities.<sup>29</sup>

<sup>23</sup> <https://tarktee.mnt.ee/#/en>

<sup>24</sup> <https://xgis.maaamet.ee/xgis2/page/link/07WbBaqx>

<sup>25</sup> <https://xgis.maaamet.ee/xgis2/page/link/8GDzWPHM> and [https://xgis.maaamet.ee/maps/XGis?app\\_id=MA11AH5&user\\_id=at&LANG=1&WIDTH=980&HEIGHT=578&zlevel=0.552500.6505000](https://xgis.maaamet.ee/maps/XGis?app_id=MA11AH5&user_id=at&LANG=1&WIDTH=980&HEIGHT=578&zlevel=0.552500.6505000)

<sup>26</sup> See the services available through the national geoportal: <https://geoportaal.maaamet.ee/eng/Services-p40.html>. A full catalogue of services is available at <https://www.x-tee.ee/service-catalog>

<sup>27</sup> <https://geoportaal.maaamet.ee/eng/INSPIRE-services-p714.html>

<sup>28</sup> <https://e-estonia.com/solutions/interoperability-services/x-road/>; see also best practice [EE1](#)

<sup>29</sup> [Periodic Reporting for period 1 - FINEST TWINS \(Establishment of Smart City Center of Excellence\) | Report Summary | FINEST TWINS | H2020 | CORDIS | European Commission \(europa.eu\)](https://www.smartcitiesworld.net/news/news/helsinki-and-tallinn-progress-cross-border-smart-city-solutions-4042) and <https://www.smartcitiesworld.net/news/news/helsinki-and-tallinn-progress-cross-border-smart-city-solutions-4042>

Unlike the national level services, the majority of cross-border services are INSPIRE conformant.

At the local and national level, Estonia has adopted an open and collaborative approach to design and improve location-enabled digital public services ([Recommendation 8](#)). However, the private sector, NGOs and citizens have been only marginally involved in the process of developing and delivering location-based digital public services.

Cooperation with other parties is instead in place for data reuse: public authorities collect location data from external parties and make in turn their data openly available for external parties to develop their products and services. For example, the Estonian Land Board gathers address data in many ways and from diverse sources, including from delivery robots<sup>30</sup>, garbage collection, election registers, and more recently from vaccination lists. The Land Board is also a valid source for topographic data (included point cloud and orthoimagery), which is provided as open data via web map services (WMS) / web feature services (WFS).

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<sup>30</sup> <https://estonia.ee/delivery-robots-created-by-estonian-engineers-are-transforming-the-world/>

### 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 ISA2 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

The scores for each recommendation in the Standardisation and Reuse focus area are shown in [Figure 9](#) and the underlying indicator scores for each recommendation are shown in [Figure 10](#). In both cases, the country scores are compared with the European averages.

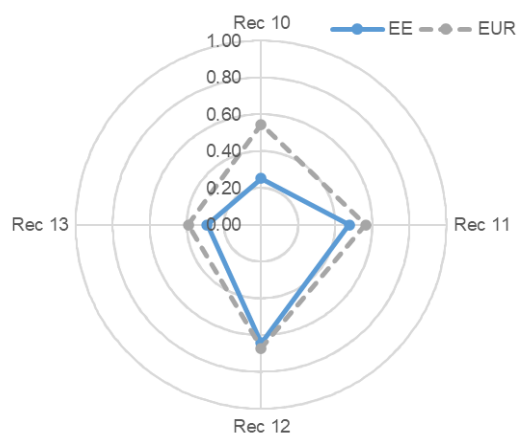


Figure 9 - Standardisation and Reuse – scores by recommendation

The “Standardisation and Reuse” focus area index for Estonia is 0.41, which is below the European average of 0.55. While Estonia is aligned with the other Member States regarding the reuse of existing solutions and in the application of relevant standards ([Recommendation 11](#) and [Recommendation 12](#)), there is a significant gap under [Recommendation 10](#), mostly due to the limited use of APIs to access location datasets, and another, smaller gap regarding location data quality management ([Recommendation 13](#)).

Estonian public administrations have implemented seven registers of location

information ([Recommendation 11](#)):

- addresses<sup>31</sup>;
- geographical names<sup>32</sup>;
- administrative units<sup>33</sup>;
- cadastral parcels<sup>34</sup>;
- buildings<sup>35</sup>;

<sup>31</sup> [Address Data | Geoportal | Estonian Land Board \(maaamet.ee\)](#)

<sup>32</sup> [Estonian Topographic Database | Geoportal | Estonian Land Board \(maaamet.ee\)](#)

<sup>33</sup> [Administrative and Settlement Division | Geoportal | Estonian Land Board \(maaamet.ee\)](#)

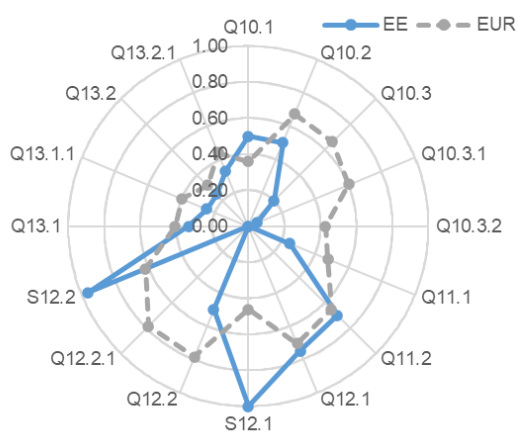
<sup>34</sup> [Cadastral Data | Geoportal | Estonian Land Board \(maaamet.ee\)](#)

<sup>35</sup> <https://livekluster.ehr.ee/ui/ehr/v1/>

- hydrography<sup>36</sup>;
- transport networks<sup>37</sup>.

These location information registers are published in RIHA, the Estonian catalogue of public sector information systems, which also offers significant opportunities for the reuse of solutions and data.

Estonia has planned and studied the possibility for re-using generic ICT solutions in the SDI, such as those designed by the ISA/ISA<sup>2</sup> programme, but actual reuse of any such solution has not yet been made.



*Figure 10 - Standardisation and Reuse - scores by indicator*

Estonia uses several geospatial standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate the integration of geospatial data in digital public services ([Recommendation 12](#)). These include international standards, adaptations of international standards (e.g. INSPIRE) and standalone domestic standards. Ad hoc specifications and tools are used for metadata to facilitate the discoverability of spatial and non-spatial data through joint access mechanisms.

Estonia performed well above the European average regarding conformity of spatial data sets with Regulation (EU) No 1089-2010 and conformity of INSPIRE network services with Regulation (EC) No 976/2009.

Maturity in terms of data quality actions and processes is reported as being relatively low ([Recommendation 13](#)). Estonia has implemented a limited set of actions to assure location data quality both at design and measurement level. There is however a data quality assurance guide for database owners<sup>38</sup> that applies as much to location data as to any other kind of datasets.

From a data quality governance perspective, the country has defined a data quality review process and implemented a collection of feedback from users to report problems to ensure data quality governance. Such feedback is collected through a collaborative platform and a community/discussion forum. A feedback mechanism is also embedded in the SDI data portals or catalogues of services.

The biggest area for improvement in Estonia is increasing access to data via APIs; only two core high value location datasets (weather observations and buildings<sup>39</sup>) can be accessed using APIs. For the other datasets, the use of APIs is still in the planning and testing phase ([Recommendation 10](#)). On the other hand, Estonia has adopted a common architectural approach for location data and services that fits within a broader national ICT framework, which facilitates the integration of geospatial requirements.

<sup>36</sup> [Keskkonnaregister 4.7.1.7 \(keskkonnainfo.ee\)](http://keskkonnaregister.4.7.1.7(keskkonnainfo.ee))

<sup>37</sup> [Teeregister \(mnt.ee\)](http://Teeregister(mnt.ee))

<sup>38</sup> [https://www.ria.ee/sites/default/files/content-editors/publikatsioonid/andmekvaliteedi\\_tagamise\\_juhend\\_andmekogu\\_omanikele.pdf](https://www.ria.ee/sites/default/files/content-editors/publikatsioonid/andmekvaliteedi_tagamise_juhend_andmekogu_omanikele.pdf)

<sup>39</sup> For the building dataset, there is an API for this registry, which still takes spatial data from the topographic registry.



New technological features or emerging technologies are monitored only on an ad-hoc basis, with little testing.

### 3.5. Return on Investment


Vision	
	There is a strategic approach to national and European funding, procurement, and delivery of location information and location-based services to minimise costs and maximise benefits for government, businesses and citizens, recognising best practices, and building on INSPIRE and standardisation tools. The funding and sourcing model for collection and distribution of core location data takes into account user needs from different sectors and the strategic importance of continued supply of data at a suitable quality. Procurement recognises INSPIRE and other standardisation tools in a meaningful way. There are compelling impact assessments and business cases, a rigorous approach to targeting and tracking benefits, and good evidence that benefits are being achieved.
<a href="#">Recommendation 14</a>	Apply a consistent and systematic approach to monitoring the performance of their location information activities.
<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

The scores for each recommendation in the Return on Investment focus area are shown in [Figure 11](#) and the underlying indicator scores for each recommendation are shown in [Figure 12](#). In both cases, the country scores are compared with the European averages.

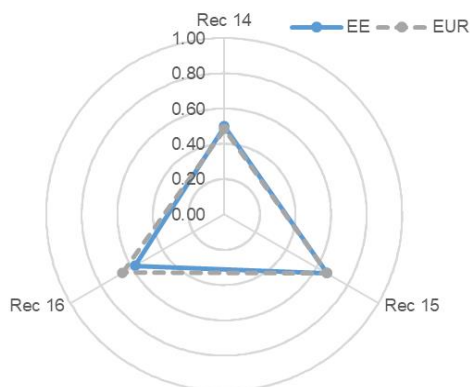


Figure 11 - Return on Investment - scores by recommendation

The "Return on Investment" focus area index for Estonia is 0.58, aligned with the European average of 0.58. [Recommendation 14](#) and [Recommendation 15](#) indexes are slightly above the corresponding European averages, while [Recommendation 16](#) index is slightly below.

A good practice is in conveying the benefits of integrating and using location information ([Recommendation 15](#)), where there is frequent, thorough and convincing communication through factsheets, news articles, web-based communication, videos and events to raise high awareness and understanding about location data and location-enabled digital public services.<sup>40</sup>

Estonia applies a systematic approach at organisation level (but not nationwide) to assess the efficiency and effectiveness of location-based services ([Recommendation 14](#)). The assessments consider a good number of dimensions such as: reusability, adaptability, availability, responsiveness, simplification of administrative processes, user satisfaction and user-centricity.

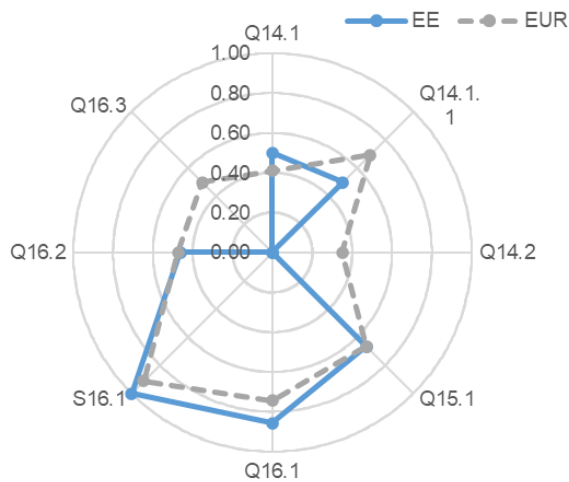
To stimulate innovation in products and services and enable job creation and growth, the country has implemented a wide range of measures to make the process of searching, finding

<sup>40</sup> See <https://www.facebook.com/maaamet.ee>; <https://www.youtube.com/watch?v=mZ52iuxdPAQ&t=4s>; <https://www.youtube.com/watch?v=w5oxcf9hp1g&list=PLqe0Fr6V2PLvJwqMi5wt-kjBn2EpAuUWQ>; <https://geoportaal.maaamet.ee/est/Kaardirakendus/Korduma-kippuvad-kusimused/Kaardirakenduste-kasutamise-videojuhendid-p475.html>

and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties ([Recommendation 16](#)), for example:

- a national open data portal merging location data and non-location data;<sup>41</sup>
- a national discovery geoportal integrating INSPIRE and non-INSPIRE data;<sup>42</sup>
- the geoportal is also harvested by the European Data Portal;
- thematic portals complementing general search facilities with “specialist” search such as the home pages of several local public administrations (although most of them use the national portal);
- websites with exposition of data;
- spatial data sets available on web search engines. It is possible to bookmark the geoportal from other portals. For example, an Estonian newspaper is using the Board's map application.

The country has also implemented policies supporting the reuse of Public Sector Information by the private sector. In this context, a variety of actions are undertaken to actively support private, non-profit and academic actors, to develop new products, services or research using public sector location data. These include:



*Figure 12 - Return on Investment – scores by indicator*

- promoting access to open data through hackathons<sup>43</sup>;
- 'innovation labs' or 'Innovation hubs';
- government sponsorship of 'innovation' pilot projects<sup>44</sup>, potentially with grants / funding;
- adding data and services from non-governmental actors<sup>45</sup> to the public sector (spatial) data infrastructure;
- collecting requirements of businesses, research institutions and other (potential) users for consideration in further development of INSPIRE or the national SDI;
- making public sector experts available to advise on / participate in the external use of data in the SDI.

However, there is no strategic approach for funding public sector location reference data to ensure access at point of use cost effective.

<sup>41</sup> <https://avaandmed.eesti.ee/>

<sup>42</sup> <https://geoportaal.maaamet.ee/>

<sup>43</sup> [https://www.facebook.com/watch/live/?v=10155068800607142&ref=watch\\_permalink](https://www.facebook.com/watch/live/?v=10155068800607142&ref=watch_permalink)

<sup>44</sup> <https://en.kratid.ee/kasutuslood>

<sup>45</sup> <https://maaamet.maps.arcgis.com/apps/webappviewer/index.html?id=e00da2ed011c4c7daa75669a804bd23a> and <https://xgis.maaamet.ee/xgis2/page/app/mahekaart>

### 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 location 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

The scores for each recommendation in the Governance, Partnerships and Capabilities focus area are shown in [Figure 13](#) and the underlying indicator scores for each recommendation are shown in [Figure 14](#). In both cases, the country scores are compared with the European averages.

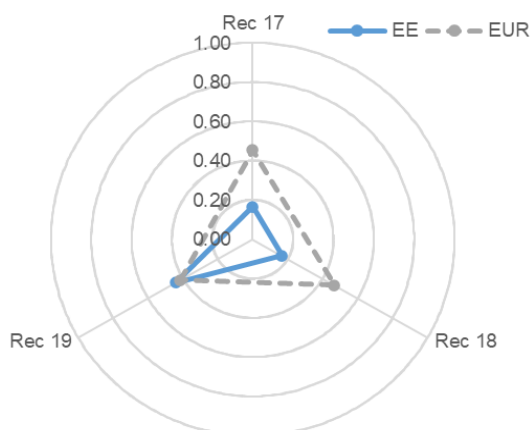


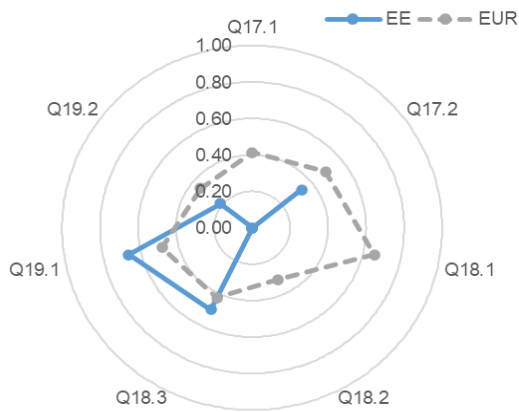
Figure 13 - Governance, Partnerships and Capabilities – scores by recommendation

The "Governance, Partnerships and Capabilities" focus area index for Estonia is 0.26, significantly below the European average of 0.45. [Recommendation 19](#) is aligned with the European average, but overall this is the focus area where the country obtains the lowest results.

Estonia's good positioning under [Recommendation 19](#) testifies to the engagement taken by the country in developing skills on the strategic role of location. Some organisations undertake training on geospatial skills as part of a recognised geospatial competency framework or within a public sector ICT or data competency framework. The

following initiatives have been organised to raise awareness and develop geospatial skills:

- location information / geospatial intelligence champions in individual organisations where location information plays a significant role;
- public or cross-government events specialising in location information / geospatial intelligence topics;
- online self-learning tools.



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

information in Digital Government. Some coordination between the organisation in charge of digital government (the Ministry of Economic Affairs and Communications) and the one in charge of the national SDI (the Estonian Land Board) is reported, although lacking strong integrated leadership.

Under [Recommendation 18](#) there is a gap relative to the European average due to the lack of formal partnership agreements between national public authorities or with public authorities in other countries to finance, build and operate location data services or digital public services using location data. However, some public-private partnerships have been established with this aim<sup>46</sup>.

[Recommendation 17](#) shows the highest deviation from the European average, indicating insufficient involvement of different administrative levels, sectors and of the most relevant communities in the decision making process concerning the role of location

<sup>46</sup> <https://www.maanmittauslaitos.fi/en>



## 4. Best practices

Best Practice EE1	X-Road
<b>Policy domain:</b> Cross-border service delivery	
<b>Process owners:</b> Nordic Institute for Interoperability Solutions	
<b>Short description:</b> X-Road® is an open-source software and ecosystem solution that provides unified and secure data exchange between organisations.	
The basic idea of X-Road is that members of an ecosystem exchange data through access points (Security Servers) that implement the same technical specifications.	
X-Road has been used to automate the data transfer between the population registers of Estonia and Finland, improving information accuracy and timeliness as well as increasing the efficiency and security of the data exchange process. This facilitates the identification of the citizens of one of the two countries in the other one, fostering cross-border mobility and economic development.	
The national business registers in Estonia and Finland are starting to exchange data and queries between each other, taking advantage of the opportunities given by X-Road.	
X-Road is a digital public good verified by the Digital Public Goods Alliance. It is released under the MIT open source licence and is available free of charge	
<b>Recommendation:</b> <a href="#">Digital Government Integration</a> (7), <a href="#">Standardisation and Reuse</a> (11)	
<b>Link:</b> <a href="https://x-road.global/">https://x-road.global/</a>	

Best Practice EE2	Estonian catalogue of public sector information systems (RIHA)
<b>Policy domain:</b> Public Sector Information System	
<b>Process owners:</b> Estonian Information System's Agency	
<b>Short description:</b> RIHA, short for Riigi Infosüsteemi Haldussüsteem, is the Estonian catalogue of public sector information systems. It serves as the national registry of public databases, systems, components, services, data models, semantic assets, etc.	
RIHA facilitates Estonian information system planning and operation activities. The main goal of RIHA is to guarantee the transparent, optimal balance and efficient management of public sector information systems.	
RIHA supports the interoperability of databases, the life-cycle management of information systems and the re-use of data by providing complete and up-to-date metadata of Estonian public sector information systems. The registration of public databases and information systems on RIHA is mandatory and enforced by law.	
<b>Recommendation:</b> <a href="#">Policy and Strategy Alignment</a> (1), <a href="#">Standardisation and Reuse</a> (11)	
<b>Link:</b> <a href="#">Avaleht - Riigi infosüsteemi haldussüsteem RIHA</a>	

## List of abbreviations and definitions

### Abbreviations

Abbreviation	Meaning
API	Application Programming Interface
DCAT-AP	Data Catalogue vocabulary – Application Profile
DXL	Data Exchange Layer
EIF	European Interoperability Framework
ELB	Estonian Land Board
ELISE	European Location Interoperability Solutions for e-Government
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
INSPIRE	Infrastructure for Spatial Information in the European Community
ISA <sup>2</sup>	Interoperability Solutions for European Public Administrations, Businesses and Citizens Programme
LIFO	Location Interoperability Framework Observatory
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
PSI	Public Sector Information
RIHA	Riigi Infosüsteemi Haldussüsteem
SDI	Spatial Data Infrastructure
WFS	Web feature service
WMS	Web map service

## Definitions

Term	Meaning	Link
Application Programming Interface (API)	A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.	<a href="https://joinup.europa.eu/application-programming-interface">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="https://joinup.europa.eu/authentic-data">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="https://joinup.europa.eu/authoritative-data">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="https://joinup.europa.eu/high-value-dataset">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/GGIM5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf">http://ggim.un.org/meetings/GGIM-committee/documents/GGIM5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf</a>
Digital government	Government designed and operated to take advantage of information in creating, optimising, and transforming, government services.	<a href="https://joinup.europa.eu/digital-government">Digital government   Joinup (europa.eu)</a>

Term	Meaning	Link
ESPD	The European Single Procurement Document (ESPD) is a self-declaration by economic operators providing preliminary evidence replacing the certificates issued by public authorities or third parties. As provided in Article 59 of Directive 2014/24/EU, it is a formal statement by the economic operator that it is not in one of the situations in which economic operators shall or may be excluded; that it meets the relevant selection criteria and that, where applicable, it fulfils the objective rules and criteria that have been set out for the purpose of limiting the number of otherwise qualified candidates to be invited to participate. Its objective is to reduce the administrative burden arising from the requirement to produce a substantial number of certificates or other documents related to exclusion and selection criteria	<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>
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 information strategy	A strategic approach for managing and maximising the value of location information.	<a href="#">Location information strategy   Joinup (europa.eu)</a>

Term	Meaning	Link
Open and collaborative methodology	Any system of innovation or production that relies on goal-oriented yet loosely coordinated participants who interact to create a product (or service) of economic value, which they make available to contributors and noncontributors alike. Prominently used for the development of open source software.	<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>
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/programmes/erasmus-plus/programme-guide/part-c/important-contractual-provisions/open-licence-intellectual-property-rights_en">https://ec.europa.eu/programmes/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 Identifiers) 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="#">Spatial Data Infrastructure   Joinup (europa.eu)</a>



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## Annex 1: LIFO 2020 Scoring methodology

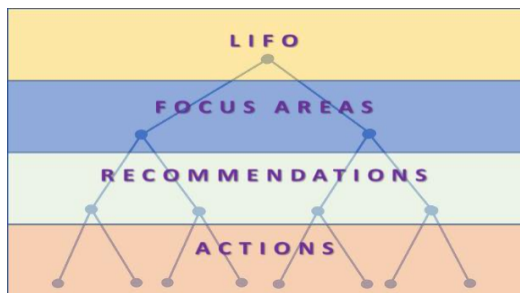


Figure 15 - Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*<sup>47</sup>, is based on a hierarchy of indicators and indexes, as represented in [Figure 15](#): from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

**(Action) Indicators:** A number of actions<sup>48</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>47</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>48</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 web services, specific legislation,).	

Recommendation 3			
Q3.1	Preparedness for GDPR under location aspects	How well-prepared are controllers and processors of public sector location data in your country for GDPR, including awareness of potential location data privacy issues and processes in place to comply with the rights of data subjects?	
Recommendation 4			
Q4.1	Use of location-based analysis for evidence-based policy making	Is location-based evidence and analysis used to help in developing relevant policies and monitoring outcomes?	
Recommendation 5			
Q5.1	References to INSPIRE and relevant standards in procurement documents	For public sector procurements of location information or services, what references are made to INSPIRE and relevant standards in the procurement documents?	

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

		<ul style="list-style-type: none"> <li>- Accessibility of spatial data sets through view and download services</li> <li>- Conformity of the network services</li> </ul>	
Q7.2	Use of SDI in cross-border services	Is the country actively involved in delivering cross-border digital public services using their spatial data infrastructure (SDI)?	Change in scale
Q7.3	SDI approach used	Please specify the main SDI approach used for delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by private sector and other organisations (e.g. NGOs)	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of 'new and innovative' applications, products and services?	
<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 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?	

Focus Area: Standardisation and Reuse			Changes vs 2019
No.	Indicator	Question	
<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 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 spatial data sets with Regulation (EU) No 1089/2010 (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in the question Q16.1?	New question
Q12.2.1	Use of specifications for combining spatial and non-spatial metadata	Where an approach to facilitate a joint discoverability of spatial and non-spatial data is adopted, what specifications and tools are used to a significant degree to combine spatial with non-spatial metadata in national implementations?	New question
S12.2	Conformity of the INSPIRE network services with INSPIRE implementing rules	Conformity of the INSPIRE network services with Regulation (EC) No 976/2009 (from INSPIRE monitoring)	
<b>Recommendation 13</b>			
Q13.1	Approach to location data quality	What actions are typically implemented to assure quality of location data in your country?	



Q13.1.1	Use of data quality standards	What data quality standard is applied to location data?	New question
Q13.2	Approach to location data quality governance	What type of actions relating to location data quality governance are put in place in your country?	
Q13.2.1	Collection of feedback from users	Where feedback is obtained from users, what approach is taken?	

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: <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 web services as easy as possible for companies, research institutions, citizens and other interested parties?	
S16.1	Existence of policies supporting the reuse of PSI	Existence of policies supporting the reuse of Public Sector Information by the private sector (from the Open Data Maturity Report)	
Q16.2	Support to the development of products and services by external parties	Which of the following actions are implemented in your country to actively support private, non-profit and academic actors in the development of new products, services or research using public sector location data?	Change of scale

Q16.3	Existence of a strategic approach to funding location reference data	Is there a strategic approach to funding public sector location reference data to make access at point of use cost effective?	
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Focus Area: Governance, Partnerships and Capabilities			Changes vs 2019
No.	Indicator	Question	
<b>Recommendation 17</b>			
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
<b>Recommendation 18</b>			
Q18.1	Use of formal agreements between public authorities in the country to operate location data services	To what extent do formal agreements exist between public authorities in the country to finance, build and operate location data services or digital public services using location data?	
Q18.2	Use of formal agreements to operate cross-border location data services	To what extent do formal agreements exist with public authorities in other countries to finance, build and operate cross-border location data services or digital public services using location data?	
Q18.3	Use of public-private partnerships to operate location data services	To what extent do public-private partnerships exist to finance, build and operate location data services or digital public services using location data?	
<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>49</sup>, with the aim to improve the capability of the LIFO analytical model to represent consistently the state of play of location interoperability at country and European level. The main changes, and the focus areas / recommendations impacted are:

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



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

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

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<sup>49</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>.

## Annex 3: LIFO 2020 additional information: Estonia

Title	Attachment <sup>50</sup>
LIFO Survey questionnaire 2020 – Estonia	 LIFO Survey 2020 Estonia
LIFO Survey questionnaire 2020 scores and charts – Estonia	 LIFO 2020 scores and charts Estonia

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<sup>50</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.